FINANCIAL PROFICIENCY OF WOMEN EMPLOYEES IN KERALA

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ABSTRACT

The purpose of this paper is to understand the financial proficiency of working women in Kerala. Overall financial proficiency is measured with Financial Literacy, Financial Self efficacy , Financial Attitude, Financial Planning Activity, Financial Risk Preference and Financial Advice Seeking. The researcher has used a structured questionnaire for data collection. Cross sectional field study was used and the respondents were 450 working women from private sector in the field of education, health and finance and insurance. SPSS was used for the study. Descriptive statistics and One sample Z test are used for the study. Women's financial literacy skills and confidence in financial planning is limited comparing to men and women are found to be less involved in financial planning actions. Hence identifying the financial literacy level of working women helps the financial planners to provide them with required financial advices. The findings suggest that the level of financial proficiency of women employees is medium.

Keywords: *Financial Literacy, Financial Self Efficacy, Financial Attitude, Overall Financial Proficiency, Working Women.*

Introduction

"Female labour force participation is a driver of growth and therefore participation rates indicates the potential for a country to grow more rapidly" (SherverickILO2014). Women participation in economic activity is a sign of economic development. According to Directorate of Employment Kerala 2016 report there are 385440 working women in organised private sector .Majority of the women employees are employed in larger establishments and there of the women in smaller establishments. The growth of private sector is so vital for a developing country like India. The participation rate of women in labour market was identified to be low and earn lower amount of wages. Majority of the women quit their career because of family responsibilities. Employees working in central and state government are eligible for a better pay scale and a well-structured pension system (SherverickILO2014). Employee provident Fund is the largest social security system working in India which is operated by Pension Fund and Regulatory Authority of India. EPF suffers from several dis advantages and hence employees working in private enterprises are motivated to purchase Life Insurance Policies for their post-retirement wellbeing. Retirement Planning is crucial for working women particularly for those women who are working in private sector. The purpose of the study is to identify the financial proficiency of working women of private sector in Kerala. Financial Literacy, Financial Self Efficacy and Financial Attitude, Financial Planning activity, Financial Risk Preference and Financial Advice Seeking are the variables used for measuring overall financial proficiency.

Literature Review

Glass & Kilpatrick (1998) in their study stated that baby boomers are required to plan for their future financial security. Information search behaviour of working women Plays a vital role in women's retirement savings behaviour as per Hsu (2016). According to Poongodi & Gowri (2016) women possess greater financial literacy skills and they are having good awareness about various investment opportunities. Hassan, Rahim Ahmad, Zainuddin, Merican, & Bahari (2016) in their study stated that choosing of Pension schemes and savings for future are made on a voluntary basis. Tan& Singaraveloo (2019) highlighted good financial literacy and financial behaviour among Malaysian Government employees and rated retirement planning behaviour as average among the government officers. Literature shows a lack of financial management among women and hence they face poverty issues after retirement Kumar, Tomar & Verma (2019). According to Pavia & Grima (2019) retirement planning behaviour of an Individual

depends upon the level of income after retirement.

The predicting role of financial literacy on retirement planning behaviour is discussed widely in personal finance literature. Lusardi & Mitchel (2011) in their working paper stated that woman who belongs to minority groups and lacks financial literacy. Financial Literacy has serious implications for retirement planning. Financial illiteracy is wide spread among both young and old individuals in United States and could be a major reason why most of the households approach retirement period within inadequate savings aspect Lusardi & Mitcheli (2007). In a study which is conducted in UK among men and women, lower level of preparation was identified especially among women and financial literacy was not a significant predictor of retirement planning behaviour (Behrman, Mitchel, Soo & Bravo (2012). Workers who are approaching the age of retirement face numerous problems and confusion about how to save for the post retirement period. The knowledge of the workers about the retirement plans offered by the company was minimal and even lacks confidence in selecting the convenient investment plans as per Clark, Morril, & Alen). The role of providing financial education to workers and its role in creation of wealth is highlighted in a study conducted by Lusardi, Michaud and Mitchel (2019). The relationship between financial literacy and financial behaviour in Thailand was explored in a study conducted by Ngamjan (2016) and reported that financial literacy is relatively high among the Thai people. But in contrast to financialliteracy70% of the Thai people were not under taking any planning activities for their future and it could have serious social implications. According to Lusardi, Michaud, & Mitchel (2017) financial literacy was identified to be a significant variable that ensures better allocation of one's resources for their future financial wellbeing. Moreover educated individuals are good in gaining more wealth from investing. In a study conducted by Fan & Chaterjee (2018), the major hurdle faced in making effective financial decision making is the poor knowledge about basic financial concepts. Knowledge about basic investing concepts improves the investing ability of the individuals. This emphasise the need to enhance financial literacy. Financial decision making is a complex task. The lack of awareness about basic financial complex makes financial decision making task even more complex. Financial literacy was found to have a significant positive relationship with retirement planning behaviour in Netherlands as per VanRooij, Lusardi, & Alessie (2011). In a study conducted by Lusardi & Mitchel (2017), the various sources of financial literacy skills are explored. Financial self efficacy is one of the core factors found to have impact on retirement planning behaviour. Lown, J.M. (2011) developed and validated a financial self efficacy scale. In a study conducted by Farrel, Fry, & Risse (2016) having Knowledge about financial concepts is not enough for taking effective financial decision. Apart from that possessing self confidence in handling financial matters is found to be significantly related to financial planning behaviour. Montford & Goldsmith (2016) stated that majority of women investors in United States are of conservative type. In contrast to men, a woman prefers investment opportunities that are of less risky in nature. Financial Self Efficacy was found to have a significant effect with the risk taking attitude of women investors in United States. Lown, Kim, Guter, &Hunt (2015) reported that the more self efficacy exists among lower and middle income households they are interested in saving activities. The decision to meet financial planners depends upon the self-efficacy of the individuals. The financial self efficacy level of an individual is a positive predictor off financial advice seeking as Reported by Letkiewicz, Domian, Robinson, & Uborceva (2014). According to Xiao, Chen, Chen (2014) enhancement of financial wellbeing among the consumers requires good financial knowledge, positive attitude towards risky financial decisions and higher financial self efficacy level. Asebedo, & Payne (2019) reported that financial self efficacy plays a significant role in making portfolio allocation decision of investors which ultimately leads to financial satisfaction.

Financial Self efficacy level influences the intention of an individual to participate in financial market. Chaterjee, Finke, & Harness

(2011). Gamst-Klaussen, Steel, & Svartdal (2019) highlighted that financial self Efficacy acts as a powerful mediator between procrastination and financial behaviour. The attitude of the young people to engage in regular savings plan was found to be related with one's own financial self efficacy level as per Engelberg (2007). Qamar, Khemta, &Jamil (2016) financial self efficacy was found to have a positive influence on personal finance management behaviour. More over financial self efficacy acts as a moderator between money attitude and personal finance management behaviour. In a study conducted by Neymotin (2010), self-esteem was found to have a strong influence with one's intention to indulge in financial planning activities. Financial self efficacy is positively related with financial inclusion among financial consumers in Uganda Mindra, Moya, Zuze, & Kodongo (2017).

Research Methodology

This study was conducted among 450 working women of private sector in Kerala. Working women in the field of education, health and finance and insurance are considered for the study. The data collection was done using a structured questionnaire. Section A consists of questions relating to socio demographic variables. Section B Consists of questions relating to Financial Proficiency. Financial Proficiency is measured with Financial Literacy, Financial Self efficacy and Financial Attitude, Financial Planning Activity and Financial Risk preference. All the variables are measured on a five point scale ranging from Strongly Disagree to Strongly Agree. (Strongly Disagree=5, Disagree=4, Neutral=3, Agree=4, Strongly Agree=5). Descriptive statistics and One sample z test are used for the study.

Objectives of the Study

- To study the Financial Proficiency of women employees in Kerala.

Hypothesis of the Study

Table 1: Measuring variables and Hypothesis

	Measuring scales	Hypothesis	Statement of the Hypothesis
Financial Proficiency	Financial Literacy	H1	The level of Financial Proficiency of Women employees is more than 50 percentage of the total score.
	Financial Self efficacy		
	Financial Attitude		
	Financial Planning Activity		
	Financial Risk Preference		
	Financial advice seeking		

Profile of the Respondents

Table 2: Demographic Profile of the respondents

Sl. No	Variable	Category	Frequency	Percentage (%)
I	Age	26-30	239	53.1
		31-35	116	25.8
		36-40	61	13.6
		41-45	34	7.56
II	Educational Qualification	Vocational/ Diploma certificates	56	12.4
		Under Graduate	132	29.3
		Post Graduate	262	58.2
III	Working Sector	Education	150	33.3
		Health	150	33.3
		Finance & Insurance	150	33.3
IV	Income	Less than Rs. 15,000	81	18.0
		Rs. 15,000 to Rs.30,000	249	55.3
		Rs.30001 to Rs. 50,000	53	11.8
		Above Rs. 50,000	67	14.9
V	Marital Status	Married	353	78.4

		Un married	97	21.6
VI	Type of Family	Joint Family	113	25.1
		Nuclear Family	337	74.9

Source: Primary Data

Descriptive Analysis

The study has used 5 – point Likert Scale for measuring variables. The mean value of the variables was 4.01 (Financial Literacy), 2.83 (Financial Self Efficacy), 3.37 (Financial Attitude), 3.37 (Financial Planning Activity), 3.74 (Financial Risk Preference), 3.60 (Financial Advice Seeking. The mean value of all variables i.e. Financial Literacy, Financial Self efficacy and Financial attitude was found to be above 2.50. The highest mean value is for Financial Literacy (4.01) and the lowest mean value is for Financial Self Efficacy (2.83).

Level of Financial Proficiency of Women Employees in Kerala

To find out the overall level of Financial Proficiency of Women employees Of Private Sector in Kerala, the respondents are asked 38questions on five point Likert scale. The responses are scored as 1 for 'Strongly disagree', 2 for 'Disagree', 3 for 'Neutral', 4 for 'Agree' and 5 for 'Strongly agree'. The total score of the 35 questions for all 450 respondents is found out, based on which the mean % score of level of Financial Proficiency of Women employees is calculated $\left[MPS = \frac{MeanScore \times 100}{Maximumpossiblescore}\right]$. This score is classified into one of the four groups. To verify whether the level of Financial Proficiency of Women employees is good or not, the below hypothesis is formulated

H_1: The level of Financial Proficiency of Women employees is more than 50 percentage of the total score

To test the above hypothesis One Sample Z test is used and the result is exhibited below.

Table 3: Mean, Standard Deviation and z value for Level of Financial Proficiency of Women employees in Kerala

Variable	N	Mean	Standard Deviation	Mean % score	CV	z	p value
Financial Proficiency	450	115.81	27.95	66.18	24.13	21.489**	<0.001

** Significant at 1% level

The mean percentage score for level of Financial Proficiency of Women employees is 66.18% which indicate that level of financial proficiency of Women employees is good or medium. The CV indicates that this score is not stable as the value is more than 20%. From the table the p value is significant at 1% level and the test is significant. Hence the null hypothesis is rejected and H1 is accepted and concludes that the level Financial Proficiency of Women employees are more than 50% i.e. good or medium.

Findings of the Study

It is observed that overall mean score for the Financial Literacy is 4.01 and women employees private sector have a greater level of financial literacy. Most of the Women employees agreed that Prime Minister Jan Dhan Yojana (PMJDY) is a financial inclusion scheme, as far as I'm aware (4.24) and least agreement on Mutual funds, in my opinion, are vulnerable to market risk (3.62).

It is observed that overall mean score for Financial Self Efficacy is 2.83 and the self-efficacy of women employees on financial matters found to be low.

It is observed that overall mean score for Financial Attitude is 3.37. Hence the financial attitude of women employees was found to be medium. Women employees most rated that they carefully decide how to spend money for various activities (3.66)

It is observed that overall mean score for Financial Planning Activity is 3.37. Hence it is found those women employees have medium level of engagement in various financial planning activities and mostly agreed on

budgeting their income and expenses (3.74) and least agreement on following financial news related pages in social media and use financial apps in their mobile (3.04).

It is observed that overall mean score for Financial Planning Risk Preference is 2.57. Hence it is found that women employees have lower level of risk preference. They agreed that return is the factor they consider most and not the risk (2.72) and rate themselves as conservative investor who is not willing to take any sort of risk (2.40).

It is observed that overall mean score for Financial advice seeking is 3.60. Hence it is inferred that the perception of women employees on approaching financial advisors is medium. They agreed that financial advisors, in their opinion, are beneficial in the saving and investing process (3.60).

It is found that the mean percentage score for Level of Financial Proficiency of Women employees is 66.18% which indicates that level of financial proficiency of Women employees is good or medium.

Conclusion

Financial Planning Behaviour for retirement plays a vital role in deciding the post Retirement wellbeing of working individuals. Financial Planning is nothing but Engaging in savings practices and ensuring that the financial situation after the Retirement will be healthy. Working women identifies financial planning as a difficult Task as they lack financial awareness and are worried to take financial decision alone. Financial literacy or financial proficiency is the major driver of retirement financial planning. Hence it is crucial to identify the financial proficiency of women employees of private Sector in Kerala. The overall financial proficiency of women employees found to be medium. In order to improve the level of financial proficiency women employees are suggested to engage in more financial planning activities.

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INDIGENOUS KNOWLEDGE AND PRACTICES- A CULTURAL KNOWLEDGE

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ABSTRACT

Sources indicate 75% of global population is home to indigenous peoples and cultures and about 5000 different cultures exist. There is 90-95% cultural diversity globally. Only 25% world population historically colonized most of the highest biodiversity and the homeland of many indigenous peoples.

India has a tradition of rich civilization. This has its root in the primordial Indian village system rising from stone culture to agriculture; thence confederated states and imperial kingdoms. Indigenous knowledge and practices are imbedded in the rudiment tools and artifacts, reading of the signs and seasons, belief systems, rites and rituals, passage rites, proverbial sayings and riddles, folk songs and stories, children's games. For the survival of these prehistoric customs in the greatest abundance, we must go to the fringe of jungle dwellers that live along the Central Indian hills. Their main habitat is in the British Central Provinces, Berar where they connect link between the Bhils in Rajputana to the west and the Santals and other cognate races of Bengal hill. They are also found in southern Mirzapur (UP) and in parts of Bundelkhand. In these areas the jungle tribes are mainly represented by the Kols, Korwas, Korkus, Moasis, Beonrihas, Kharwars, Majhis, Bhuiyas, Bharias, Binjhwars, Cheros, Gonds, Uraons, etc. and their cognate tribes. The production of indigenous knowledge and practices could be seen through these aborigine groups in their agricultural practices, administration of herbal medicines, ecological conservation approach, collection and processing of herbal food, cultural practices, etc. On the substratum of all these plays indigenous knowledge and practices of the people who produce the cultural knowledge. It is tolerably certain that many of them have only quite recently adopted the use of metals and are little removed from the Age of Stone. However, many of these tribes have been brought under Brahminic influence. Before the expiry of another generation they will have lost much of their primitive customs which make them so interesting to the ethnologists.

Keywords: *Indigenous, Baiga/Byga, Bhuinya/Bhumia,Sustainable,Cultura- relics, Artifacts, Bewar, Deowar, Marya, Kolerian, Dravidian, ethnology, ethnomedicine.*

Concept of Indigenous, Indigenous Knowledge and Practices

Etymologically, the word indigenous derives from Latin 'indigena' from a combination of two Words: a contraction of *indu* (in, within) and *gen* (root). It means, rooted in. Hence, 'indigenous' means "originating in the region or country where found". In French the equivalent term is '*autochtone';* comes from ancient Greek '*khton'* (land). '*Autochtone'* is defined as "he who comes from the land where he lives and who did not come as a result of migration". Thus, a defining element of indigenousness is with a specific historical attachment to a territory. (Gilbert, 2006: xv).

The term 'indigenous' is to be understood as indigenous people. It denotes to somebody who is born in a particular country / area; or a person who lived in a place originally or a country before other people. Knowledge is "awareness or familiarity gained by experience of a fact or situation.' More particularly, it is 'expertise and skills acquired by a person through experience or education" (Oxford Dictionary). Indigenous knowledge is cultural knowledge of the indigenous people. It exists in two levels - explicit and implicit (tacit). Explicit cultural knowledge- makes up part of what people know, a level of knowledge people can communicate. Every community or group has acquired large areas of cultural knowledge which can be talked about explicitly. This is shared cultural knowledge. Implicit knowledge, cannot be expressed in direct ways. A large portion of cultural knowledge remains tacit, outside the awareness level. What people know, one has to listen carefully, by observing their behaviors, and by studying artifacts and their use thence through inference tacit knowledge can be arrived (Spradley, 1980:11).Hence, indigenous knowledge can be defined "as the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular

geographical area" (Behera, 2000). It is learned through observation, practical engagement; gained by trial and error; in sustained contact with the natural environment and phenomena. It explains natural phenomena often with spiritual undertone; transmitted orally within population by kinship, gender, age, experiences, possession of ritual power and political authority. Indigenous knowledge is 'the web of natural environment, people's belief systems and the use of plants for therapeutic purposes' (Oguamanam, 2006:16-17). It emerges from the close contact of the environment people live in ((Hughes, 2003:46; Semali & Kincheloe, 2011:6).

Significance of Indigenous Knowledge and Practices for Development

The basis of any scientific knowledge is indigenous knowledge. For it is anchored in a specific socio-political-cultural context (Brower, 2000). The indigenous knowledge and practices are valuable in and of themselves to humanity in general, for a number of reasons as expressed in the words of Barnhart, "the depth of indigenous knowledge rooted in the long inhabitation of a particular place offers lessons that can benefit everyone, from educator to scientist, as we search for a more satisfying and sustainable way to live on this planet" (Kawagley, 2005:9). There is a growing consciousness among academicians and policy makers to the value and legitimacy of indigenous knowledge and practices for development. Indigenous knowledge and practices as a body of knowledge have been incorporated and implied in the approaches of 'sustainable development'. According to Brundtland report,"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"(https://www.iisd.org).

Producers of Cultures and Cultural Knowledge

Indigenous knowledge is cultural knowledge and developed over time "...based on experience, often tested over long period of use, adopted to local culture and environment, dynamic and changing and lays emphasis on minimizing risks rather than maximizing profits" (Mangla, 2006). "It is built up as a body of knowledge through generations of living in close contact with nature. It is "the sum totals of the knowledge and skills which people in particular geographical area possess, and which enable them to get the most out of their natural environment. Most of this knowledge and these skills have been passed down from earlier generation, but individual men and women in each new generation adapt and add to this body of knowledge in a constant adjustment to changing circumstances and environmental conditions" (Behera, 2000). It covers wide spectrum of soil, water and nutrient management, pasture and fodder management, crop cultivation, plant protection, farm and non-farm equipment, farm power, post-harvest preservation and management, agro-forestry, bio-diversity conservation and exploitation, animal rearing and health care, animal products and preservation and management, fisheries and fish, ethnic food, etc. These forms are coming from rudiments cultures of the aboriginal tribes. Take example of the most characteristic tribe Baiga of Central India; calls him *Bhumia* 'sons of the soil' (Sahu, 1998:172). '*Bhumia'*, according to Russell, 'is only a variant of Bhuiya[1]; having same meaning of 'lord of the soil' or 'belonging to the soil', the autochthones. We

[1] the ethnographic record mentioned by Elwin in three location viz.. first, "the Baiga appearing to be a branch of the great Bhuiya tribe ….in Bengal and Bihar, and is to be found chiefly in Jashpur and Serguja in the present neighborhood of the Baiga". The Bhuinya, who are also called Bhumia, are, as their name implies, 'lords of the soil'. This title is also claimed by the Baiga who call themselves Bhumiaraja or Bhumijan, and Bhumia is the name given to the most important sub-section of their tribe" (Verier, 1939:2). ; second, "….that the Baiga tribe of the Central Provinces - a branch of the Bhuiya"(Russell & Lal, 1916:310 ff; Verier, 1939:3; Roy, 1935:23 quoted in (Herbert, 2010:22); and third, "The Bhuniyar of Mirzapur, who seem to be identical with the Bhuiya of Chota Nagpur, as also called Baiga in so far as they perform the function of propitiating the local and ancient deities as their priests" (Crooke, 1896b:85; Russell & Lal, 1916b:312; Verier, 1939:4) all these ethnographic accounts, lead us to infer the Baiga, and its true identity to be 'Bhuinya/*Bhumia*'.

note 'the Bharia-Bhumia of Jubbulpore and Chhindwada have taken name Bhumia as meaning 'Lords of the soil' (cf. ft nt:2 in Verier,1939:318). Baiga is known across the country for its cultural heritage. The Baiga had nomadic life not long before recent past; now settled; once isolated, now at par with tribes in the plain. The Baiga was hunter, food gatherer, and *Bewar* (shifting) cultivator. The Baiga lives in sub-sects with some cultural variation viz. 'Binjhwar/Injhwar, Bharotia, Narotia or Nahar, Raibhaina, Kathbhaina, Kondwan or Kundi and Gondwaina. Colonel Ward, who was the first to give a list of Baiga jāt, the sects or castes of the Bygas. There was no very careful distinction drawn between Bhumia and Bharotia. Even today in parts of the Baiga Chak some Bhumia Baiga is known as Bharotia. On the other hand, the two sections were distinguished in the census of 1891" (Verier, 1939:5). The Baiga has lost its language. However, its antiquity can be traced through linguistic relics, artifacts and cultural practices. We trace their ethnological links to its cognate tribes and akin through these cultural relics. More-or less, this is the state of the aboriginal groups in India. 'Baiga/Byga' 'deoar' 'bhumia', 'Binjhwar' 'Bewar' etc. are some trace words that leads us not only into its antiquity but also its cultural history of the tribes.

The term Baiga/Byga' apparently has derived from Bygana in the cult of bewar or dhya/jhuming/daho. It simply meant 'sowing or planting seeds by scraping and dibbling the surface of ash covered area under bewar cultivation with sickle or iron tool khanta (dibble)'. Bewar was a Byga identity. The practice was wide spread as Beonra among the ancestors of the Uraon, jhuming among the Mundas of Chota Nagpore. The cultivation system was with Korwas, Birhors, and other Particularly Vulnerable Tribal Groups (PVTGs). of Bhuiyâr or Bhuinhâr of south Mirzappur (UP) were known as beonrea, for they practiced bewar cultivation. It was known chena by Vedda, dahi and koman of the Bhuiya of Orissa, penda of the Bastar Muria, jhum of the Assam hills, podu of the Khonds, beora of the Pahari Korwa of Jashpur, taungya of the Burma hill tribes. The shifting cultivation was found "in the forests of south America, in many parts of Africa and Marituis, in Melansis and the Atlantic Islands, in Cylone, in the remoter forests areas of South and Central India. It was 'sartage' in French and Belgian Ardennes, 'farming' in West-Africa, 'kohala' in South-east Solomon Islands. These were shown as akin to the bewar of Baiga, the age old custom of the Bhuiyas/ Bhumias (Sons of the soil) and akin in the line of their immigration. We trace that the earliest villages founded by the Dravidian races, the dolichocephalic Australiods, (called themselves sons of the tree). After systematic agricultural practice on a large scale in the forest lands of Southern India, from thence carried the rules of the village communities with them as they progressed northward and are now represented by the Marya (marom) Gonds and their Indian cognates who still use the 'the boomerang' like the southern races of Australia. "They made the village, and not the family, their national unit, and made it a rule, that the mothers and fathers of children born in their villages should never belong to the same village, and that the children should be brought up by their mothers and maternal uncles without the intervention of the father, and should be regarded as the children of the village and State in which they were born. Thus each village was ruled by the mothers and maternal uncles of the children born in it, and it was this system of government which they took with them into Europe, where they became the Amazonian races of Asia Minor and Greece. It was the matriarchal tribes who were the ancestors on the mother's side of the dolichocephalic Basques, and the cognate melanchroia, or dark skinned races, who were the agriculturists of the Neolithic Age" (Hewitt, 1894:43). Further, we trace racial infusion of the Indian matriarchal race resulting into Indo-Germans, Indo-Europeans, Indo-Aryans. The queen of Britain, and in other countries in Europe are the remnants of the matriarchal socio-political system.

In home country, the most characteristic tribe Marya or tree-Gonds of the Central Provinces, we trace 'Mundas are a mixed race formed by the infusion of the mountaineers of the north-east with the Gond sons of the tree, together with the admixture of later elements, the Mâl Paharias and Ooraons' (Hewitt, 1894:45). 'The

Mundas are, as judged by the test of language and social institutions, of the same race as the Kasia on the Brahmaputra in Assam, the Palang and Mon or Peguans on the Irawaddy, the Kambojas on the Mekong and the Assamese on the Tonquin, in Burma, Siam, and Cochin China, Malay Lampoongs of Sumatra, Malay Archipelago. ..these Mons or Mals, who claim to be aborigines in all these countries, show by their names that they were originally a mountain people, for Munda and Kol are both derived from the roots of Mon and Ko, which mean a mountain' (Hewitt, 1894:46). It is conjectured, 'they began their national existence as a race of hunters, living as some of the Indian forest tribes now do almost, exclusively on jungle roots, berries, and such wild animals as they could kill with the stone weapons, of which many specimens have been found in Central India and Madras, for they are all keen sportsmen. It is they who are the cave-men of India, who, like the similar race in Europe, have left in the caves of Central India pictures of their hunting scenes. They sought out for their tribal-headquarters the regions of soft sandstone and limestone rocks, where caves are naturally formed by infiltrating water. One of the principal of these natural nursing-grounds was doubtless that now occupied by the Korwas, the coal-bearing strata of Rewa, Korea, Sirgoojya and the southern hills of Mirzapur, which last formed of Vindhyan rocks. It is through this country that the Sone and its western tributaries flow, and here in Sirgoojya, is the headquarters of the Korwa, the primitive forest Kols, who still like their forefathers, live principally by hunting, though, they also grow some crops, the most important of which are the improved grasses called murwa, the prolific raggi of Madras, and a similar crop called gundli. It was in the lower valleys of these mountains that they came in contact with the Dravidian sons of the tree living in the Chattisgarh plateau, where, as in Southern Madras, they had found and cultivated the wild rice, the first shoots of which, when they sprout at the beginning of the rains, are still reverently gathered in Chhatisgarh and Central India and hung up in every house at the festival of Gurh-puja, held in August, at the same time as the Sravanas, or snake and barley festivals of the Hindus and Ooraons. It was these rice- growers who formed the first permanent village. They are the Pitaraḥ Somawantah, the Fathers possessed of Soma or the generating power (Su) whence all life is born. They are the oldest race of Fathers, to whom rice is offered at the annual festival of the Pitri-Yajña, or sacrifice to the Fathers. They were the ancestors of the ruling races of the land, called originally Bhārata-varsha, the land of the Bhāratas, the begetting and conceiving (bhri) race before it got the name of Sindhava or land of the Moon (Sin) whence, India is derived. It was these stone-men of the north east who were the first clearers of the sal-forests of North-east country, who made the sal-tree (Shorea robusta) their mother-tree, and who used in their clearance the peculiar form of shouldered Celt common to India and Burma. It was with these that they stripped off, as their successors do now, the bark of the trees grown on the banks of smaller rivulets they selected as the sites of their rice-fields, and burned the trees afterwards. These processes of early cultivation are described in the national Gond Epic, called the song of Lingal" (Hewitt, 1894:46-48).

'Baiga' is also a designating title given to a village priest for being eponymous founder of a village. The practice of designating him hereditary title is antiquarian and can be traced up to Kushika rule as village governed by the three chief authorities, the Munda, assisted by the Pahan and Mahto had been consolidated into the great confederacy of the Kushika federal empire (Hewitt, 1894:95)[2], which was formed provinces of united villages. The use of the term 'Baiga' as a village priest could be seen among the tribes of Pahari Korwas, the Bhuyas of Orissa, the Kharwars, the Bharias of Jabbalpur, Gonds of Central India, the beonreas of Southern Mirzapur (UP), Cheros, Oraons. The concept of village priest could

[2] "The first great immigration after that of North-eastern Mons or Mundas, was that of the sons of the dog and boar-god, who formed the race of Maghadas, represented in Bengal by the Dosadha and Bauris, …. and their congeners; and it was they who made the tribal medicine –man, the Byga, into the village priest under the name of Dosadhs, Degharias, Deoris, etc. (Hewitt, 1894: 90-91).

also be seen through Bhils of Arawali belt[3] (Vidyarthi, 1976:31). Similar custom, was found in Orissa, the feudal states of Keonjhar (Gangpur), Bonai and Bamra (Dalton, 1872:140; Herbert, 2010:29).

It is not known whether the concept of Baiga is also among Birhors and Assurs. The equivalent term for Baiga is Pāhān and 'Dewar'. The Munda and Bhuiya tribes of Chota Nagpur use' Pāhān and Naya-Pāhān'as village priests in their religious domains; their cognate tribe Santals have naiya (nayaka, vulgo laya) (Hunter, 1887:240); Bhumka among the Korkus of Vindhya hills and also perhaps among the Ho or Larka Kol. Among the Baiga tribe in Mandla, Dindori and Balaghat he is known as Deowar. The thread of Dewar can also be traced remotely among the Gonds and Kawanrs. 'Deoris'is close to Dewar, being used by the Kacharis and the Chutias of Assam for their priests. Similar is observed among the 'the hill Bhuiyas (Pahari Bhuiyas) in Bonai, their priests being called Deoris.

All these various terms for village priest, may indicate to its phase of chronological evolution of the concept of 'Baiga' taking shape with the spread of tribal people into different tracts, river valleys and geographical locations. The common features of the tribal priesthood not only indicates of the tribes of common ethnicity but also gives sufficient idea pointing out where these people were living, or had the line of their religious practices communicated. Thus 'Byga' or 'Deowar' for village priest are trace words among all the Dravidian and Kolerian tribes of British Central Provinces as 'Baiga' was applied in the sense of bhunhiars, or 'sons of the soil' in outset, accepted the aboriginal inhabitants of the country- either by belonging to the race by way of racial infusion of Kolerians and Dravidians or coming d from the direct lines. In these two lines of ethnology, the indigenous knowledge and practices exist, for they are the producers of cultures which is transferred from one generation to other.

From Oraon tradition, we learn that the 'Nāigas/Baigas' both are used as a singular for masculine gender. Gleaning from these Oraon traditions, we may be able to trace the original family stock (khunt/koont) (Hewitt, 1894: 91-95) as 'bhuiya' (the eponymous founder of the village, later to be represented in the head of family in the linage, and being appointed Baiga, Pahan or Dewar as a village priest). Singularly, this is known 'bhuiya' and the clan members are known as 'bhuinhar'or bhuinyar (plural) and Oraon 'bhuinhar' or 'bhuinyar' in the village organzation. Philologically, (in masculine singular gender), 'Baigas is understood as equivalent or pre-existing to the Bhumias of Central province. Baigār or Bygār and 'bhuinhār'or bhuinyār (in masculine plural gender) denotes to members of the Baiga or of Bhuiya clans. Indigenous knowledge and practices of the Baiga tribe as 'multi layered knowledge system' evolves and revolves the Bhuiya eco-spiritual practices in one hand while in another, derives from matriarchal society of forest tribes, the Baiga or the Korwas. We find Baiga tribe in its substratum the matriarchal family system.

Indigenous Knowledge and Practices

1. Indigenous Crop Cultivation and Tillage, Grain Storing, Food Processing

Much has been learnt from the colonial writers and anthropologists on the underlying indigenous knowledge and practices in ethnographic studies. However, bewar indigenous agricultural practice got supplanted by plough agriculture and only elements of it remain as relics in the present agricultural systems among aborigine groups in India including Baiga tribe. Cultivation of cereals like Mandya, Kang, Jowar, Rahar are bewar crops. Kutki, a bewar cereal is now sown under plough agriculture in the plain. Bhadeli kutki (Gondli), as said to be the primordial grain discovered by the women of the fore parents of the matriarchal Baiga, is totally abandoned. Among Uraons it still survives. Similarly, the rice cultivation with dahi dhonkna is abandoned. Now, the improved

[3] "…that the Bhils have been fighting for their very existence since early times with the Rajputs and then Muslims. The Bhils were drivien deeper into the Arawali belt. However, the Rajputs recognize the Bhils as the original owners of land and as such, possessing some mystical rights over it. Each time a new ruler succeeds to the throne, his accession is not regarded valid unless it is formally ratified by the representatives of the Bhil chiefs"

variety of rice has revisited through plough agriculture. In the primitive days, preparation and eating of rice bhat (food) was only in the ritual sacrifices on feasts like Hareli. It is said cereal offerings existed in that matriarchal society, while blood sacrifice is later addition entering from Dravidian Scythian customs. Now blood sacrifice has supplanted cereal offerings. Rice bhat, once used for rituals, is staple food of the aborigine tribes and the primitive food has gone in the background. However, indigenous cereals formerly considered 'poor man's food' or tribal food, is 'Nutri- cereal in India.

On one hand, the age old bewar practice got supplanted by the plough agriculture, it introduced cultural change in seasonal works, tools and implements, storing techniques, food processing, and even insertion of agricultural feasts like Diwali (the cattle feast). The bewar practices (dobbhai and scraping with sickle for sowing seeds in the ash) have been supplanted by plough tillage. The manual foot threshing as had been the practice for gleaning the grains, now has been confined or abandoned totally. Daiey (animal) threshing has taken over among aborigine tribes. Cattle rearing apparently entered with plough agriculture. Thus, the age old bewar practice has been pushed back; and kharif, rabi crops of plough agriculture is in lead role among all the tribal agriculture. The grain storing techniques and implements too have undergone change. The primitive tribes stored their grains in pateli (Mohline leaves plaited into basket) for 20-25 kgs, and khudsa (bamboo plaited cylenderic basket) for storing grains of 5-6 quintals. Now both are at stake and grains are stored up in kothi (a mud cell), plastic/jute baggage. The indigenous storing of maize by hanging under the ceiling or on the open courtyard is still in practice. Formerly, the salt was stored in a box indigenously plastered of cow dung paste or a wooden wheeled twin box to keep away from moisture and melting. Now, they keep in a plastic sack/container.

2. House Construction, Fencing Techniques, Growing Edibles and Processing Astringent Herbs and Roots

The cultural mix of the tribes brought changes in the techniques of housing construction. The primitive tribes thatched house with chhir grass; without a Bari (backyard garden). Now, he has house construction techniques, tools and implements at par with much progressed tribes Gonds and Uraons. Though, interior division and design of the house is said to resemble the primitive housing system. However, separate cattle shed replicates Gond and contemporary tribal groups Pig sty, is of primitive tribes. The fencing techniques as well have undergone with circumstantial changes. The bewar fencing is adopted in the Bari (homestead garden) with improvised fencing techniques. The vanishing of the bamboo has confined the bamboo fencing. Moreover, legal restriction on the accessibility to the jungle for cutting of green and fresh bush or wood has forced to adopt lesser use of the green or fresh wood for fencing. Shrub fencing, khunta fencing, katbalang rundhai (fencing) are at place while Khadiya rundhai (fencing), supplanted ada and benda rundhai (fencing) of primitive types. Combination of old and new techniques are being adopted; boulder fencing is also seen in tribal villages. Growing edible tubers, plants, tress for bhajis (herbs) and fruits are common in the tribal villages. Herbs, flowers, fruits, mushrooms are widely used as edibles by the tribals. They are supplementary to their food. As had been jungle bhajis and kand-muls being scarce, these species are being planted in the Bari. The aborigines indigenously dug out the jungle edible roots, collected bhajis, plucked fruits and ripen them indigenously. They are quite adept not only in growing them but processing the bitter, fetid, astringent or poisonous bhajis and roots into edibles; and thus, add them in their inventory of food. These indigenous knowledge and practices are being transferred from generation to generation by way of regular food habits, processing techniques and cultural practices.

3. Artisan based Indigenous Knowledge and Practices

Artisan based knowledge and practices can be seen as it is in the Kolerian villages. A family or two of blacksmith render services of iron works, agricultural tools and implements to the village community. A family of cowherds is found to be employed to graze the cattle of the village. For all these services they are paid in kinds and in grains during harvest season. As

artisans in specific, the Baiga is a "medicine man". He is a Dewar or gunia. He handles and fights out the witchcrafts and the spirit world that may cause ailments to human and animals. Moreover, the Baiga is quite adept in basket making. For his domestic needs, many kinds of bamboo baskets are plaited. Khudsa (a big cylindrical basket for grain storing), Mora, Gundri, Dhonti, Khirnaha, Pasine, Churki, Sarki are some items of bamboo craftsmanship. Jhapi, Sikosi, petla, dauri, dali (bamboo baskets) are out of practice. Similar, status is of knowledge and techniques in rope extraction, broom making, kakai making (wooden comb), Khomra- khumri (rain cover) and mat making. Wood carving on the doors is of semi-skilled in carpentry. Formerly, the tribals extracted oil from seeds through indigenous processing (pressing petla between Sondhi/patni). The oil extraction technique by kolhu (Oil mill/crusher) is now extinguished. Oil pressing is controlled by the telis (oil pressing caste) who own automated machines in the area. Thus, the indigenous knowledge and techniques of oil extraction is almost finished and now tribals depend on the telis.

4. Ecological based Indigenous Knowledge and Practices

The aborigines lived in close proximity of the jungles and natural bio-diversity, the sources of knowledge and practices for livelihood and health care. They knew to derive the economic importance of the bio-diversity, thereby knowledge and ability of identifying flora and fauna. This knowledge being percolated to the children who do almost in the same manner the elders do. Hence, the ecological based indigenous knowledge and practices go beyond identifying flora and fauna but to a synthetic knowledge of future forecasting by seeing the nature, and reading the signs of the time. Short or long range of weather forecasting helps them in adopting mitigation measures in their agricultural works and cropping patterns in ongoing climatic change. The efforts are made to avert drought and famine by appeasing the supernatural powers by ritual or periodical sacrifices. The aborigines have techniques of honey bee tracking, liquor extraction (replication of distilling of rain water, the life by the heavenly clouds and flashing lights (Hewitt, 1894:20-21,161). It is like 'heat and cold' technique applied to fragment schistose rock (Dalton, 1872:205) by Munda of Chhota Nagpur, the cognates of Baiga.

4. Cultural Practices

The aborigines, like Baiga had rudiment tools and weapons for hunting; practiced 'the art of tracking, trapping, snaring, killing, and hunting the game which destroyed their crops'; developed 'to make the first rude tools of stone and wood' and the deadly lethal bisar (poisoned arrow) sending into the animal's body by techniques of propelling. These indigenous knowledge and practices derived out of urgency less for leisure time. Now in the changing scenario of legal restrictions, the hunting tools, techniques and practices have been abandoned and only smaller items like sudi, thongi, ghopi phanda, khuntwans, manjoor phanda, and noose are in practice. Now, the hunting techniques and practices have been confined to suit the present legal environment of the country. In fish catching Jhulna seench, jhumar, daiey bansi, gabi girai, etc. are out of practice, while the modern techniques used are throw nets, poison, explosion to catch the fish in the river pools. Indigenous practices of Machhri Mataov (stupefying the fish) by Bhin-di or Mainhar, tinsa rinds are occasionally used. They divert the river water into temporary channel and very fondly catch fish by mora seench. Setting kumni, jhumar, kurru (fishing traps) in the river are in vogue. Fishing by hooks is also common.

The house walls are decorated in red (geru), white (chhuhi) and black (Kala pit) color obtained from the soil found in the local quarries. The house floors were smeared with the dung paste of Surli (antelope); now is a past story. It does not exist in the ritual form either. The cultural mix has influenced on wall paintings; not only Chhuhi in Diwali used but distemper. The aborigines extracted dyes from chuewla flowers and played colors in the feast of Phaag. Black ink is produced from harra, and most durable yellow dye from the galls of Harua tree. Haldi paste is the most sacred color of the aborigine tribes. As washing, brushing tools and techniques- Mund manjni mati (soil shampoo) is used. The linen washing by

boiling in the ash water, cleaning of brass vessels by rubbing with Dhotte leaves is in practice. The tooth brush is kharika (sal tender twig) while potar, kanke twigs are taken for medicinal tooth brushing and aonla twigs for ritual brushing in Dasgatar. The present tribal do not extract oil for fuel. Kerosene, electrification has taken its place.

The aborigines have distinct cultural practices. The matriarchal substratum is seen in marriage; facing or keeping legs south in marriage ceremonies and the positioning of the head of corpse to the south in burial are apparent matriarchal cultural stratum. The blood sacrifice, except in Navakhai, (harvest feast) the offering of liquor libation in all ritual feasts is prevalent. Primordially, they worshiped Darhi (water god); and Dharti (Earth) as later evolution with its allied deities, viz. Budha deo, thakurji and budhi dai. The dresses and ornaments originate from non-aborigines. The specific tribal ornament is godna godai (tattoo/imprint). The identity of a tribal woman is known from her godna. The seasoning of dafla khole (frame) as musical instruments is almost lost. Siblings share their patriarchal inheritance. Tribal panchayat is to resolve the disputes and organize the tribe. They are hospitable. The games of the tribal children derive indigenously, with minor variations. The older tribal men spend their leisure time in hunting, fishing and collecting wild herbs.

5. Ethno Medicine

The aborigines have preserved ethno- medicine as they live in close proximity of the forest. So they derive good knowledge of the herbal plants of medicinal importance. About 70-80% of villagers of aborigine tribes treat their sick with herbal medicine. They also believe in witchcraft, supernatural power and propitiate them to escape from their haunt.

Conclusion

However, there is a growing shift in consciousness among academicians and policy makers as to the value and legitimacy of indigenous knowledge and practices, it may be difficult to formalize and fit indigenous knowledge and practices into the hierarchical and compartmentalized systems of 'modern scientific' or 'western' knowledge. Because it is informally and orally-transmitted. It is a way of life. It can only be learned and understood by means of pedagogy traditionally employed by people themselves.

There are number of factors affecting the indigenous knowledge and practices of the aborigine tribes. The cultural mix of Dravidians and Kolerian aboriginal matriarchal race has much bearing in the indigenous knowledge and practices. Successively, there had been cultural mix of the aboriginals under policy like in the Baiga land. Bewar practice was systematically weaned out; thus affecting their livelihoods. The Indian Forest Act almost out steered the forest dwellers from natural habitat and reduced them to cheap forest labor. The market driven forces equally damaged the indigeniety. The unsustainable extraction technique of the forest resources has caused resource depletion. Project intervention by GOs and NGOs suit the target driven demands. Most of the schemes operate in top down approach ruinous to indigenous knowledge and practices. The aborigines are in utter confusion and in transition.

Today, the tribal is exposed to the external world through various communication channels: digitals and media, markets and fairs, schools and hostels/ahrams, etc. These have impacts on their life positively or adversely. The changing trends in their dressing patterns, adorning ornaments, food habits, and clothing are external signs of the cultural change in the aborigines, while internally the traditional knowledge and practices are in transition.

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MUNICIPAL SERVICES AND CITIZEN'S SATISFACTION: A WARD-WISE STUDY OF THANE MUNICIPAL CORPORATION

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ABSTRACT

The ultimate objective of all function of Municipal Corporation is the satisfaction of city people. Therefore to evaluate the satisfaction level of Thane city people located closer to Mumbai holds cosmopolitan population next to Mumbai. The Municipal Corporations are divided their city areas in different administrative wards to facilitate easy in administration and service delivery but unfortunately the wards are not equally blessed with various services provided, which results significant difference in service satisfaction and growth of different wards. The present study examine the uniformity of satisfaction of city peoples of different Administrative wards of Thane Municipal Corporation on services provided and determine rank wise status of all nine administrative wards of TMC with respect to service satisfaction. Therefore the data is collected from all nine administration wards of Thane Municipal Corporation (TMC), analysed with suitable statistical tools and suggest suitable measures to improve overall and equal satisfaction of city people of Thane city.

Keywords: *Thane Municipal Corporation (TMC), Administration Wards, Service satisfaction*

Introduction

Municipal Corporations are the financial core of the state. They have a greater share in the overall development and identity of state and in Maharashtra as well. The study is an attempt to undertake service satisfaction analysis of local self-Government of Municipal Corporation specially Thane Municipal Corporation in order to suggest suitable strategies to improve and sustain effective financial management. Thane Municipal Corporation (TMC) can be visualized at different levels as it comprises of the most cosmopolitan population with most advanced technologies and infrastructure which is closer to Mumbai holds cosmopolitan population next to Mumbai. Due to limited space accessible for future population and economic expansion, Greater Mumbai began to relocate its inhabitants to nearby locations especially in Thane City. Thane Municipal Corporation came into existence on 1st Oct, 1982 with its geographical expanse 128.23 sq. km. with 18, 41,000 populations which are divided into nine administrative wards and 33 electoral wards consist of four Corporators in each electoral ward. The nine administrative wards of Thane Municipal Corporation are Diva, Kalwa, Lokmanya Nagar, Majiwada-Manpada, Mumbra, Naupada-Kopri, Uthalsar, Vartak Nagar and Wagle Estate. The study is an attempt to undertake service satisfaction analysis of these wards citizens and find out where any difference between their satisfactions as they all are part of Thane Municipal Corporation.

The survey helps to determine whether residents of Thane Municipal Corporation's nine administrative wards are satisfied in general and equally and whether there are any differences in satisfaction with the services provided by TMC. It tries to find out whether all nine wards are developing equally or not and if there is any shortfall in a particular ward that requires extra attention in terms of service satisfaction. It aids TMC in improving services in the examined wards for equal growth of Thane city and improved resident service satisfaction.

Objectives of Study

1. To examine the uniformity of satisfaction of city peoples of different Administrative wards of Thane Municipal Corporation on services provided.
2. To represent rank wise status of all nine administrative wards of TMC with respect to service satisfaction.
3. To highlight the key factors where need to mobilize resources to increase overall satisfaction on services provided to citizens of Thane city.

4. To suggest suitable measures to improve overall and equal satisfaction of city people of Thane city.

Hypothesis

H-0: There is no significant difference in satisfaction between the city peoples of different Administrative wards of Thane Municipal Corporation.

H-1: There is significant difference in satisfaction between the city peoples of different Administrative wards of Thane Municipal Corporation.

Research Methodology

- Survey method used for Collection of data and the primary data collected by preparing structured questionnaire.
- Research based on survey conducted by interview method.
- The primary data is collected from Thane City people by structured questionnaire with personal interview of 490 peoples living in all nine administrative wards of Thane Municipal Corporation.
- The approximately 50 respondents randomly selected for interview from each ward of TMC.
- The 22 basic services are analysed to study the satisfaction differences among wards.
- The 5 points rating scale are used.
- The statistical tools like Kruskal-Wallis test to determine significance and the Mean Rank to determine rank of wards are used.
- The mean, median and S.D. are calculated to each service ward wise as per data collected.
- The tables and graphs are laid out in such a way that they are easy to comprehend.

Data Analysis And Interpretation

Table No. 1: Coding of services: The selected 22 basic services are coded for unbiased transparent analysis of collected data

Code	Services (Statement from Questionnaire)
A1	Maintenance of Roads in your Municipal area
A2	Streetlights in the city.
A3	Public Health Services provided by the T.M.C.
A4	Sanitation in your area
A5	Garbage disposal in your area
A6	water supply in your Area
A7	Drainage system in your Area
A8	Maintenance of Community Hall
A9	Condition of Municipal Schools in your area
A10	Technological up gradation in Working of TMC's Dept.
A11	Town planning development in the city
A12	Parks/Libraries /Recreation in the city
A13	Maintenance of municipal sports grounds or stadiums in your area
A14	Maintenance of municipal swimming pools in your area
A15	Maintenance of markets in the city
A16	Traffic Control Arrangement
A17	Parking facilities by Municipal Corporation
A18	Provision for protection of environment in the city
A19	Online payment facility of TMC to pay Bills and Taxes
A20	Welfare Scheme for Handicap, widow women's, poor Children's etc.
A21	Public Information system about welfare scheme
A22	Public Toilet Facility

Table No. 2: Basic Data Distribution

Code	Very poor		Poor		Average		Good		Best	
	Count	%	Count	%	Count	%	Count	%	Count	%
A1	28	5.7%	64	13.1%	166	33.9%	216	44.1%	16	3.3%
A2	24	4.9%	32	6.5%	146	29.8%	266	54.3%	22	4.5%
A3	36	7.5%	76	15.8%	180	37.3%	184	38.2%	6	1.2%
A4	36	7.4%	90	18.5%	116	23.9%	230	47.3%	14	2.9%
A5	36	7.4%	46	9.5%	104	21.4%	276	56.8%	24	4.9%
A6	22	4.5%	30	6.1%	74	15.2%	266	54.5%	96	19.7%
A7	38	7.9%	80	16.5%	146	30.2%	204	42.1%	16	3.3%
A8	204	44.3%	70	15.2%	102	22.2%	78	17.0%	6	1.3%
A9	62	13.1%	76	16.1%	222	47.0%	110	23.3%	2	.4%
A10	26	5.3%	128	26.2%	256	52.5%	78	16.0%	0	.0%
A11	16	3.3%	104	21.2%	188	38.4%	178	36.3%	4	.8%
A12	136	28.0%	118	24.3%	116	23.9%	112	23.0%	4	.8%
A13	194	40.4%	96	20.0%	102	21.3%	74	15.4%	14	2.9%
A14	278	62.3%	68	15.2%	58	13.0%	36	8.1%	6	1.3%
A15	74	15.3%	178	36.8%	160	33.1%	72	14.9%	0	.0%
A16	114	23.3%	168	34.3%	138	28.2%	66	13.5%	4	.8%
A17	218	44.9%	158	32.5%	76	15.6%	34	7.0%	0	.0%
A18	48	10.0%	122	25.3%	170	35.3%	138	28.6%	4	.8%
A19	16	3.3%	90	18.4%	130	26.5%	238	48.6%	16	3.3%
A20	38	7.9%	152	31.8%	208	43.5%	74	15.5%	6	1.3%
A21	256	52.5%	138	28.3%	54	11.1%	36	7.4%	4	.8%
A22	172	35.1%	106	21.6%	128	26.1%	82	16.7%	2	.4%

Interpretation: The above table number 2 show the responses towards the service provided by TMC in five points rating scale of very poor, poor, average, good and best. The table present count of 490 responded from all administrative wards regarding their opinion about service provided by TMC and percentage of rating is also mentioned.

Table No. 3: Comparison of the Service aspects between different administration wards:

The collected data are divided as per response given by resident of each administration ward of TMC and determine the median, mean and standard deviation of each administration ward to examine the result of differences.

Descriptive Statistics

		Ward of Respondent								
		Diva	Kalwa	Lokmanya Nagar	Majiwada-Manpada	Mumbra	Naupada-Kopari	Uthalsar	Vartak Nagar	Wagle Estate
A1	Median	2.00	4.00	4.00	3.00	3.00	3.00	4.00	4.00	3.00
	Mean	2.16	3.63	3.40	3.22	3.04	3.28	3.61	3.65	3.35
	SD	1.06	.62	.70	.94	.77	.97	.71	.79	.83
A2	Median	2.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	Mean	2.16	3.70	3.68	3.49	3.58	3.64	3.61	3.65	3.65
	SD	1.02	.60	.62	.80	.70	.80	.88	.79	.55
A3	Median	2.00	4.00	4.00	3.00	3.00	3.00	3.00	3.00	3.50
	Mean	2.04	3.48	3.44	3.11	3.00	3.16	2.96	3.38	3.25
	SD	1.01	.69	.70	.81	.79	1.17	.82	.69	.92
A4	Median	2.00	4.00	3.00	3.00	3.00	4.00	4.00	4.00	4.00
	Mean	1.92	3.59	3.24	3.16	2.96	3.32	3.57	3.50	3.47
	SD	.94	.79	.77	1.06	.83	1.10	.98	.64	.89
A5	Median	2.00	4.00	4.00	4.00	3.00	4.00	4.00	4.00	4.00
	Mean	2.36	3.67	3.64	3.64	3.27	3.52	3.41	3.69	3.48
	SD	1.24	.67	.75	1.12	.87	.95	1.09	.61	.76
A6	Median	2.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	Mean	2.56	3.70	3.72	3.70	3.84	4.12	4.22	4.04	4.16
	SD	1.21	.82	.88	1.04	.55	.59	.73	1.07	.63
A7	Median	2.00	3.00	4.00	4.00	3.00	4.00	3.50	4.00	3.00

	Mean	2.17	3.11	3.20	3.41	2.77	3.46	3.36	3.73	3.16
	SD	1.08	.84	.99	.83	1.10	.87	.99	.82	.81
A8	Median	1.00	1.00	3.00	1.00	1.00	3.00	1.00	2.00	3.00
	Mean	1.56	2.00	3.24	1.69	1.54	2.92	1.55	2.14	2.96
	SD	1.03	1.31	.92	1.18	.80	.75	.90	1.14	.94
A9	Median	2.00	3.00	3.00	3.00	3.00	3.00	3.00	4.00	3.00
	Mean	2.12	2.96	3.12	2.47	3.23	2.76	2.52	3.33	2.93
	SD	1.00	.85	.59	.99	.90	.92	1.06	.86	.67
A10	Median	3.00	2.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	Mean	2.68	2.48	2.80	2.73	2.68	2.80	2.91	3.15	2.90
	SD	.89	.75	.57	.86	.84	.86	.72	.67	.53
A11	Median	2.00	3.00	3.00	4.00	3.00	3.00	3.00	4.00	3.00
	Mean	2.36	3.04	3.20	3.46	2.81	3.12	3.09	3.58	3.10
	SD	.80	.89	.64	.76	.84	.77	.78	.70	.90
A12	Median	1.00	3.00	2.00	3.00	1.00	3.00	3.00	2.00	3.00
	Mean	1.08	3.04	2.08	2.73	1.62	3.04	3.09	2.36	2.74
	SD	.28	.89	.94	1.14	1.12	.88	.89	1.14	.96
A13	Median	1.00	2.00	1.00	2.00	1.00	3.00	2.00	2.00	2.00
	Mean	1.04	2.52	1.84	2.35	2.08	3.16	2.43	2.09	2.23
	SD	.20	.97	1.06	1.39	1.54	.79	1.11	1.15	1.00
A14	Median	1.00	2.00	1.00	1.00	1.00	3.00	1.00	1.00	2.00
	Mean	1.00	2.19	1.50	1.27	1.65	2.88	1.50	1.55	2.05
	SD	.00	1.23	.59	.65	1.37	.73	.93	1.00	1.08
A15	Median	2.00	2.00	3.00	2.00	2.00	3.00	2.00	3.00	3.00
	Mean	1.80	2.37	2.96	2.46	2.19	2.84	2.59	2.36	2.70
	SD	.70	.73	.67	1.01	.97	.74	.73	1.03	1.05
A16	Median	2.00	2.00	2.00	2.00	1.50	3.00	3.00	2.50	2.00
	Mean	2.00	2.11	2.28	2.57	1.73	2.64	2.74	2.46	2.48
	SD	1.07	.92	.88	1.06	.87	1.03	.85	.98	.95
A17	Median	1.00	1.00	1.00	2.00	1.00	3.00	1.00	2.00	2.00
	Mean	1.64	1.52	1.48	2.19	1.69	2.64	1.65	1.96	1.72
	SD	.80	.75	.58	1.02	1.04	1.06	.97	.71	.70
A18	Median	2.00	4.00	3.00	3.00	2.00	3.00	3.00	3.00	3.00
	Mean	2.16	3.23	2.61	3.24	2.38	3.00	3.09	3.12	2.68
	SD	.89	.94	.88	.98	1.01	.70	.91	.81	.97
A19	Median	4.00	4.00	3.00	3.00	4.00	4.00	4.00	3.00	3.00
	Mean	3.44	3.37	3.24	3.35	3.58	3.20	3.35	3.23	3.00
	SD	.95	.83	.92	.85	.80	1.03	.92	.85	1.02
A20	Median	3.00	3.00	3.00	2.00	3.00	3.00	2.00	3.00	3.00
	Mean	2.64	2.85	2.72	2.35	2.96	3.08	2.26	2.68	2.86
	SD	.85	.76	.97	.71	1.03	.70	.68	.83	.94
A21	Median	1.00	1.00	2.00	1.00	2.00	2.00	1.00	2.00	2.00
	Mean	1.60	1.74	2.04	1.68	2.04	1.96	1.32	1.81	1.65
	SD	1.03	1.01	1.05	1.12	1.10	.88	.56	.89	.75
A22	Median	1.00	1.00	3.00	2.00	2.00	3.00	3.00	2.50	3.00
	Mean	1.36	1.85	2.68	2.24	2.35	2.52	2.35	2.38	2.55
	SD	.85	1.05	.98	1.27	.97	.86	1.06	1.19	1.14

Interpretation: As per above table number 3, five points rating scale of very poor, poor, average, good and best are measured and therefore the statistical result indicates accordingly. The median value above 3 indicates positive response towards the service satisfaction and the administrative ward with higher median value is more satisfied as compare to other administrative ward in particular service. Similarly the mean value above 3 indicates positive response towards the service satisfaction and the administrative ward with higher mean value is more satisfied as compare to other administrative ward in particular service.

Hypothesis Testing

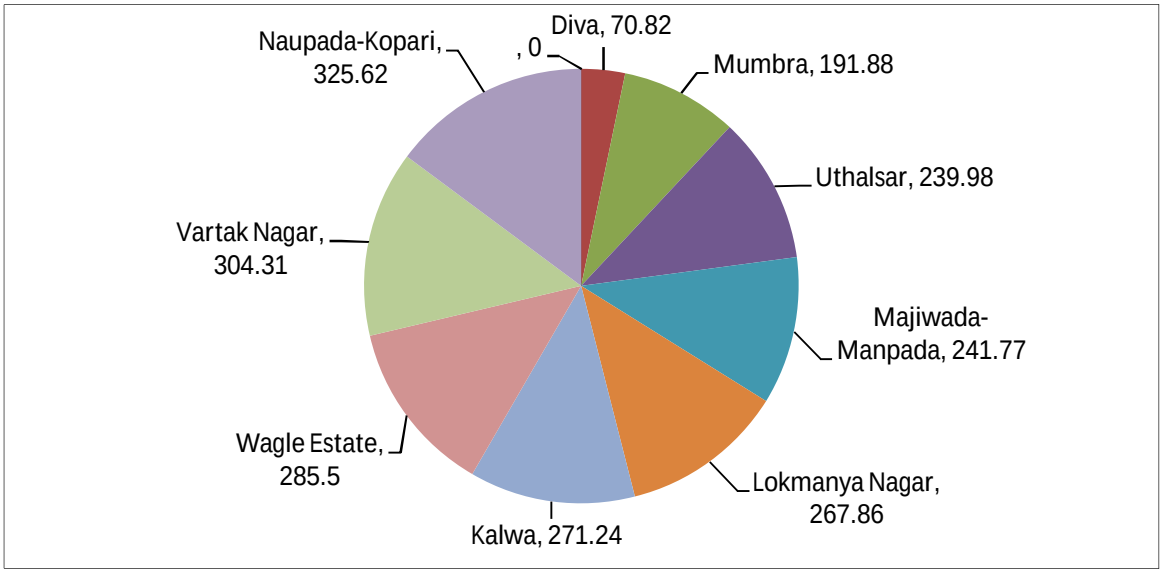
Table Number 4: Mean Rank

The overall satisfaction results about considered services are combined and

calculated mean rank value as per administrative wards to determine the ranking.

Ward of Respondent	Mean Rank	Rank of Wards (Satisfaction on TMC Services)
Naupada-Kopari	325.62	1st
Vartak Nagar	304.31	2nd
Wagle Estate	285.5	3rd
Kalwa	271.24	4th
Lokmanya Nagar	267.86	5th
Majiwada-Manpada	241.77	6th
Uthalsar	239.98	7th
Mumbra	191.88	8th
Diva	70.82	9th

Graph



Interpretation: The higher mean rank indicates higher satisfaction on services of that administration ward of TMC. With highest mean rank of 325.62 Naupada kopri is most satisfied ward as compared to others in terms of services and with lowest mean rank of 70.82 Diva is most unsatisfied ward with services provided by Thane Municipal Corporation.

Kruskal-Wallis test

	Services
Chi-Square	116.718
df	8
p-value	.000

Interpretation: p-value less than that of 0.05 indicates significance of difference between the satisfactions of respondents from different wards. The higher mean rank indicates higher satisfaction. Therefore we reject null hypothesis and conclude that **there is**

significant difference in satisfaction between the city peoples of different Administrative wards of Thane Municipal Corporation.

Findings

- As per Kruskal Wallis Test there is a significant difference in satisfaction between the city peoples of different nine administrative wards of Thane Municipal Corporation.
- P-value is less than 0.05 indicates significant difference between the satisfactions of respondents from different words. It indicates that all 9 wards are not equally facilitated in terms services in Thane Municipal Corporation.
- With highest mean rank of 325.62 Naupada kopri is most satisfied ward as compared to others in terms of services.
- With lowest mean rank of 70.82 Diva is most unsatisfied ward with services provided by Thane Municipal Corporation.
- Vartak Nagar has second highest mean rank with 304.31 and subsequently Wagle Estate with mean rank 285.50, Kalwa with 271.24, Lokmanya Nagar with mean rank 267.86, Majiwada-Manpada with 241.77, Uthalsar with main rank 239.98 and Mumbra with mean rank 191.88.
- 22 parameters for satisfaction of services are differing from ward to ward as per their mean values. Higher mean indicate that the service is better in that ward.

Suggestions

- It's a fine line to walk between people's priorities or expectations and budgetary restraints.
- Need to ensure balance development of all nine wards as result of analysis showing a significant difference in development and service satisfaction of all nine wards of Thane Municipal Corporation.
- To give more concentration on to improve the service satisfaction and development of Diva, Mumbra, Uthalsar and Majiwada-Manpada administration ward as mean rank is lowest as compare to other wards.
- 22 parameters for satisfaction of different services are presented in above descriptive table number 2 as per wards with mean values. Hence the TMC have to concentrate on services which are having less means value in respective wards.
- Therefore by finding the area of concentration helps TMC to take decisions to improve the services where particular ward lacking behind.
- Thane Municipal Corporation should start 360 degree framework with the title of TMC CARE where the priority focus is people's satisfaction on every aspect of service delivery of civic administration.
- TMC CARE is a 360 degree framework by TMC which is digitally driven, citizen centric provides various channels to peoples for effective and responsive governance.
- The objective of TMC CARE is to collect citizen's feedback of different wards to improve service delivery continuously and have good suggestions or ideas which help in development of Thane city.
- The social media platform, specific TMC mail id and toll free number is the main channels of TMC CARE can be provided.
- A team of experts should appoint to monitor, gather, analyse and interpretate the data collected from citizens which helps in city planning and for allocation of budget to get high satisfaction on services from TMC administration.

Conclusion

The study undertaken about service satisfaction analysis of nine administration wards residents and result indicates significant difference in satisfaction between the city peoples of different nine administrative wards of Thane Municipal Corporation.The nine administrative wards of Thane Municipal Corporation are Diva, Kalwa, Lokmanya Nagar, Majiwada-Manpada, Mumbra, Naupada-Kopri, Uthalsar, Vartak Nagar and Wagle Estate.With highest mean rank of 325.62 Naupada kopri is most satisfied ward as compared to others in terms of services and with lowest mean rank of 70.82 Diva is most unsatisfied ward in Thane Municipal Corporation. There is need to give more concentration on to improve the service satisfaction and development of Diva,

Mumbra, Uthalsar and Majiwada-Manpada administration ward as mean rank is lowest as compare to other wards. The study concluding with suggestions enables TMC to take decisions to improve the services where particular wards lacking and provided a table which indicates service satisfaction as per mean value for reference to Thane Municipal Corporation.

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COMPARATIVE STUDY OF KEY GENERATION FOR INTERNET OF THINGS COMMUNICATION DEVICE

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ABSTRACT

Today's academics are focusing on the physical layer-based security idea, particularly signal-based encryption and key generation in the physical layer security process. The wavelet transform function generates a session shared key for communication before sampling RSS (received signal strength) and convolution of Langrage's interpolation. The fundamental issue with this system is key generation problem and device bit mismatch. For the mentioned bottleneck concerns, minimization is necessary, necessitating the usage of the suggested DCT – DWT based key generation and sharing methods. In terms of bit agreement and generation rate, the suggested algorithm is exceedingly efficient. The suggested approach extracts the RSSI signal's channel reciprocity property. In terms of quantization and bit representations, the energy and entropy characteristics of the channel are estimated. To exchange information, the suggested approach uses a public-key cryptography algorithm such as a cyclic key in conjunction with the IEEE802.11 wireless protocol. Increased randomization minimizes the risk of security breaches, which is why the cyclic key technique is used. The algorithm's overall approach reduces the computational overhead of the secret key creation process for IoT enabled devices. In the Internet of Things, transform and language interpolation techniques were employed to improve the efficiency of the key generation process. The proposed key generation algorithm enhances efficiency by 5-8 percent.

1. Introduction

The Internet of Things (IoT) is an open area of next-generation creative communication stemming from Wireless Sensor Networks (WSNs) (WSN). IoTs application extends beyond the digital era to areas such as education, transportation, healthcare, agriculture, and many more. The physical hardware of the embedded device and non-standard protocols determine how IoTs communicate. The sharing of information and data across a non-standard communication protocol provides a security gap for network and data authentication and prevention. The variety and application of IoT-based communication raises the risk of security and authentication vulnerabilities. The secure communication protocol marks a watershed moment in the evolution of device-based communication. In Wireless-based Communication Systems, encryption methods and traditional security protocols are unable to provide the complete range of authentication and security procedures. The wireless embedded device's limitations, such as memory, processing unit, energy, and computing capability. The Conventional Symmetrical Cryptographic Protocol requires Secret Key or Certificate Management to assure the security of the data being transferred [9–12], with the computing capability of the device influencing the protocol's security. However, with the advancement in computer power of the eavesdropping device, the protocol will be readily overcome in the future [13–15]. Because secret key distribution is difficult to deploy on a wide scale network, it necessitates intense secret key distribution, which facilitates the establishment of secret keys between devices. Several studies [16–20] have focused on efforts to obtain low-cost and promising symmetric cryptographic methods that can be employed as a lightweight cryptographic solution for IoT devices. Several writers proposed the process of key generation methods in IoT-based communication devices to improve security.

The length of the key and the computational complexity will determine the future of key generation technologies. Existing generation algorithms have to deal with both issues. With a combination of Langrage's interpolation and

the discrete wavelet transform function, a novel key generation algorithm is given. In 1980, the language's interpolation feature was previously utilized for information exchange and data encoding. These mathematical functions serve as a point of intersection for data concealment during transmission. This information sharing and concealment is used in the key interval generation process. The discrete wavelet takes a group of small waves and turns them into a series of waves in the form of a frequency-time representation of signals. For the generating process, the sample of the key was employed to represent signals. The secret key is generated using the wavelet's low-frequency value. The security flaw in the internet of things communication paradigm was improved by the transform-based key generation procedure.

2. Principle of Key Generation

The communication dependency of IoTs devices is a wireless channel. The predictability and temptation of the wireless channel are very high. Due to the predictability of wireless channel, IoTs based communication system always come under security threats. For the authentication of data and without the intervention of communication used key generation techniques. Some studies used cryptography algorithms such as RSA, AES, ECC, and many more cryptography algorithms [18, 19]. Now in the current trend of research used the properties of the wireless channel such as RSS. The limitation of IoTs devices is memory and energy. To reduce the computational cost of key generation and improve the performance of communication models of IoT devices the RSS parameters is used. There are the various reasons to used channel property of wireless communication, and some are mention below [23].

- The nature of the wireless channel is symmetrical, so participants in the communication process received signal is identical.
- Variation of RF signals according to their motion of devices.
- The location variation of participants decreases the strength of the signal and third-party intercept of communication.

The variation of time changes the nature of signal strength; due to this reason various authors used the frequency-based transform function for the generation of key and extraction of key. The transform function plays a role of quantization and enhances the reliability of signal. In this paper used discrete wavelet transform function for the process of quantization and generation of key for secret communication in two IoT devices. The discrete wavelet transform function generates from the mother wavelet transform function.

2.1 System Model of Key Generation

The key generation system model is described in figure 2.1. The model of key generation used three parties is called Alice, Bob and Eve. The Alice and Bob is two authorized party for the process of communication. The Eve plays an important role of communication intervention or passive attacker. The Alice and Bob both used the $RSSchannel$ parameters for the sharing of information based on the concept of channel probing. The Ya signal transmit by Alice and Yb signal Transmit by the Bob. The symmetric of signal strength is equal in both case (Ya=Yb). Here two cases consider in case of Eve. Eve know about the key of message and decode the information of two parties Alice and Bob. Another condition is Eve cannot aware of key and tamper the RSS information for the extraction of key value for decode information [1, 4, 5].

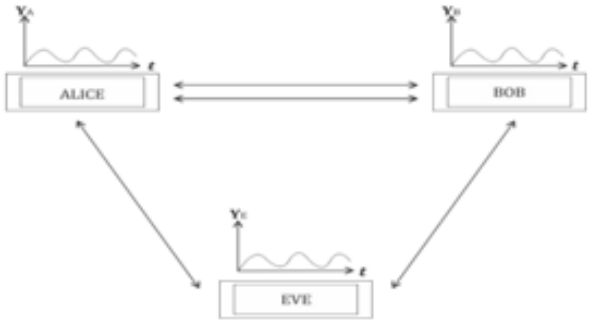


Figure 2.1: The process block diagram of RSS based communications in two authorized parties Alice and Bob. The third-party Eve as message and key intercept.

The process of key generation models defines two conditions for key generation.

1. The Eve knows about the key value used by the Alice and Bob and behaves like as passive attacker.

2. The Eve cannot the familiar of key generation and performs the attacks for the process of key tampering.

2.2 Key Generation Algorithm

Various key generation algorithms used transform function and signal quantization methods in wireless communication. The channel parameters such as RSS used in case of key generation and key extraction for IoTs device. The Sky glow algorithms used DCT transform function for the process of quantization and enhance the reliability of bit and reduce the bit error rate (BER). The Sky glow algorithm reduces the utilization of radio frequency in case of receptions and transmissions. These algorithms not used the process of privacy amplification for the generation of key [22-23]. 128 bits is the length of Sky glow generated. The enhanced reliability of IoTs based communication system and the Key entropy of Sky glow is very high. Some authors used key generation system five stages and some are used four steps. The steps of key generation shown in figure 2. The 1st Step is the process measures the channel properties between 2 authorized party. The measured difference's value is high then used the process of preprocessing. The next step is quantization of signals into bit single bit value and multi-bit value. After the process of quantization measured the bit difference value is called error correcting phase and finally proceed for the privacy amplification. In privacy amplification used the hash code algorithm for the creation of message digest.

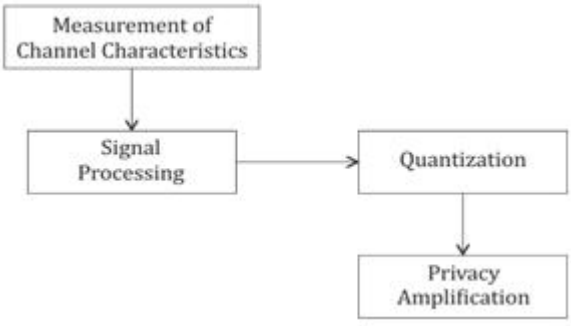


Figure 2.2.1: Process of key generation algorithms using Five phase.

2.3 Langrage's and Wavelet Transform

In this section discuss the mathematical function of languages interpolation. The languages interpolation method used for the distribution of key the key for the process of creation of key [7, 21].

a. A set of data points (x_i, y_i), i$0,1,\dots\dots,n$ obtained from a function $f(x)$ so that $i = f(x)$ y, $i = 0,1,\dots,n$. A suitable function for interpolation $I(x)$ is expressible as

b. $I(x) = \sum_{i=0}^{n} L_i(x).f(x_i)$

c. The functions $L_i(x), i = 0,1,\dots\dots,n$are chosen to satisfy

d. $L_i(x) = \{^{0x=x_0,x_1,\dots.x_{i-1},x_{i+1},\dots.x_n}_{1x=x_i}$

In DWT, with a small number of scales with varying number of translations at each scale a signal is analyzed. A critical sampling of the CWT $W(a,b)$ is obtained by substituting $a = 2^{-j}$ and $b = k2^{-j}$ where j and k are integers representing the scale and translation. Upon this substitution,

$$\Psi_{j,k}(t) = 2^{j/2}(2^j t - k)$$

These wavelets for all integers j and k produce an orthonormal basis. $\Psi_{0,0}(t) = \Psi(t)$ the $motherwavelet$. Other wavelets are produced by translation and dilation of the mother wavelet. Discrete wavelet transforms, denoted by $W(j,k)$, is hence given by

$$W(j,k) = \int_t^{\cdot} f(t)2^{\frac{j}{2}}\Psi(2^j t - k)dt$$

The term critical sampling is used to ensure that a minimum number of wavelet coefficients are retained to represent all the information present in the original function. In CWT, transform coefficients are found for every (a,b) combination, where as in DWT, transform coefficients are found only at very few points.

2.4 Proposed Methodology

The proposed methods of key generation based on two transform and property of channel reciprocity. The DCT and DWT involve in two processes sampling and encoding of signals for the formation of bits. The discrete wavelet transforms also increase the randomness factor of key and reduces the risk of security of sharing of information. The processing of key generation describes as

1. We apply DCT transform on the receive RSS signals value. The DCT transform sampled in finite time series of sample into sum of different frequency.

$$X_k = \sum_{n=0}^{N-1} x_n cos\left[\frac{\Pi}{N}\left(n+\frac{1}{2}\right)k\right] k = 0, \dots\dots\dots N \dots\dots\dots (1)$$

2. The sample of DCT signal input of wavelet transform as

Wavelet transform applied long time windows, in order to get high frequency data. The processing of wavelet transforms of DCT sample frequency mapped as relative frequency process

Consider $f(x) \in L^2(R)$ relative to wavelet function$\psi(x) \wedge scalingfunction\phi(x)$

The DWT defined as

$$W_\phi(j0,k) = \frac{1}{\sqrt{M}}\sum_x f(x)\phi_{j0,k}(x) \dots\dots\dots\dots\dots\dots\dots\dots (2)$$

$$W_\psi(J,K) = \frac{2}{\sqrt{M}}\sum_X f(x)\psi_{j,k}(x) \dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

Now

$$f(x) = \frac{1}{M}\sum_K W_\phi(j0,k)\phi_{j0,k}(x) + \frac{1}{\sqrt{M}}\sum_{J=J0}^{J-1}\sum_K W_{\psi(J,K)}\psi_{J,K}(X) \dots\dots\dots\dots\dots (4)$$

In the value of M measure, the power of 2. The component of transform estimate M number of coefficients the maximum scale j-1 and minimum coefficient is 0, and detail coefficient define in equation 3.

3. Select the decomposed higher frequency and estimate the mean of sample as threshold selection of frequency section
4. Estimate the real value of transform of sample signal x(t). Arrange these signals as ascending order. Now new sequence of signal as:

$$X(k) = (arrange|s|2),(k = 0,1, \dots\dots\dots\dots\dots\dots Nr - 1) \dots\dots\dots\dots\dots\dots\dots\dots ( )$$

Here Nr is length of signal

5. Measure the value of threshold for the selection of frequency

$$k = \sqrt{f(k),(k = 0,1, \dots\dots\dots\dots, Nr-1)}^{th}$$

6. Process of binary function is call for bit representation
7. Framed the bit value of 4-octact vector
8. Change the ordered and sequence of bit with rand () function
9. Finally, key is generated
10. Exit

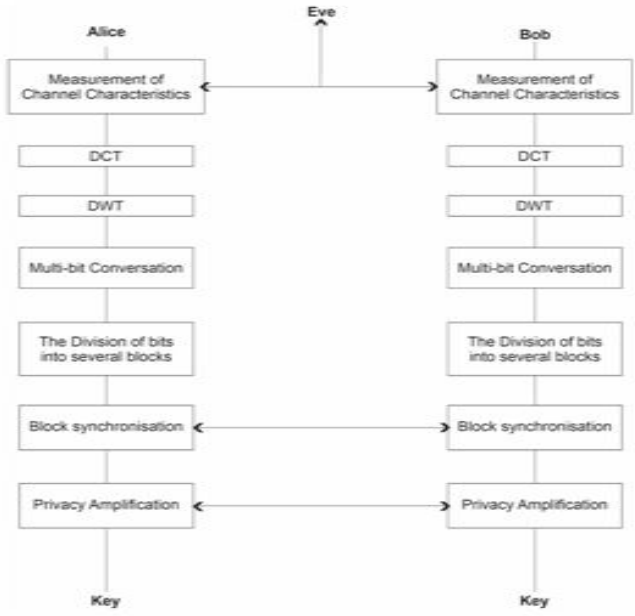


Figure2.4.1: Process block diagram of key generation based on DCT-DWT.

2.5 Methodology WPT

The proposed keys generation algorithm based on three steps as follows channel reciprocity, quantization and amplification. The reduces steps of proposed algorithm, increase the computational and time efficiency of communication model. The proposed algorithm applied the discrete wavelet packet transform for the process of quantization and multi resolution mapping of bit sequence. The process of exchange of information share by cyclic key. The cyclic key is lightweight public cryptography approach for the amplification of message.

The steps of key generation process: -

1. Steps

The Alice (A) , Bob (B) and Eve (E) collect the RSS channel characteristic and proceed these channel parameters with discrete packet transform as

The received signal reciprocity represented as X= []x1,x2,……..,xn]. Where each x signal length is T and the sequence of signal given as $Xs = [xs(0), xs(1, \ldots\ldots\ldots\ldots\ldots xs(T-1$ the response of transform is h0=[h0(1),h0(1),……,h0(k-1)]. The derivation of received strength is

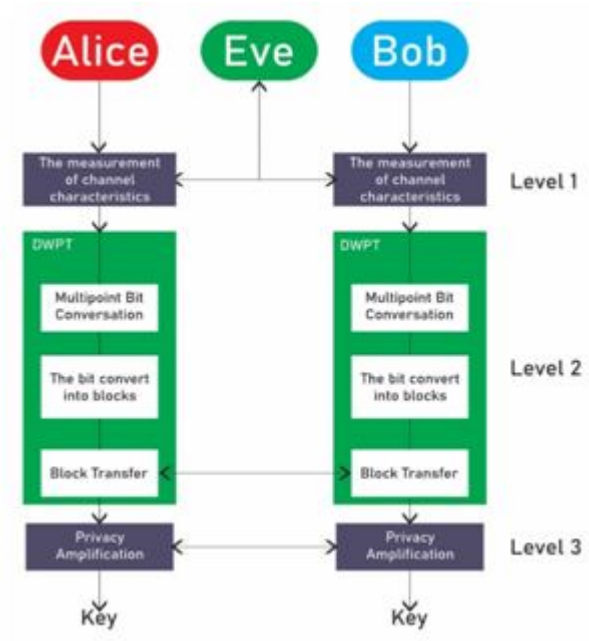
$$yA = [YA^{(s0)}, YA^{(s1)}, \ldots\ldots\ldots\ldots\ldots, YA(n)]T \ldots\ldots (2)$$

$$yB = [YB^{(s0)}, YB^{(s1)}, \ldots\ldots\ldots\ldots\ldots, YB(n)]T \ldots\ldots (3)$$

$$yE = [YE^{(s0)}, YE^{(s1)}, \ldots\ldots\ldots\ldots\ldots, YE(n)]T \ldots\ldots (4)$$

$$yE' - [YE'^{(s0)}, YE'^{(s1)}, \ldots\ldots\ldots\ldots\ldots, YE'(n)]T \ldots\ldots (5)$$

2. Steps



The second step phase of proposed method to convert the channel characteristic Yu, in multi-resolution bit with WPT methods.

Derive the level of quantization of transform function with the length of transform M=4

$$h1(n) = (-1)^n ho(M-1-n) \ldots\ldots\ldots\ldots\ldots\ldots (6)$$

The factor of H1 and H0 are symmetrically similar and orthogonal set of signals and represents as

$$H0H = 1, H1H1 = 1, H0H1 = 0 \ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Now the projection of signal with space factor for the quantization level

P0-H0xs, P1=H1xs……..(8)

The resulting bits of sequence is

$$Rs \begin{cases} Yu \le Ho - \left(\frac{\delta}{\varepsilon}\right), 00 \\ \delta u - \left(\frac{\delta}{\varepsilon}\right) < H*, 01 \\ \delta u \le Yu < H1 + \left(\frac{\delta}{\varepsilon}\right), 11 \\ YU \ge \left(\frac{\delta}{\varepsilon}\right) + H0, 10 \end{cases} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

Here the $\frac{\delta}{\varepsilon}$ is the ratio of entropy and energy of different signal sub-bands of transform with level =M.

Now the set of key generation is code $Gd = [G(1), G(2), \ldots\ldots, Gd(n)]^M \ldots\ldots\ldots\ldots\ldots\ldots (9)$

3. Steps

The last and final step for key generation methods is privacy amplification, the process of privacy amplification increases the randomness factor of generated bit of sequence and prevent with the man in middle attack and some other Eve factor in communication model. The process of this decides the size of block bit, here uses both variable and fixed. The process of amplification applies cyclic key process. The cyclic key process is round of circle and left the previous value of generation process and reduces the computational overhead of process. The relation of length of bit and their correction ability is:-

$$CK=1-\left(\frac{1}{2}\right) \ge sS = \lceil log_{1/2}(1-c] \ldots\ldots\ldots\ldots\ldots\ldots 10$$

Figure 3. Process model of key generation method based on discrete wavelet packet transform.

2.7 Validation of the Framework

The validation of the proposed framework derives from mathematical modelling and the simulation process. The process of validation following steps:

- Derive the mathematical function of Langrage's equation of signals coordinate points.
- The Coordinates point intersects with the noise.
- The derive function cancels the impact of noise.
- The proposed Algorithm simulates in MATLAB environments.
- Estimate empirical parameters such as BER, KAR, KLR and entropy
- The maximum value of entropy suggests that the proposed framework is efficient with other algorithms
- The reduced values of bit mismatch tell the story of success.
- The cancellation of the noise factor increases the acceptance of the Algorithm.

3. Simulation Tool Matlab

For the performance evaluation of feature reduction classifier technique used MATLAB software package. MATLAB is a product bundle for elite numerical calculation and perception. It furnishes an intelligent situation with several implicit capacities for specialized calculation, designs and liveliness. The best part is that it likewise gives simple extensibility its very own abnormal state programming dialect. The MATLAB represents lattice research facility. There are likewise a few discretionary; tool compartments; accessible from the designers of MATLAB. These tool stashes are accumulations of capacities composed for uncommon applications, for example, representative calculation, picture handling, insights, control framework plan, neural systems and so forth the rundown of tool stash continues developing with time. There is presently in excess of 50 such tool stashes. A standout among highlights of MATLAB is its stage freedom. When you are in MATLAB, generally, it doesn't make a difference which PC you are on. All directions work a similar way. The main directions that contrast are the ones that fundamentally rely upon the neighborhood working framework, for example, altering and sparing M-records. Projects written in the MATLAB dialect work the very same path on all PCs [14].

3.1 Performance Parameters

For the validation of algorithms measure following standard parameters [25, 18, 19, 20].

- Bit Error Rate (BER): Between the two generated bits, BER denotes the bit mismatch probability.
- Key Agreement Rate (KAR): Generally, the probability of generating identical keys with no bit errors is denoted by KAR.
- Key Leakage Rate (KLR): the probability of Eve reconstructing the key using the unencrypted syndrome is denoted by KLR.
- Entropy: With entropy that is ideally 1, the generated key should be random.

3.2 Implementation Analysis

3.2.1 Scenario-I

Figure 3.2.1.1: Window show that the GUI of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here we can see the three input field's number of node, distance and indoor (1)/outdoor (2).

Figure 3.2.1.2: Window show that the GUI of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here we can see the three input fields number of node is 10, distance is 10 and indoor (1).

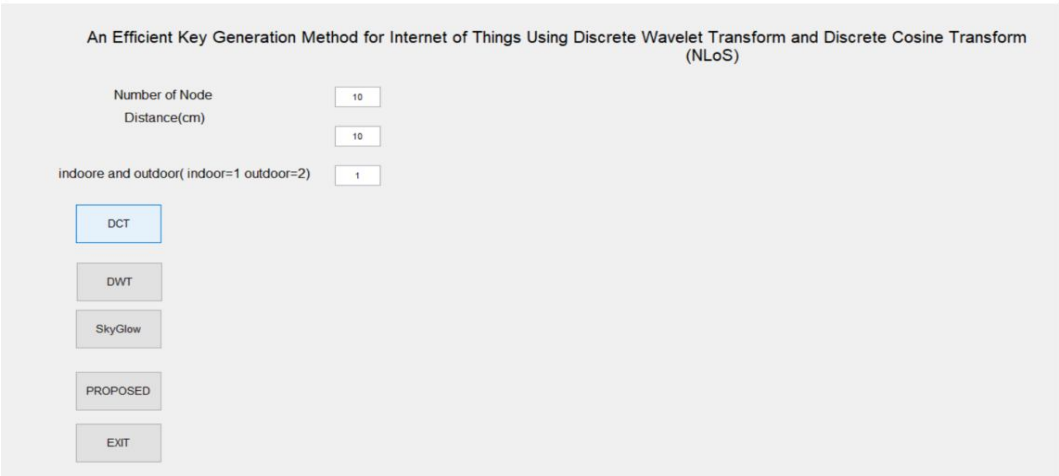


Figure 3.2.1.3: Window show that the GUI of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit DCT technique button and we can see the three input fields number of node is 10, distance is 10 and indoor (1).

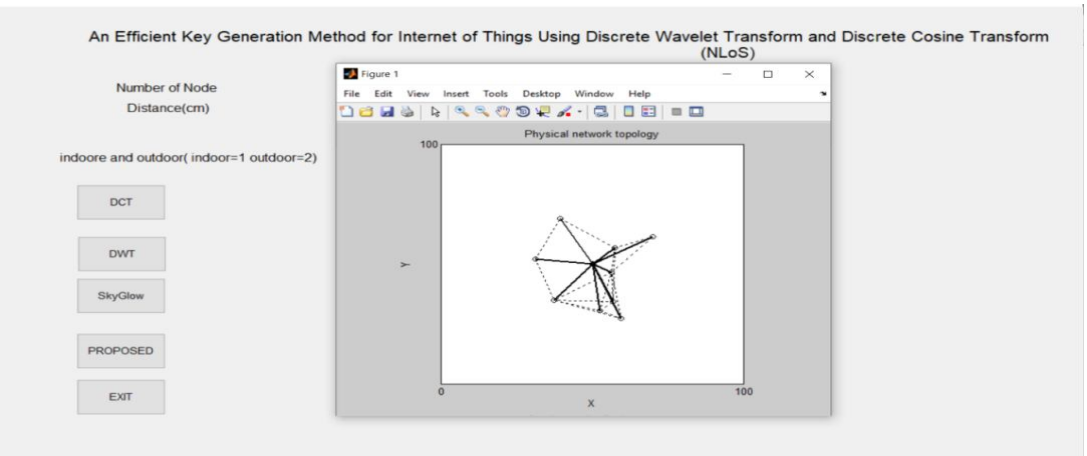


Figure 3.2.1.4: Window show that the output of physical network topology with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit DCT technique button and we can see the three input fields number of node is 10, distance is 10 and indoor (1).

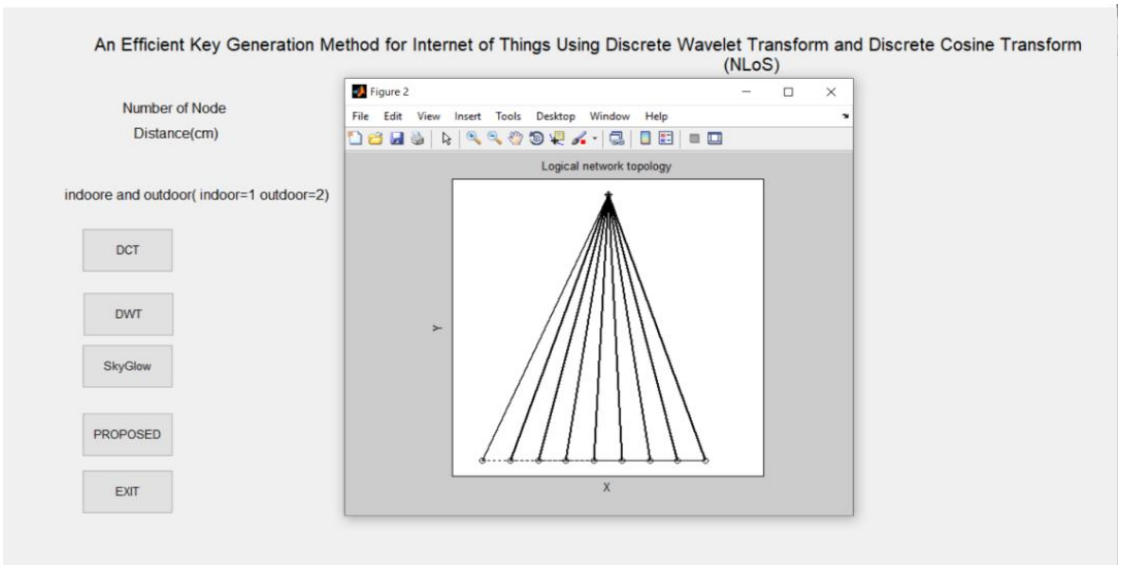


Figure 3.2.1.5: Window show that the output of physical network topology with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit DCT technique button and we can see the three input fields number of node is 10, distance is 10 and indoor(1).

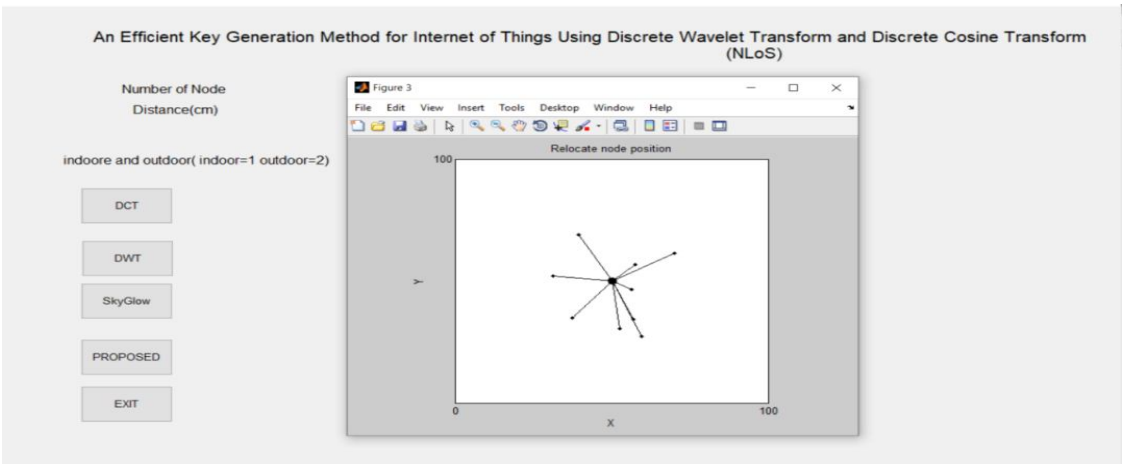


Figure 3.2.1.6: Window show that the output of relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit DCT technique button and we can see the three input fields number of node is 10, distance is 10 and indoor (1).

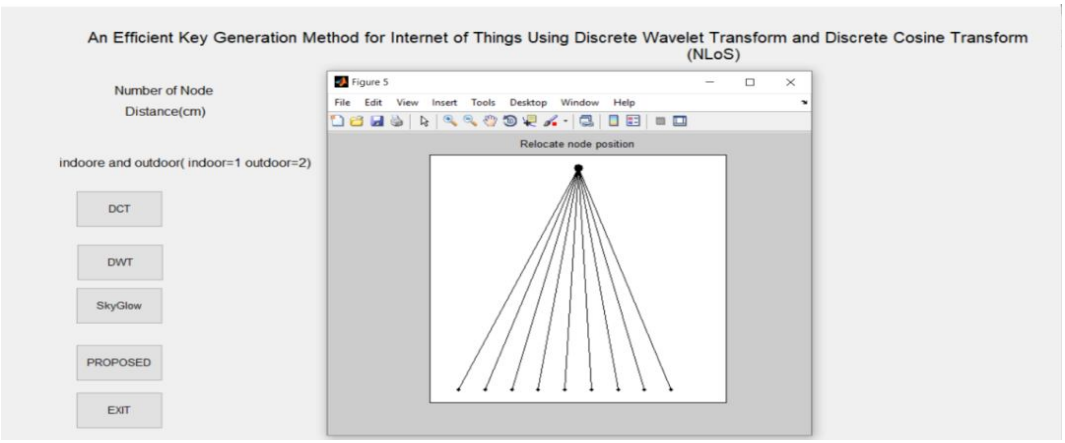


Figure 3.2.1.7: Window show that the output of relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit DCT technique button and we can see the three input fields number of node is 10, distance is 10 and indoor(1).

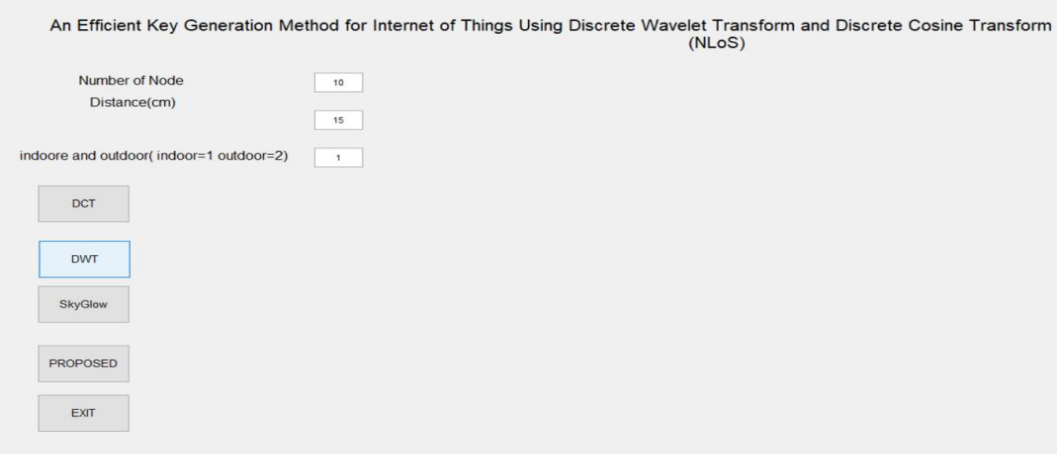


Figure 3.2.1.8: Window show that the output of GUI of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit DWT technique button and we can see the three input fields number of node is 10, distance is 15 and indoor (1).

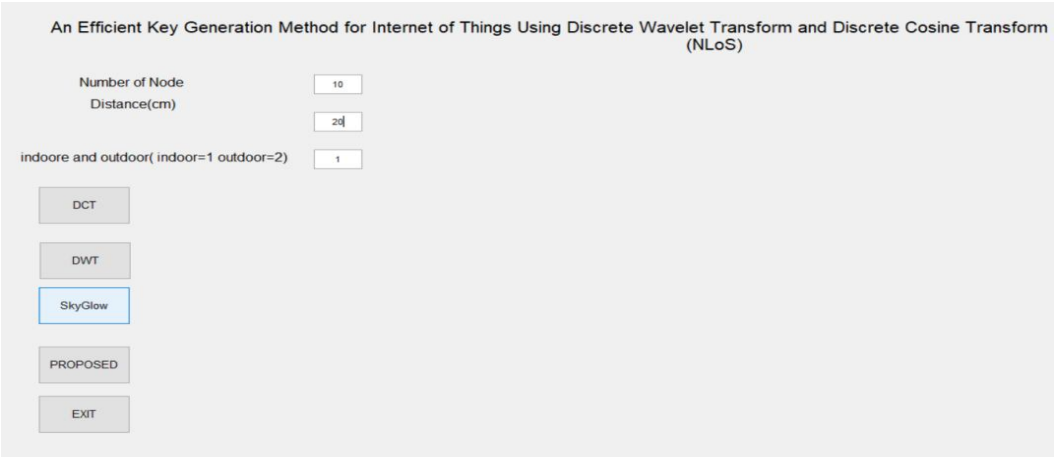


Figure 3.2.1.9: Window show that the output of GUI of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit Skyglow technique button and we can see the three input fields number of node is 10, distance is 20 and indoor(1).

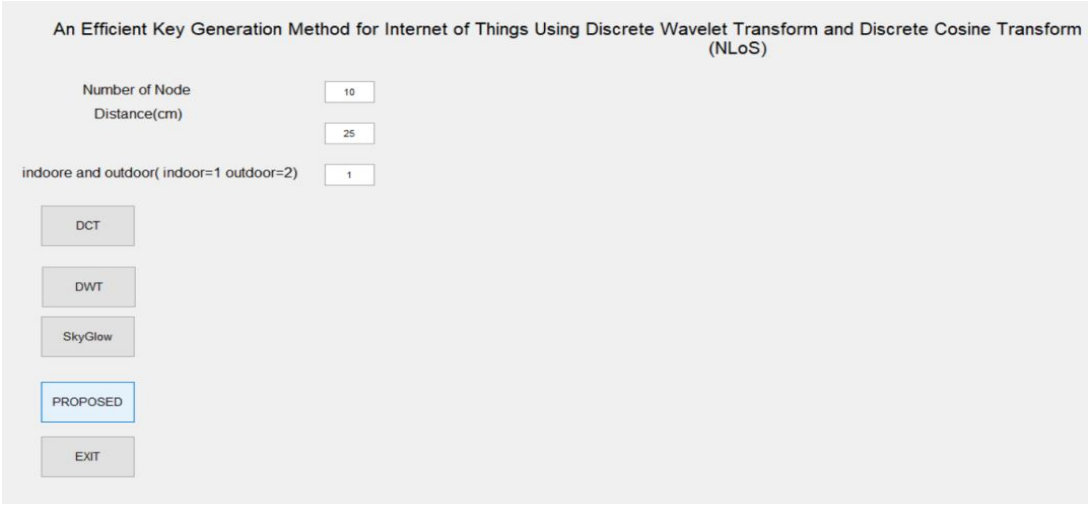


Figure 3.2.1.10: Window show that the output of GUI of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit Proposed technique button and we can see the three input fields number of node is 10, distance is 25 and indoor(1).

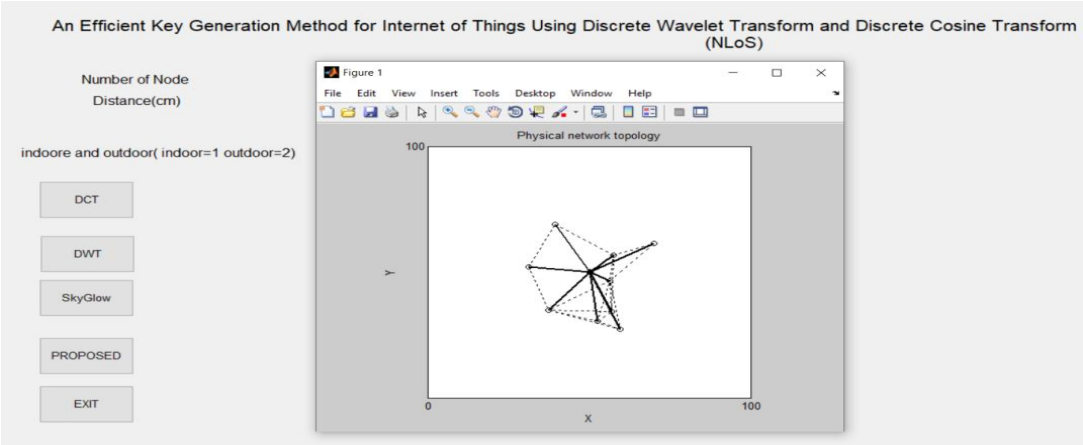


Figure 3.2.1.11: Window show that the output of physical network topology with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit Proposed technique button and we can see the three input fields number of node is 10, distance is 25 and indoor(1).

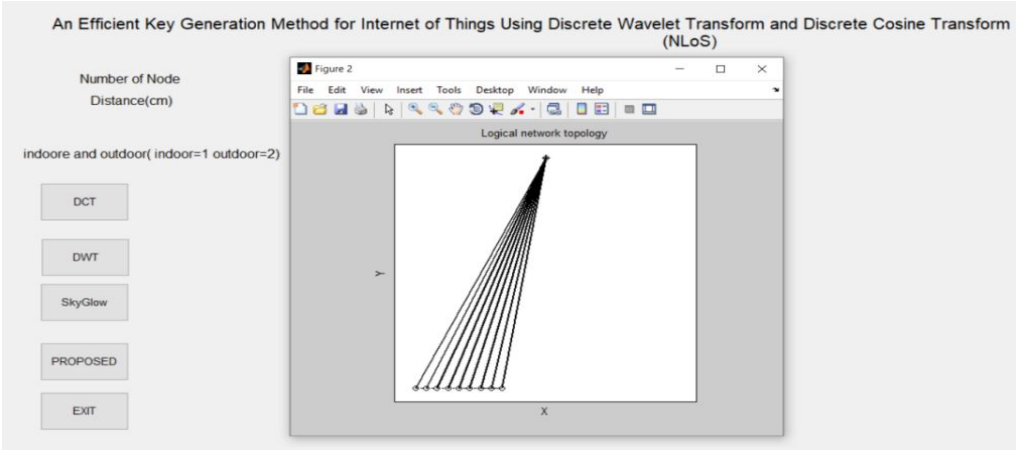


Figure 3.2.1.12: Window show that the output of physical network topology with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit Proposed technique button and we can see the three input fields number of node is 10, distance is 25 and indoor(1).

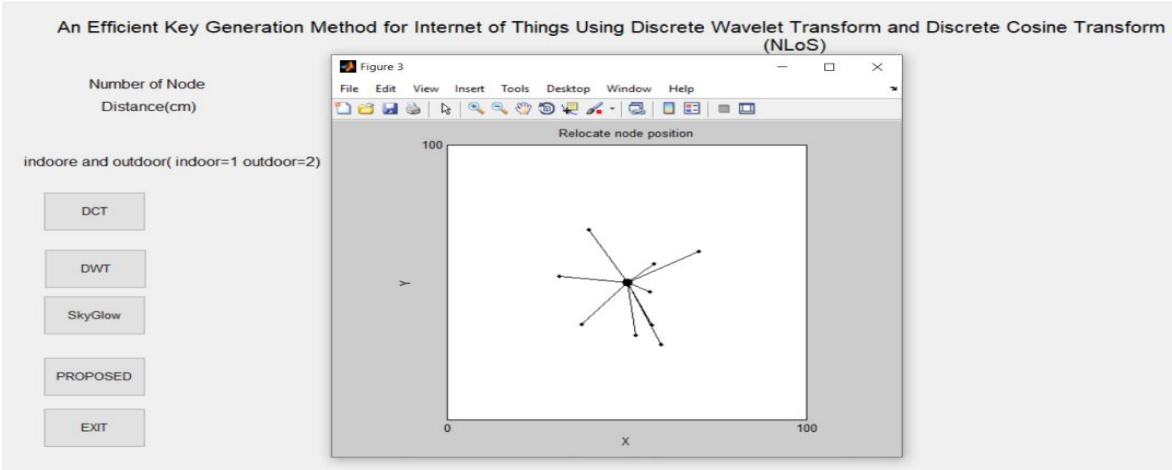


Figure 3.2.1.13: Window show that the output of relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit Proposed technique button and we can see the three input fields number of node is 10, distance is 25 and indoor(1).

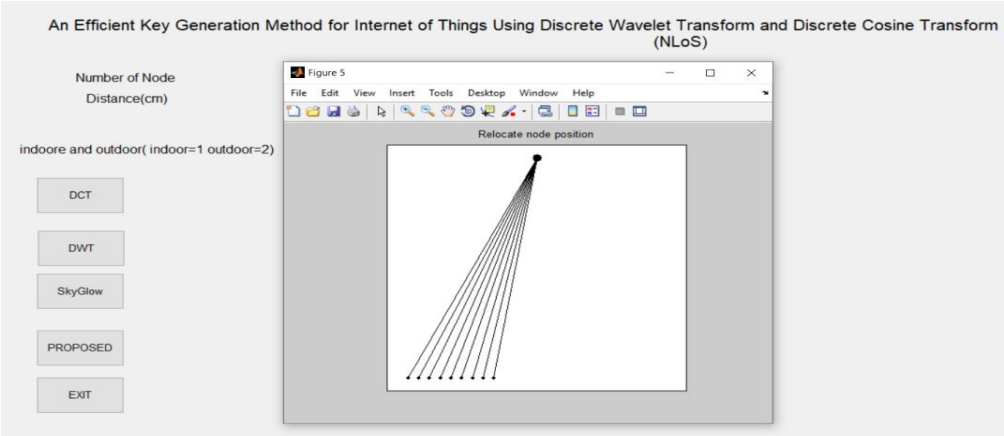


Figure 3.2.1.14: Window show that the output of relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit Proposed technique button and we can see the three input fields number of node is 10, distance is 25 and indoor(1).

3.2.2 SCENARIO-II

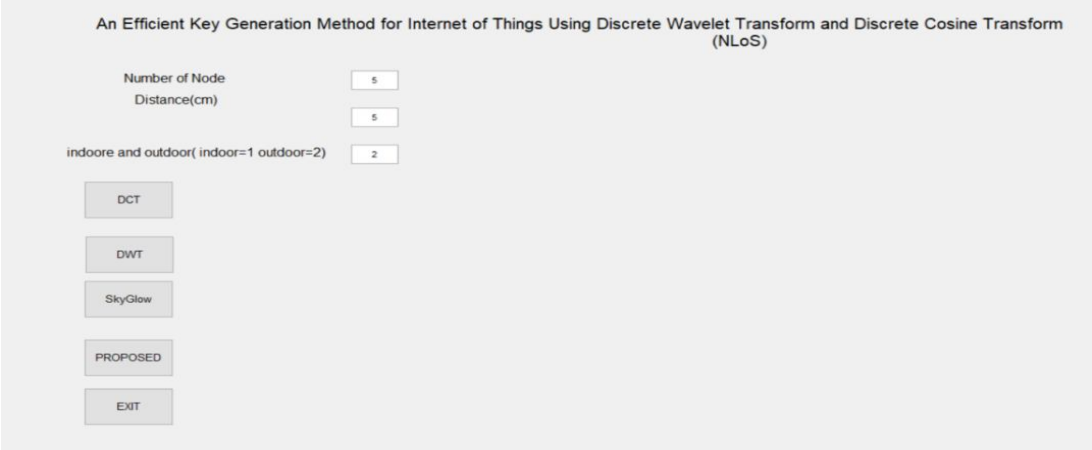


Figure 3.2.2.1: Window show that the GUI of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here we can see the three input fields number of node is 5, distance is 5 and outdoor (2).

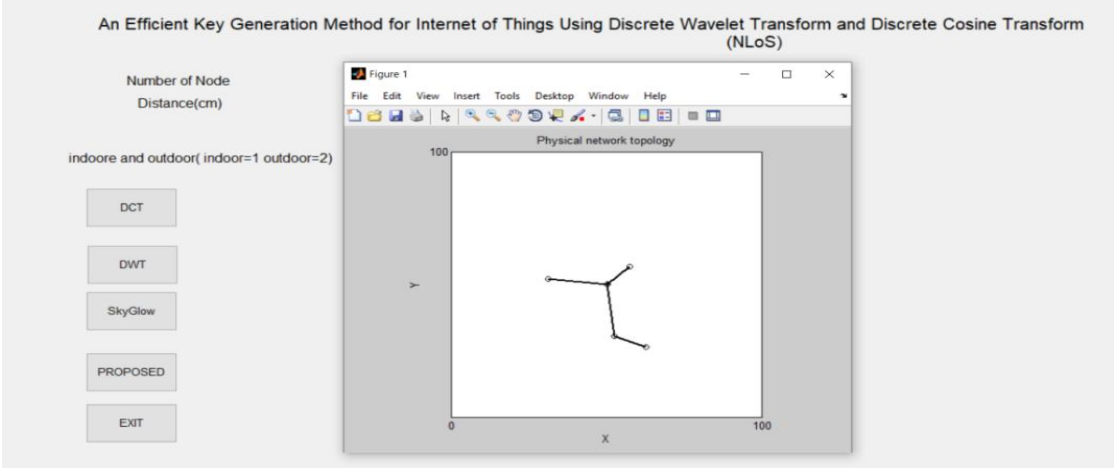


Figure 3.2.2.2: Window show that the output of physical network topology with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit DCT technique button and we can see the three input fields number of node is 5, distance is 5 and outdoor(2).

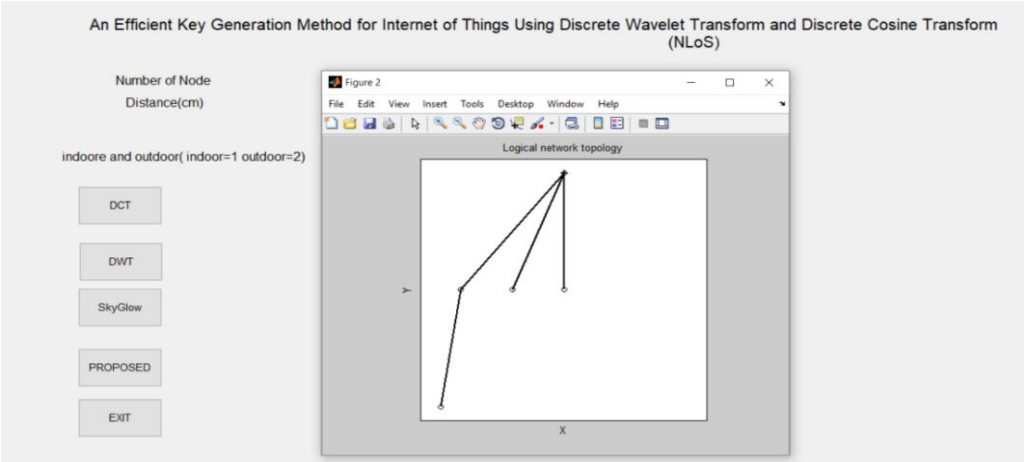


Figure 3.2.2.3: Window show that the output of physical network topology with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit DCT technique button and we can see the three input fields number of node is 5, distance is 5 and outdoor(2).

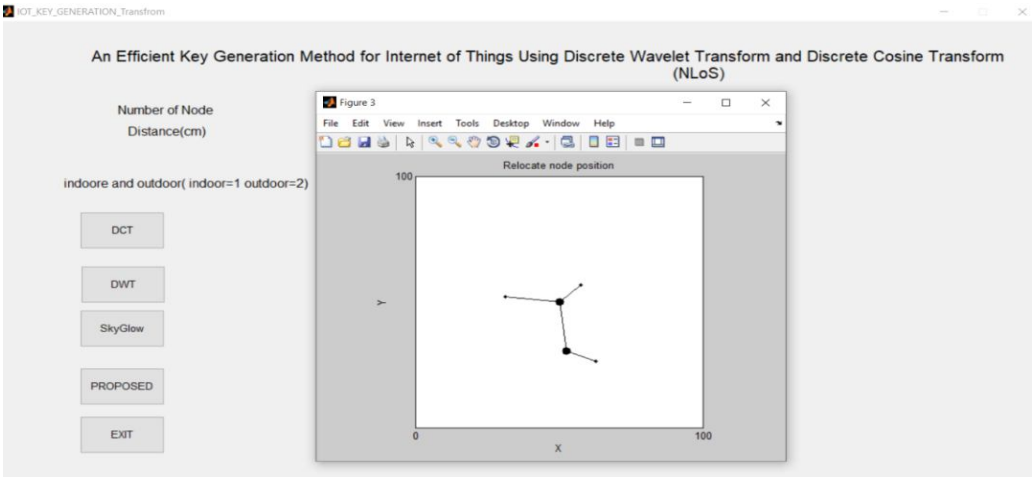


Figure 3.2.2.4: Window show that the output of relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit DCT technique button and we can see the three input fields number of node is 5, distance is 5 and outdoor(2).

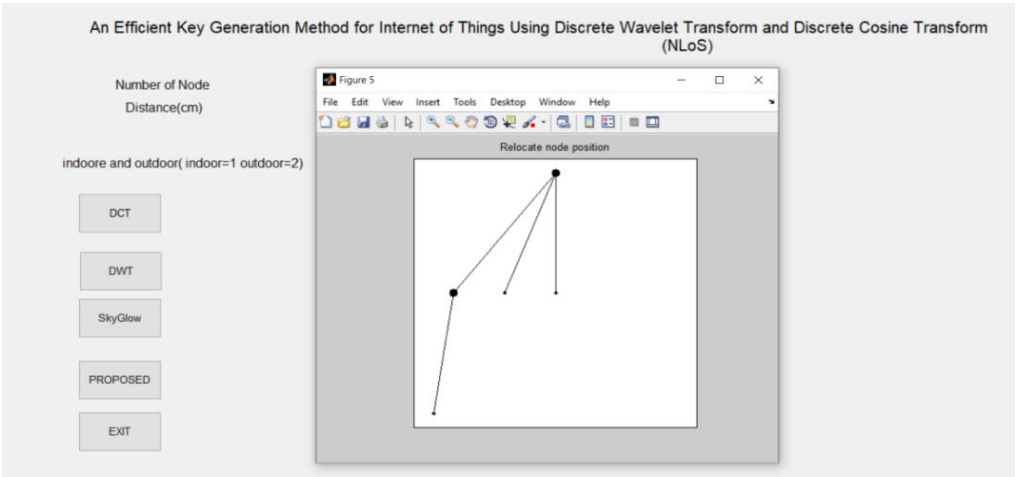


Figure 3.2.2.5: Window show that the output of relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit DCT technique button and we can see the three input fields number of node is 5, distance is 5 and outdoor(2).

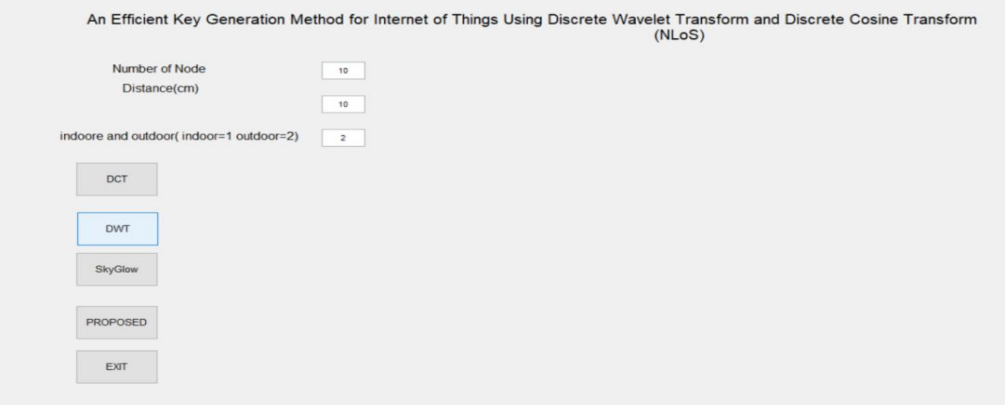


Figure 3.2.2.6: Window show that the output of relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit DWT technique button and we can see the three input fields number of node is 5, distance is 5 and outdoor(2).

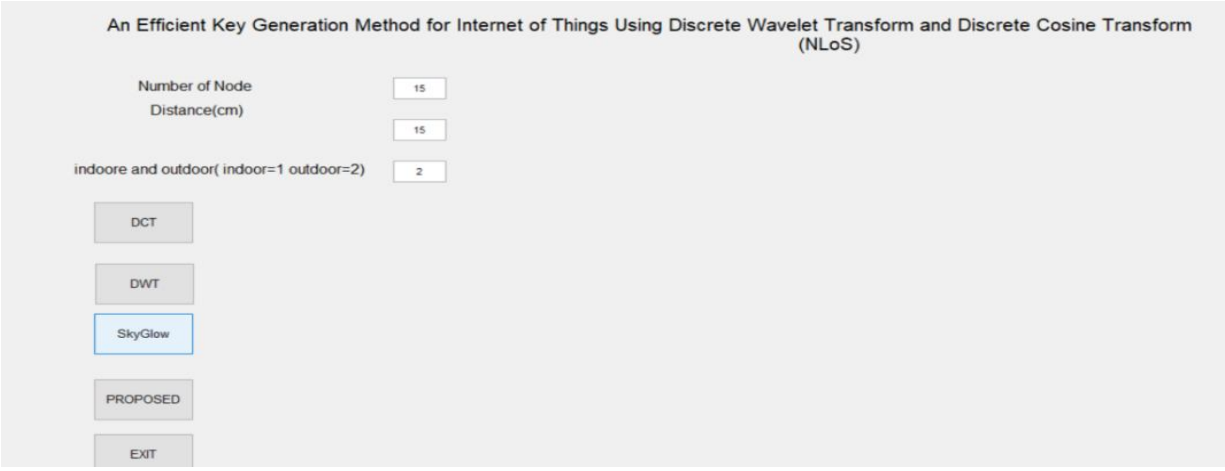


Figure 3.2.2.7: Window show that the output of relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit Skyglow technique button and we can see the three input fields number of node is 5, distance is 5 and outdoor(2).

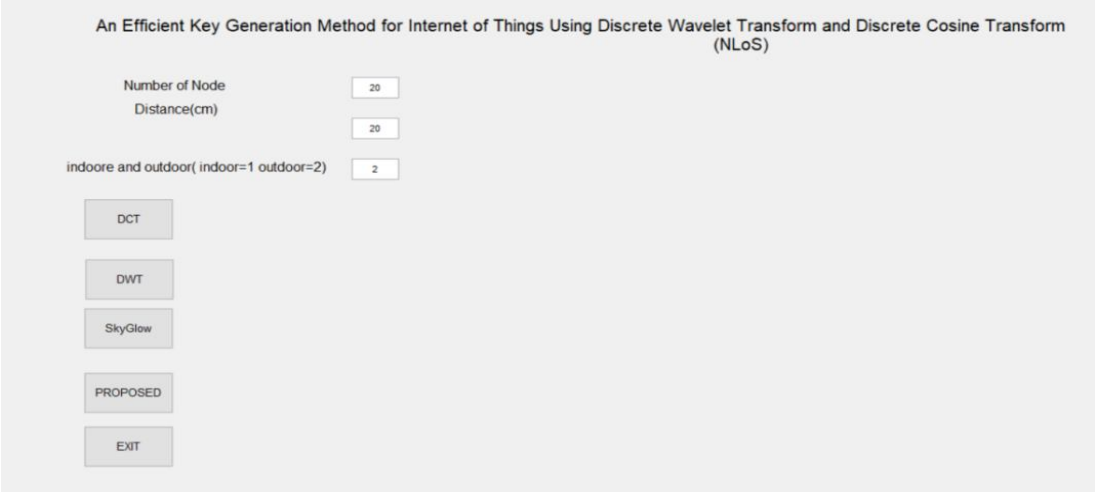


Figure 3.2.2.8: Window show that the output of relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if nLoS. Here hit Proposed technique button and we can see the three input fields number of node is 5, distance is 5 and outdoor(2).

4.2.3 SCENARIO-III

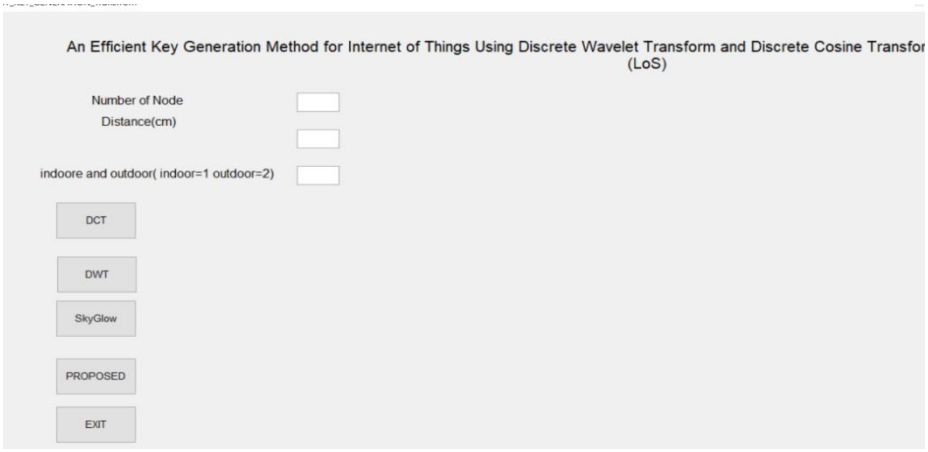


Figure 3.2.3.1: Window show that the GUI of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here we can see the three input fields number of node, distance and indoor(1)/outdoor(2).

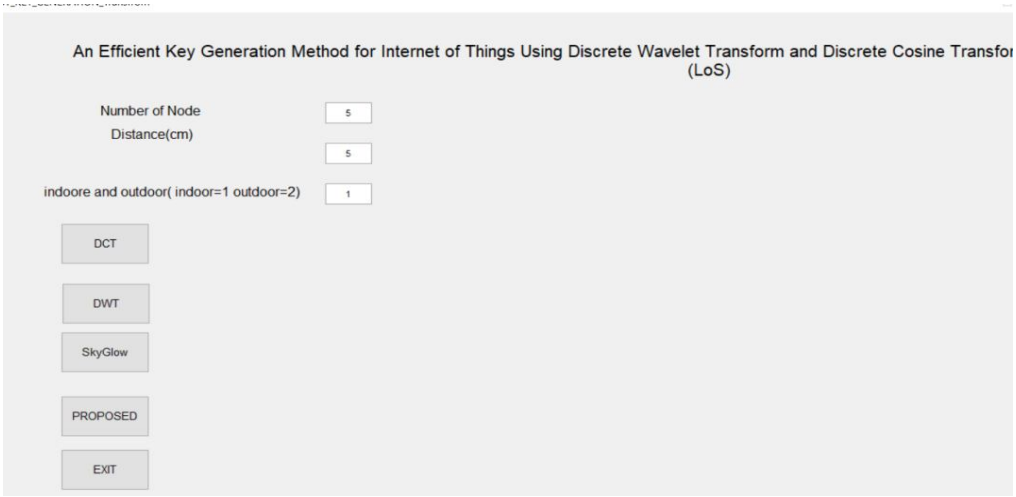


Figure 4.2.3.2: Window show that the output of GUI of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here we can see the three input fields number of node is 5, distance is 5 and indoor(1).

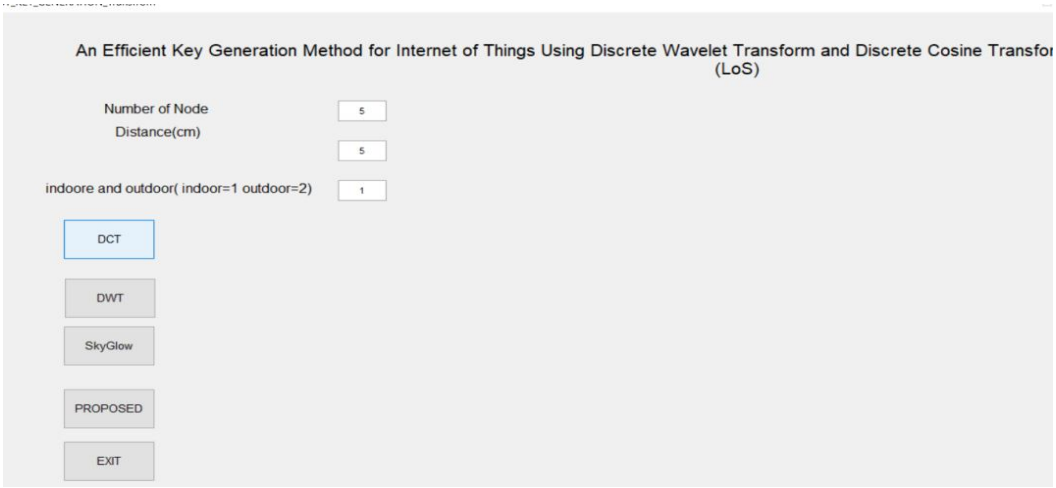


Figure 3.2.3.3: Window show that the output of GUI of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit DCT technique button and we can see the three input fields number of node is 5, distance is 5 and indoor(1).

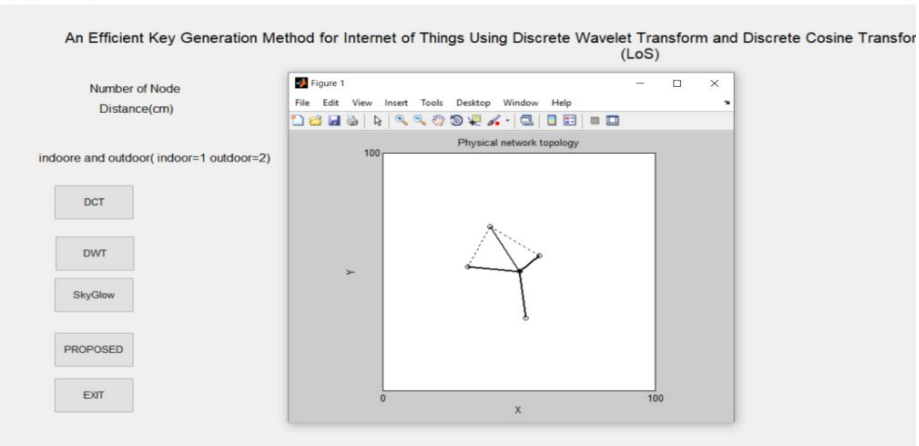


Figure 3.2.3.4: Window show that the output of physical network topology with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit DCT technique button and we can see the three input fields number of node is 5, distance is 5 and indoor(1).

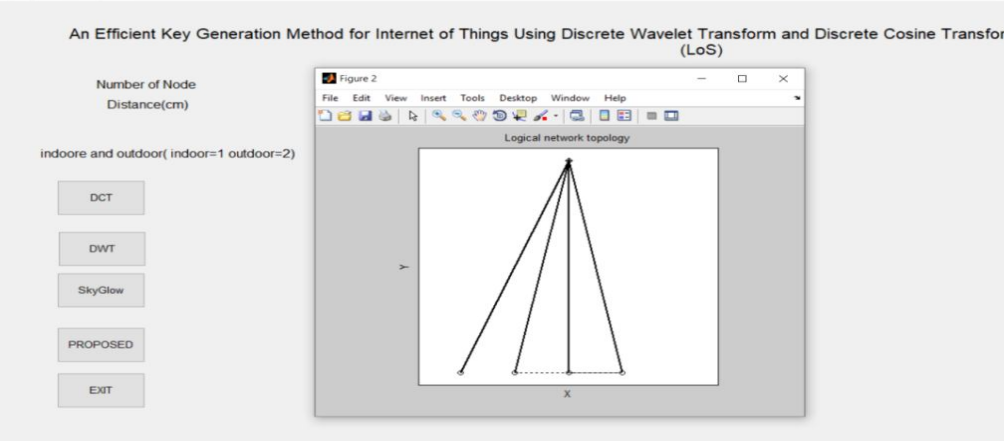


Figure 3.2.3.5: Window show that the output of physical network topology with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit DCT technique button and we can see the three input fields number of node is 5, distance is 5 and indoor(1).

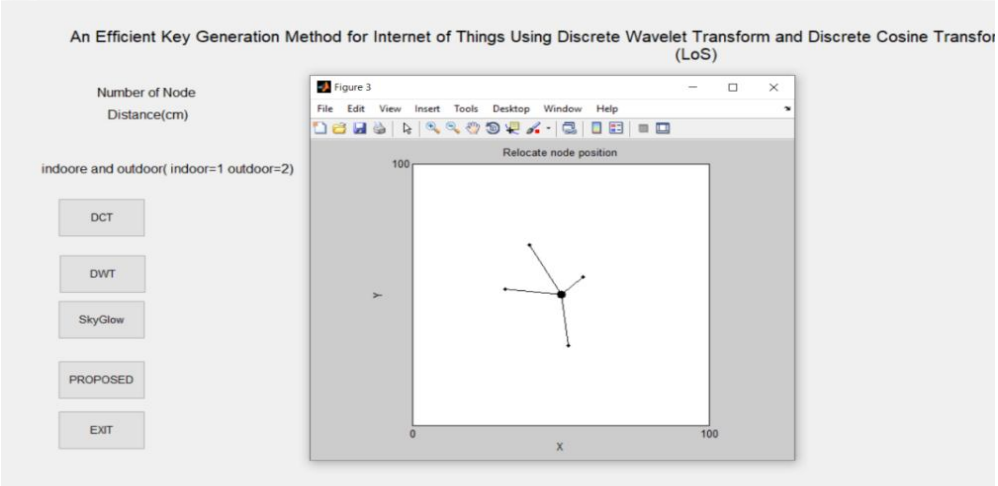


Figure 3.2.3.6: Window show that the output of relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit DCT technique button and we can see the three input fields number of node is 5, distance is 5 and indoor(1).

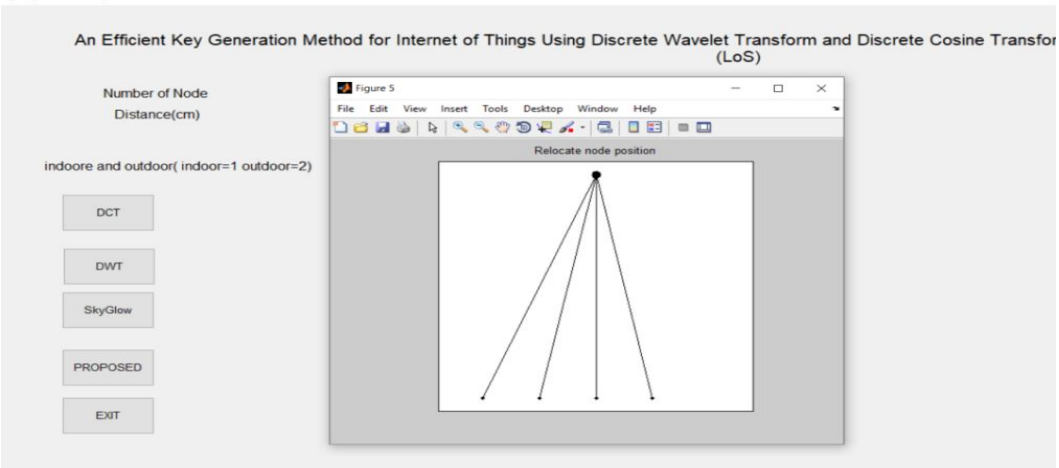


Figure 3.2.3.7: Window show that the output of relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit DCT technique button and we can see the three input fields number of node is 5, distance is 5 and indoor(1).

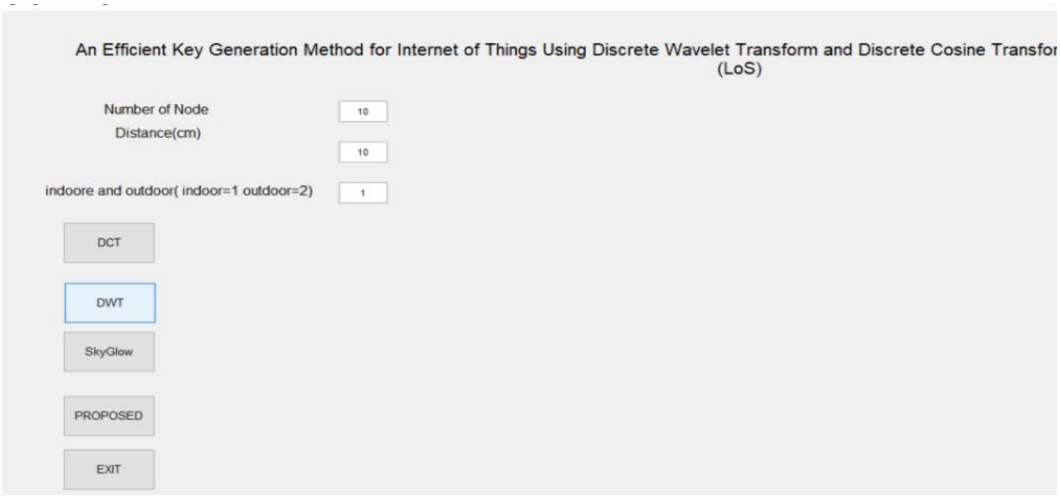


Figure 3.2.3.8: Window show that the output of GUI of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit DWT technique button and we can see the three input fields number of node is 10, distance is 10 and indoor(1).

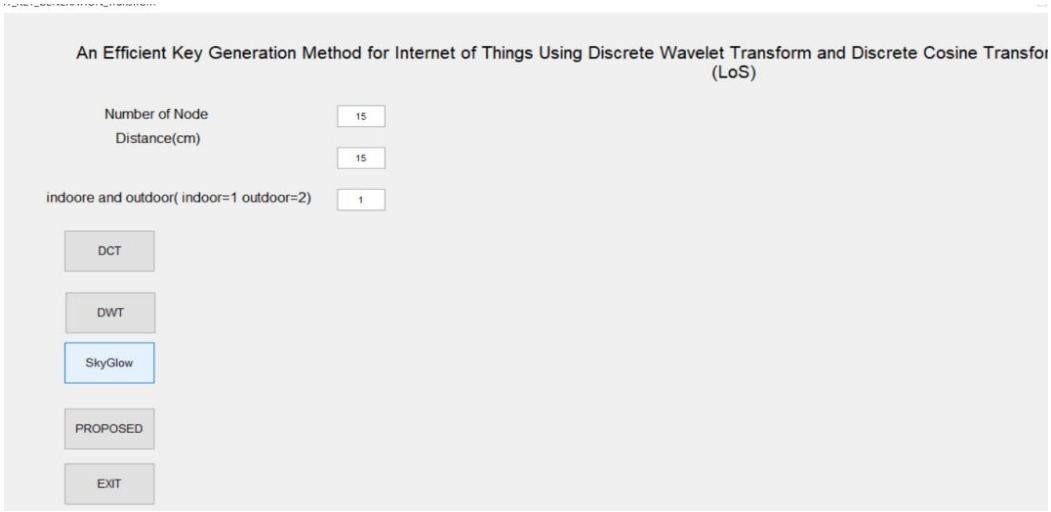


Figure 3.2.3.9: Window show that the output of GUI of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit Skyglow technique button and we can see the three input fields number of node is 15, distance is 15 and indoor(1).

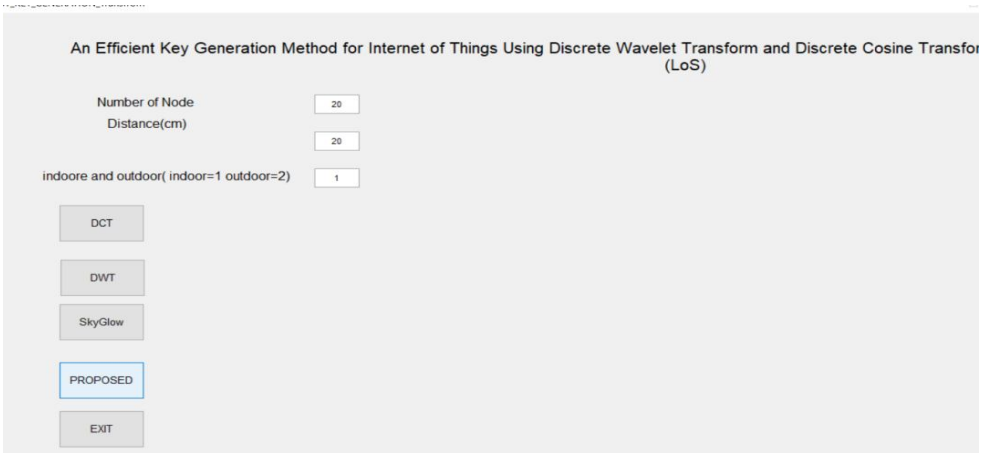


Figure 3.2.3.10: Window show that the output of GUI of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit Proposed technique button and we can see the three input fields number of node is 20, distance is 20 and indoor(1).

4.2.4 SCENARIO-IV

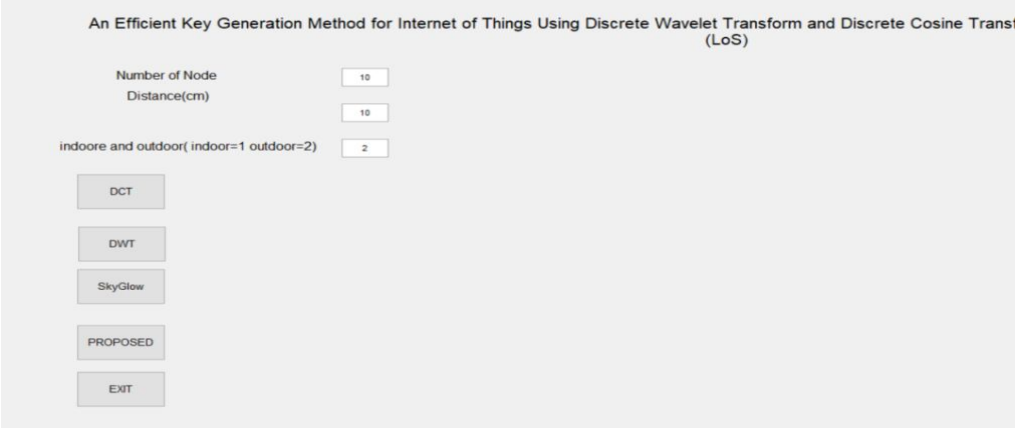


Figure 3.2.4.1: Window show that the GUI of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here we can see the three input fields number of node is 10, distance is 10 and outdoor(2).

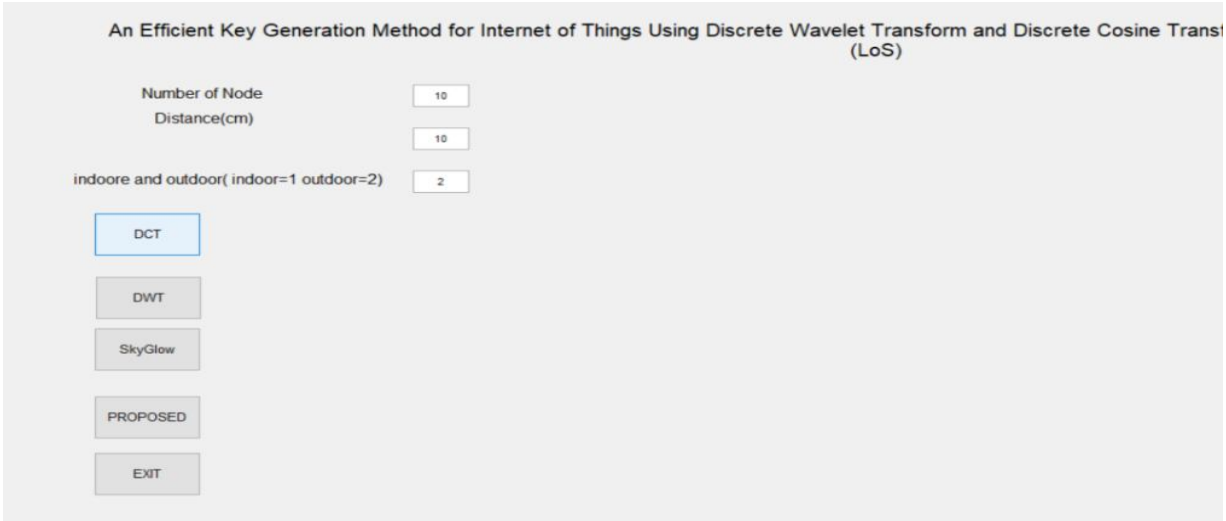


Figure 3.2.4.2: Window show that the GUI of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit the DCT technique button we can see the three input fields number of node is 10, distance is 10 and outdoor(2).

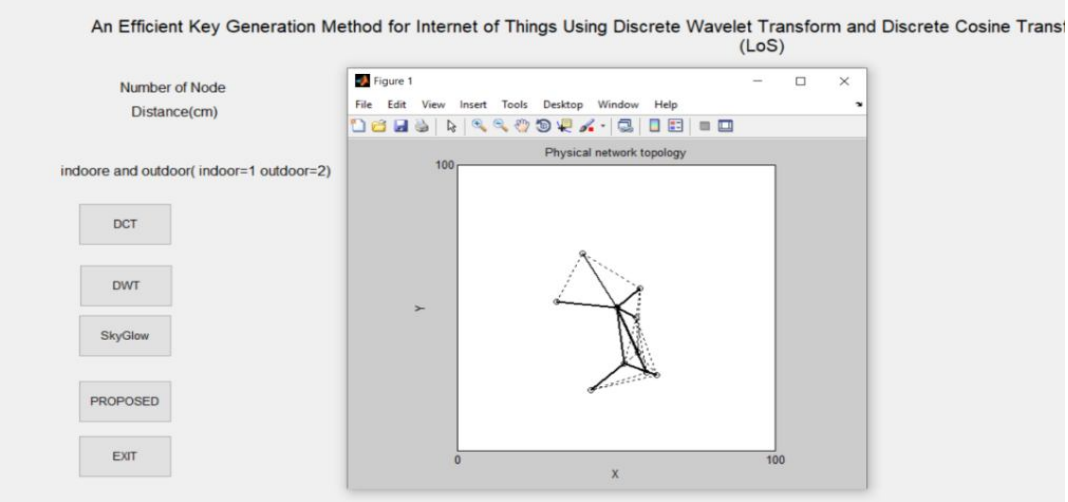


Figure 3.2.4.3: Window show that the physical network topology with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit the DCT technique button we can see the three input fields number of node is 10, distance is 10 and outdoor(2).

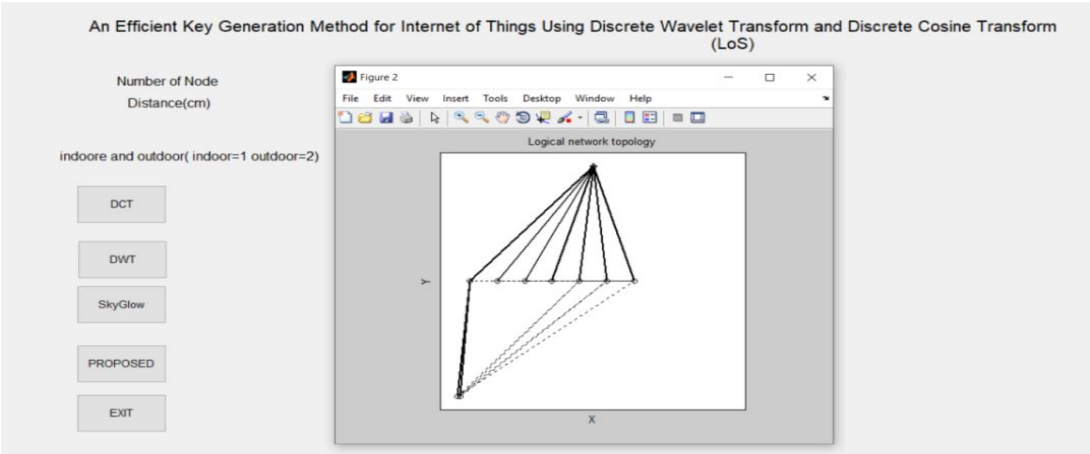


Figure 3.2.4.4: Window show that the physical network topology with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit the DCT technique button we can see the three input fields number of node is 10, distance is 10 and outdoor(2).

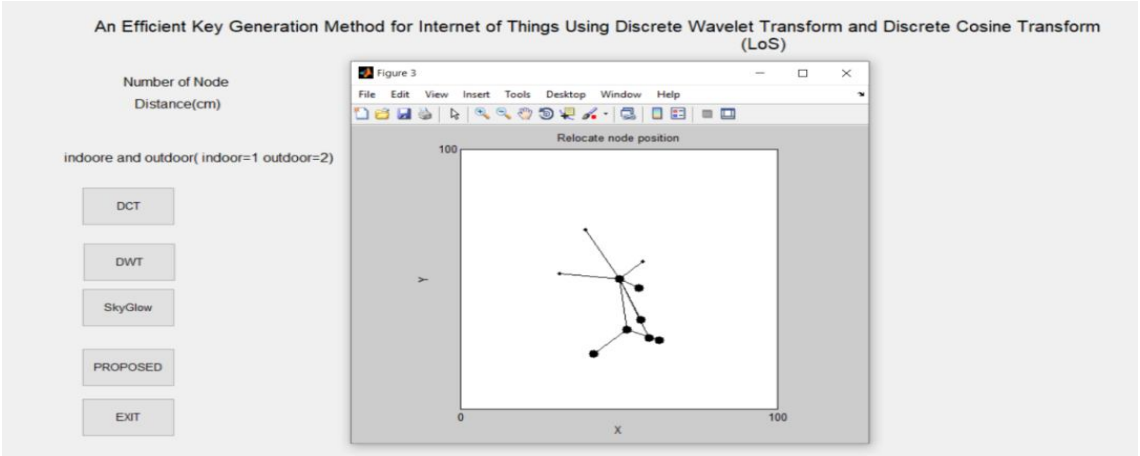


Figure 3.2.4.5: Window show that the relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit the DCT technique button we can see the three input fields number of node is 10, distance is 10 and outdoor(2).

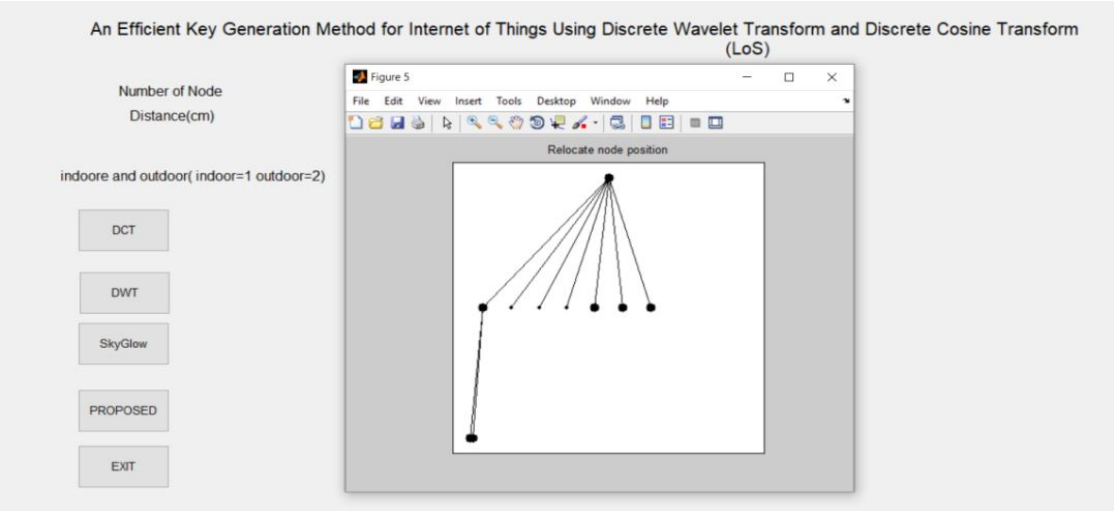


Figure 3.2.4.6: Window show that the relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit the DCT technique button we can see the three input fields number of node is 10, distance is 10 and outdoor(2).

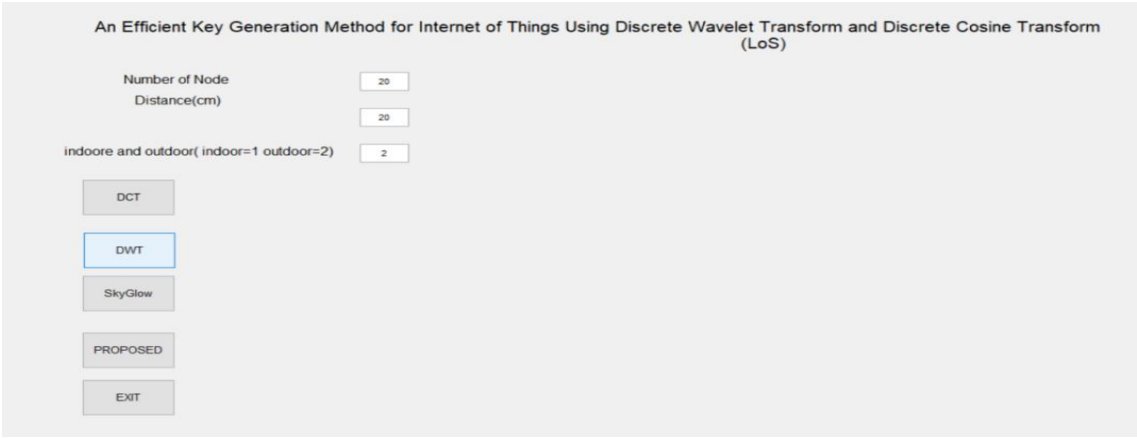


Figure 3.2.4.7: Window show that the relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit the DCT technique button we can see the three input fields number of node is 20, distance is 20 and outdoor(2).

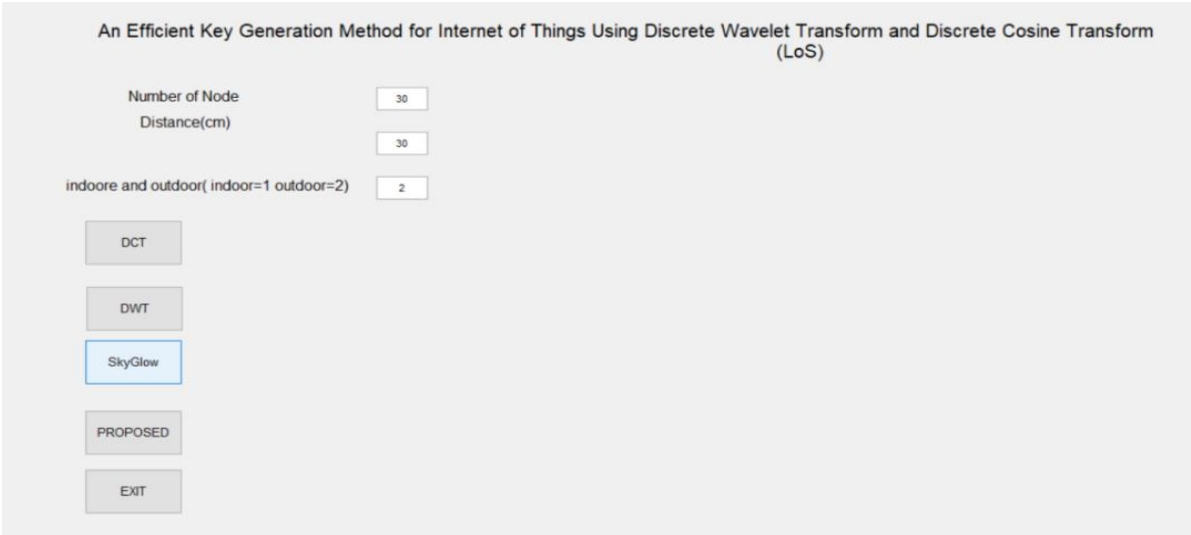


Figure 3.2.4.8: Window show that the relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit the Skyglow technique button we can see the three input fields number of node is 30, distance is 30 and outdoor(2).

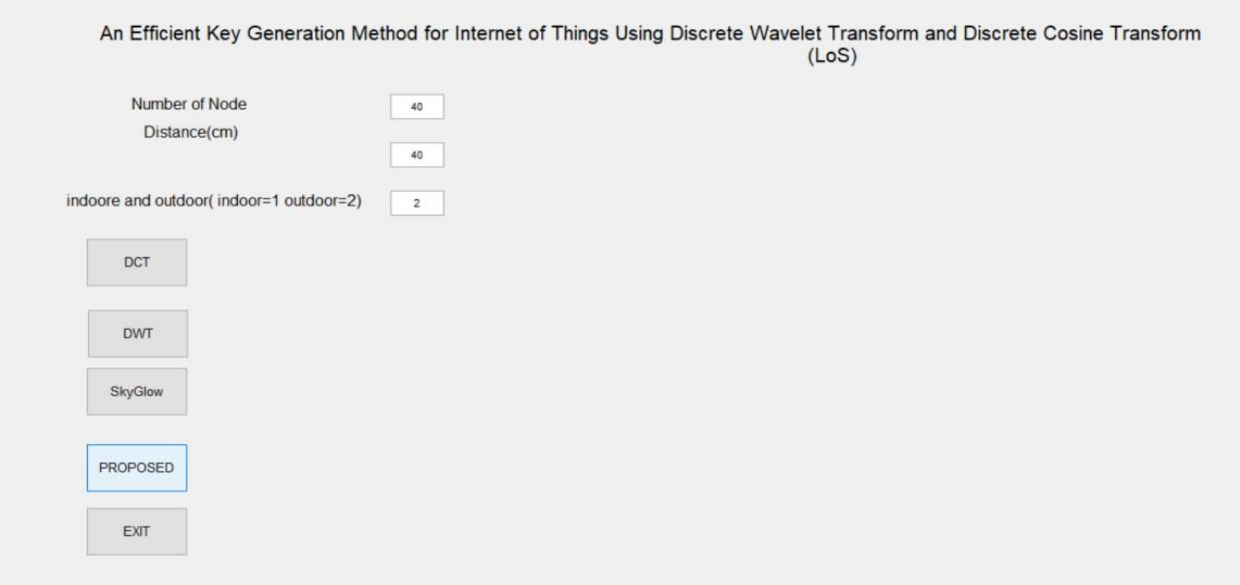


Figure 3.2.4.9: Window show that the relocate node position with x-axis and y-axis of an efficient generation method for IoTs using DWT and DCT in case if LoS. Here hit the Proposed technique button we can see the three input fields number of node is 40, distance is 40 and outdoor(2).

4. Data Analysis AND Result

4.1 Scenario-I

Table 4.1.1: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.58	0.58	0.58	0.56
KAR	0.89	0.89	0.90	0.92
KLR	0.008	0.008	0.008	0.009
Entropy	0.89	0.91	0.94	0.86

Table 4.1.2: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.67	0.67	0.65	0.64
KAR	0.84	0.85	0.84	0.88
KLR	0.007	0.008	0.007	0.008
Entropy	0.85	0.86	0.86	0.84

Table 4.1.3: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.79	0.79	0.79	0.78
KAR	0.88	0.86	0.89	0.90
KLR	0.005	0.005	0.007	0.008
Entropy	0.79	0.75	0.74	0.70

Table 4.1.4: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.55	0.56	0.55	0.53
KAR	0.78	0.79	0.78	0.75
KLR	0.007	0.007	0.008	0.008
Entropy	0.90	0.90	0.91	0.88

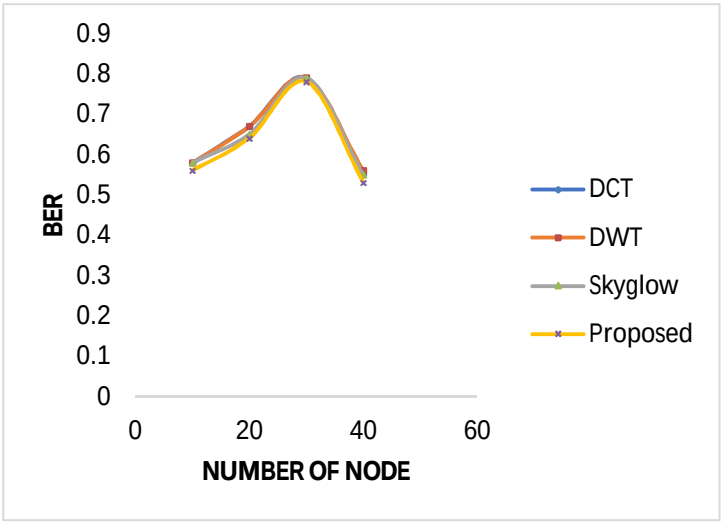


Figure 4.1.1: Comparative performance of different techniques for BER with number of nodes 10, 20, 30, 40.

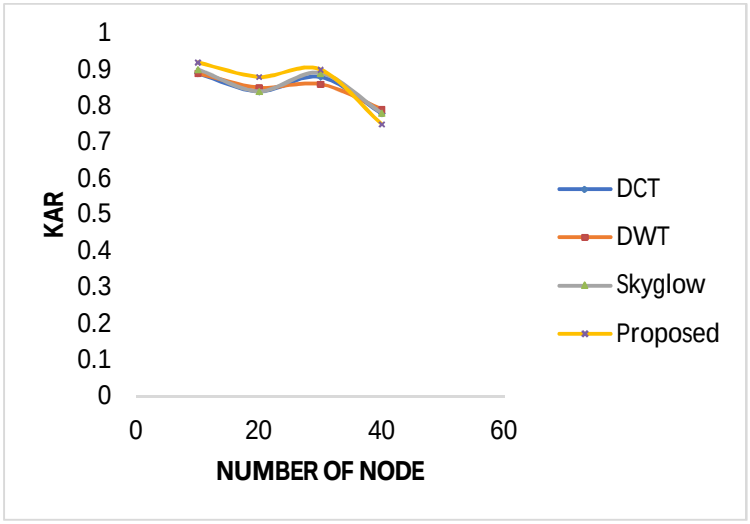


Figure 4.1.2: Comparative performance of different techniques for KAR with number of nodes 10, 20, 30, 40.

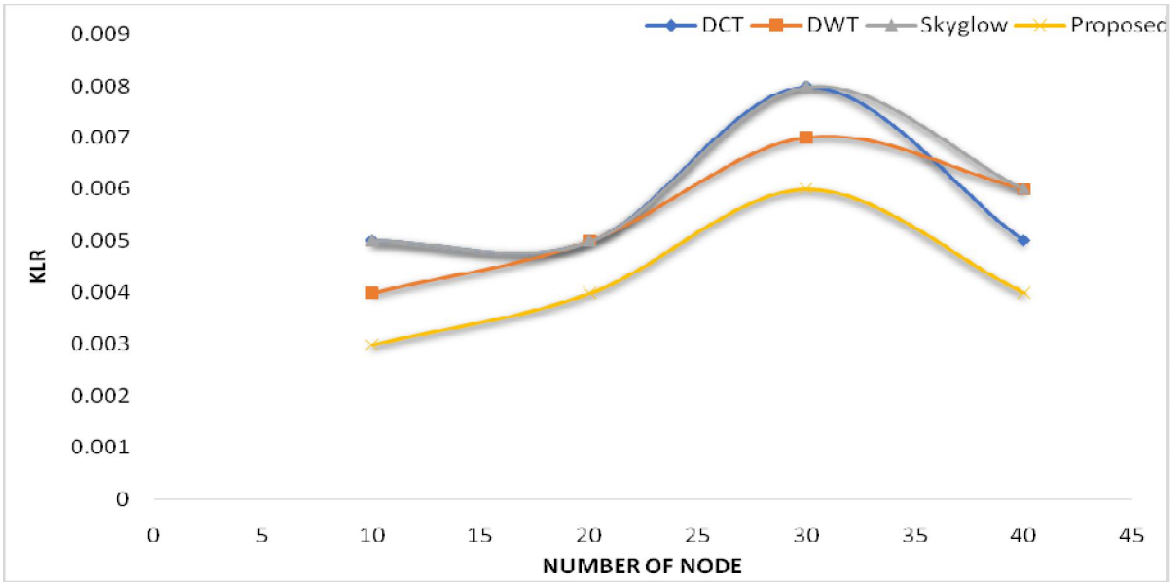


Figure 4.1.3: Comparative performance of different techniques for KLR with number of nodes 10, 20, 30, 40.

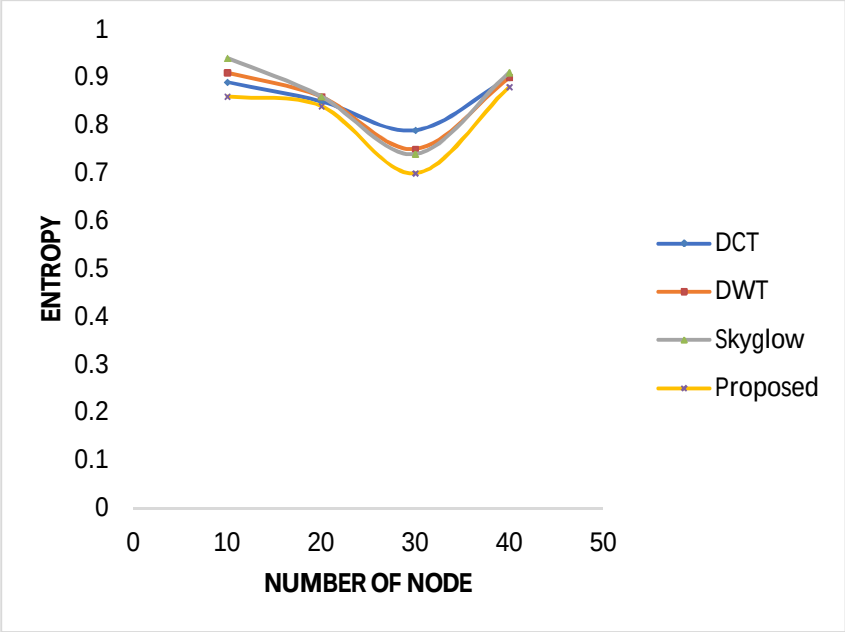


Figure 4.1.4: Comparative performance of different techniques for entropy with number of nodes 10, 20, 30, 40.

4.2 Scenario-II

Table 4.2.1: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.49	0.49	0.48	0.44
KAR	0.63	0.63	0.64	0.65
KLR	0.004	0.003	0.003	0.005
Entropy	0.99	0.98	0.98	0.97

Table 4.2.2: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.37	0.37	0.35	0.33
KAR	0.71	0.71	0.73	0.73
KLR	0.005	0.005	0.005	0.006
Entropy	0.79	0.77	0.78	0.75

Table 4.2.3: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.42	0.40	0.39	0.38
KAR	0.65	0.66	0.63	0.67
KLR	0.007	0.007	0.008	0.008
Entropy	0.90	0.89	0.89	0.88

Table 4.2.4: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.27	0.26	0.25	0.25
KAR	0.75	0.75	0.74	0.77
KLR	0.006	0.007	0.008	0.009
Entropy	0.92	0.91	0.89	0.94

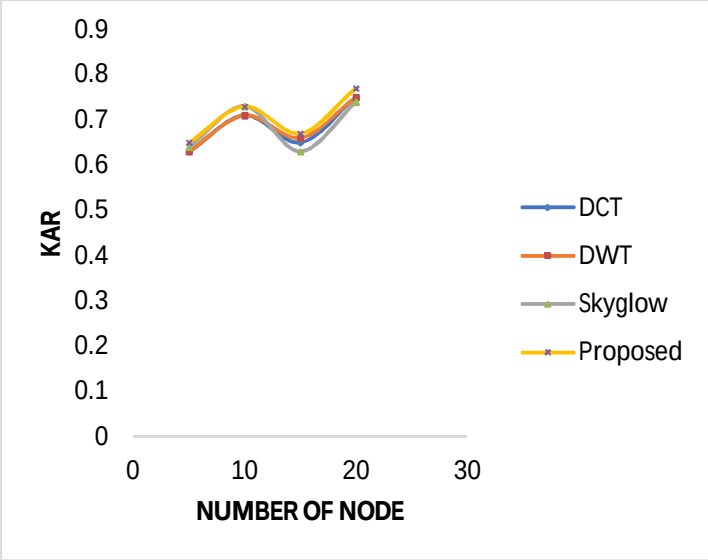


Figure 4.2.1: Comparative performance of different techniques for BER with number of node5, 10, 15, 20.

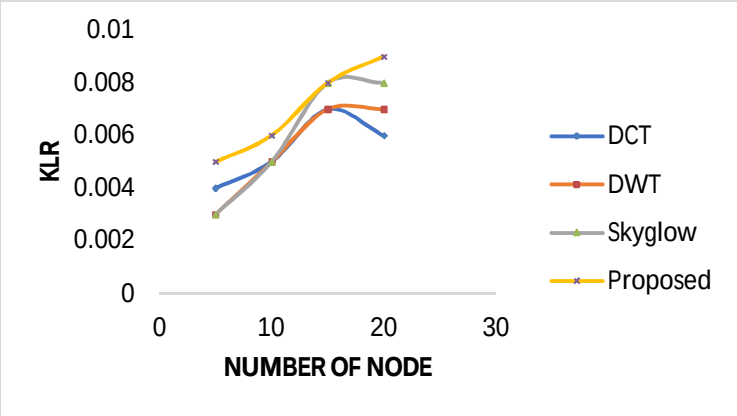


Figure 4.2.2: Comparative performance of different techniques for KAR with number of node5, 10, 15, 20.

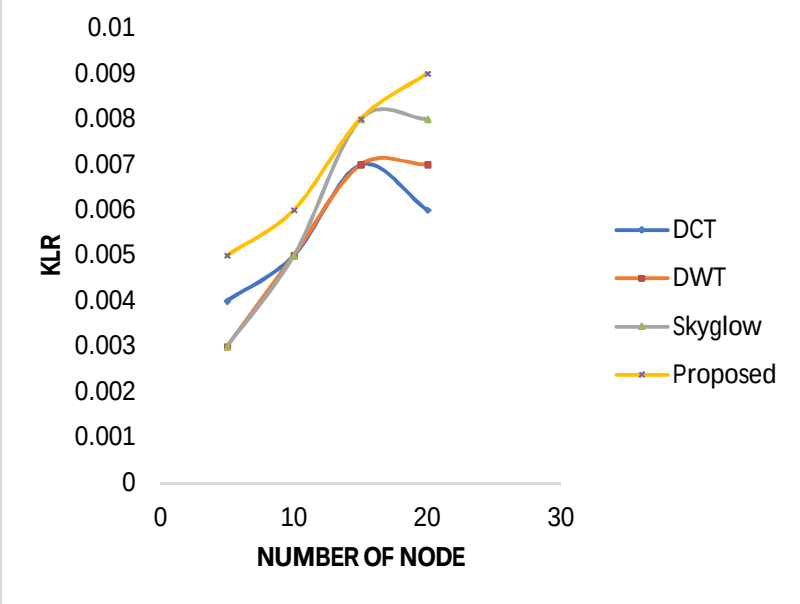


Figure 4.2.3: Comparative performance of different techniques for KLR with number of node5, 10, 15, 20.

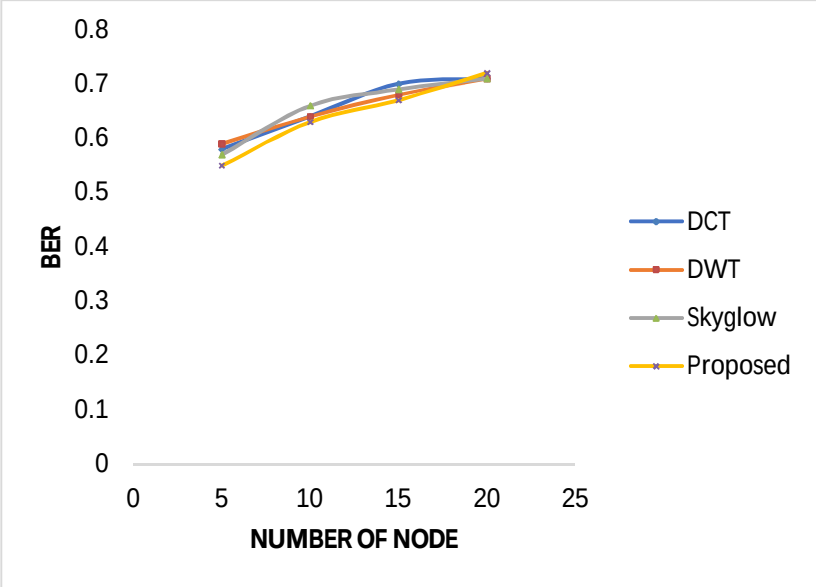


Figure 4.2.4: Comparative performance of different techniques for entropy with number of node5, 10, 15, 20.

5.3 SCENARIO-III

Table 5.3.1: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.58	0.59	0.57	0.55
KAR	0.83	0.84	0.86	0.88
KLR	0.005	0.005	0.007	0.007
Entropy	0.89	0.90	0.92	0.88

Table 5.3.2: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.64	0.64	0.66	0.63
KAR	0.78	0.79	0.78	0.80
KLR	0.007	0.006	0.006	0.008
Entropy	0.84	0.88	0.84	0.82

Table 5.3.3: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.70	0.68	0.69	0.67
KAR	0.58	0.60	0.59	0.61
KLR	0.005	0.006	0.007	0.007
Entropy	0.84	0.88	0.84	0.82

Table 5.3.4: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.71	0.71	0.71	0.72
KAR	0.80	0.81	0.82	0.82
KLR	0.007	0.006	0.007	0.008
Entropy	0.79	0.79	0.78	0.80

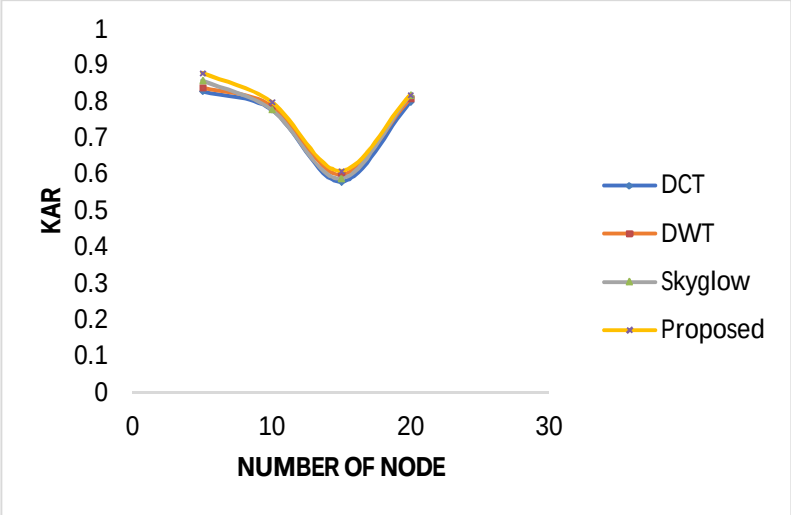


Figure 5.3.1: Comparative performance of different techniques for KAR with number of node5, 10, 15, 20.

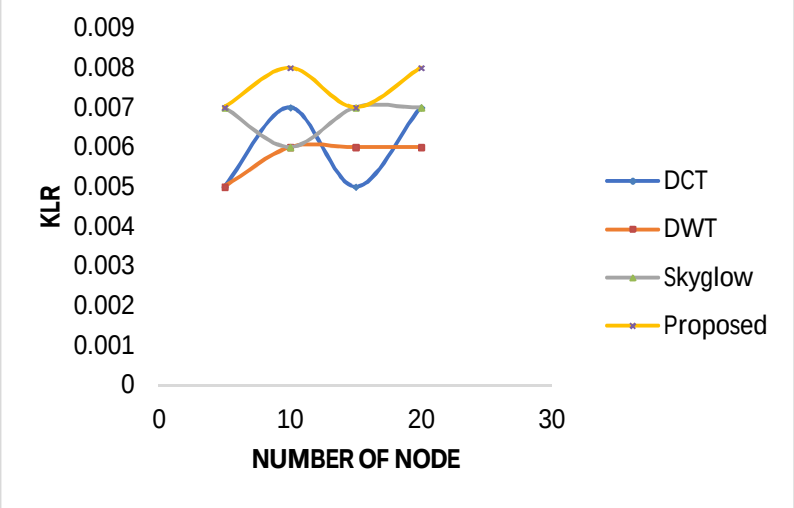


Figure 5.3.2: Comparative performance of different techniques for KLR with number of node5, 10, 15, 20.

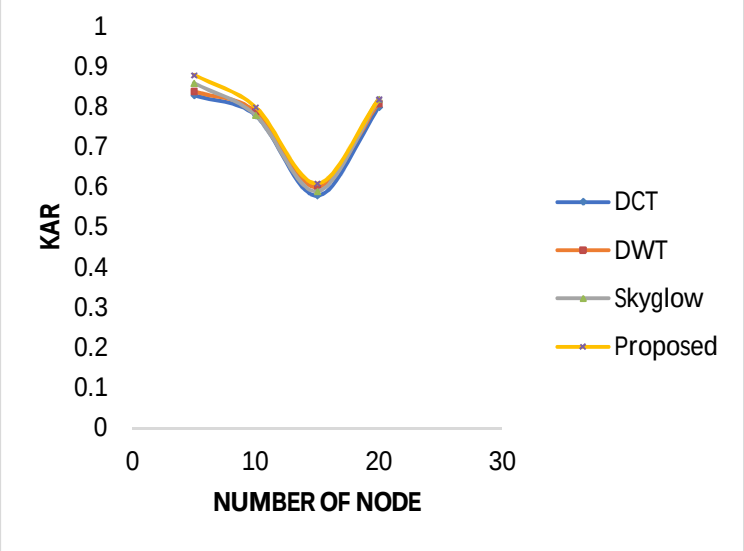


Figure 4.3.1: Comparative performance of different techniques for BER with number of node5, 10, 15, 20.

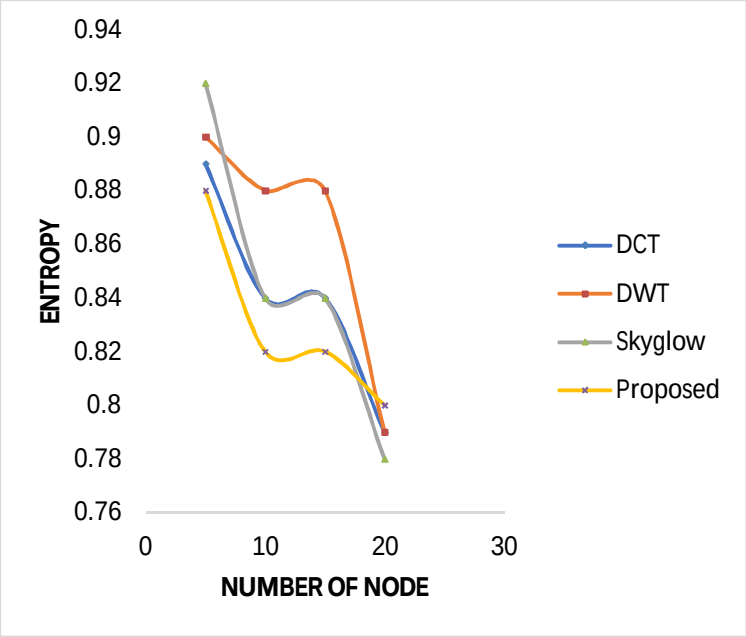


Figure 5.3.4: Comparative performance of different techniques for entropy with number of node5, 10, 15, 20.

5.4 SCENARIO-IV

Table 5.4.1: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.75	0.74	0.73	0.70
KAR	0.68	0.66	0.66	0.65
KLR	0.005	0.004	0.005	0.003
Entropy	0.90	0.91	0.91	0.88

Table 5.4.2: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.56	0.55	0.57	0.52
KAR	0.82	0.81	0.82	0.80
KLR	0.005	0.005	0.005	0.004
Entropy	0.87	0.88	0.85	0.86

Table 5.4.3: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.35	0.33	0.33	0.31
KAR	0.66	0.68	0.68	0.64
KLR	0.008	0.007	0.008	0.006
Entropy	0.75	0.80	0.75	0.74

Table 5.4.4: Comparative performance of DCT, DWT, Skyglow and proposed with these parameters BER, KAR, KLR, Entropy.

	DCT	DWT	Skyglow	Proposed
BER	0.26	0.22	0.23	0.21
KAR	0.65	0.65	0.66	0.62
KLR	0.005	0.006	0.006	0.004
Entropy	0.80	0.79	0.80	0.78

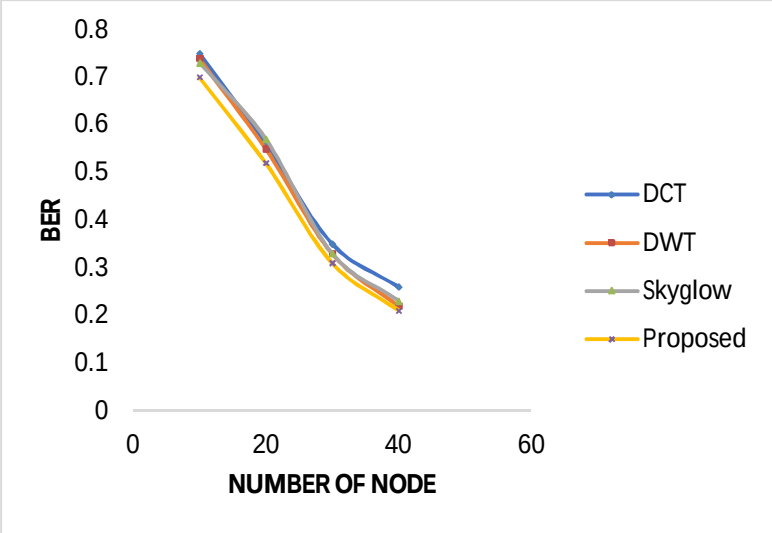


Figure 5.4.1: Comparative performance of different techniques for BER with number of nodes 10, 20, 30, 40.

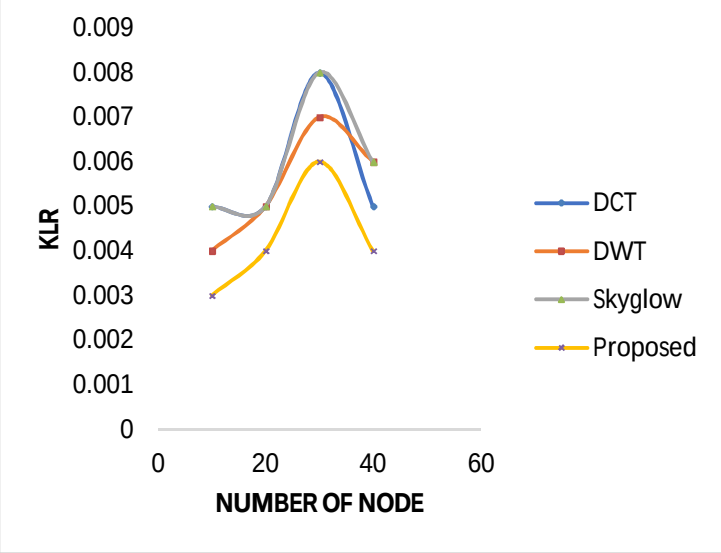


Figure 5.4.2: Comparative performance of different techniques for KLR with number of nodes 10, 20, 30, 40.

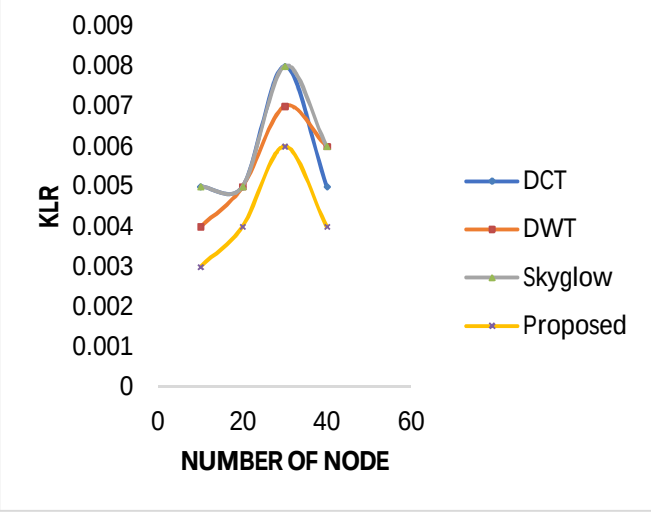


Figure 4.4.3: Comparative performance of different techniques for KAR with number of nodes 10, 20, 30, 40.

5.5 SCENARIO-V

Table 5.5.1: Using 10KB data size below is the comparative result of different algorithm AES, 3DES, RSA and ECC.

Algorithm	10 KB	20 KB	50 KB	100 KB	150 KB	200 KB
AES	1.040	7.476	9.036	1.022	7.478	7.808
3DES	7.0123	5.328	7.773	8.337	5.940	5.993
RSA	2.955	3.128	3.193	3.591	3.079	3.163
ECC	2.051	1.772	2.040	2.389	2.233	6.873

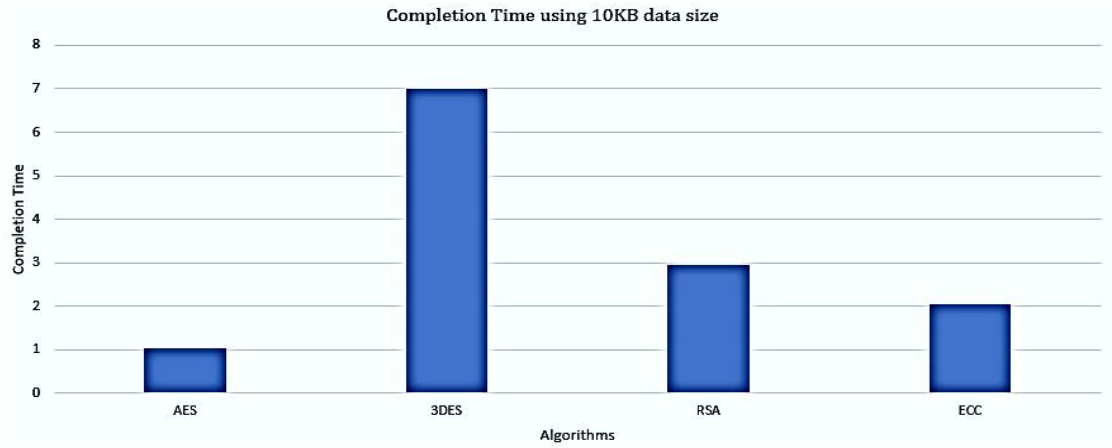


Figure 5.5.1: using 10KB data size comparative performance of the different cryptography algorithm AES, 3DES, RSA and ECC in our simulation model analysis.

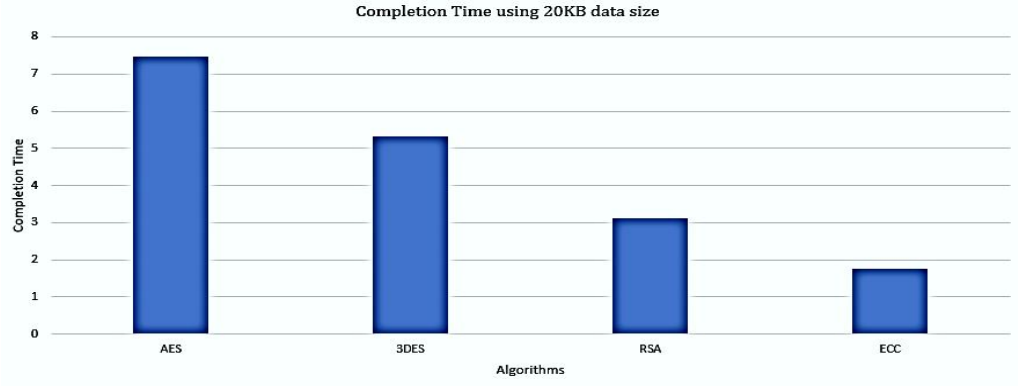


Figure 5.5.2: using 20KB data comparative performance of the different cryptography algorithm AES, 3DES, RSA and ECC size in our simulation model analysis.

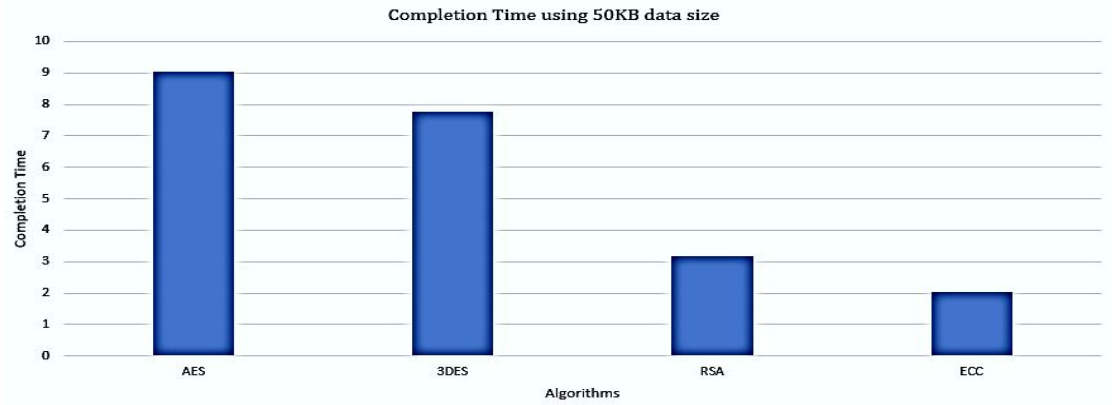


Figure 5.5.3: using 50KB data size comparative performance of the different cryptography algorithm AES, 3DES, RSA and ECC in our simulation model analysis.

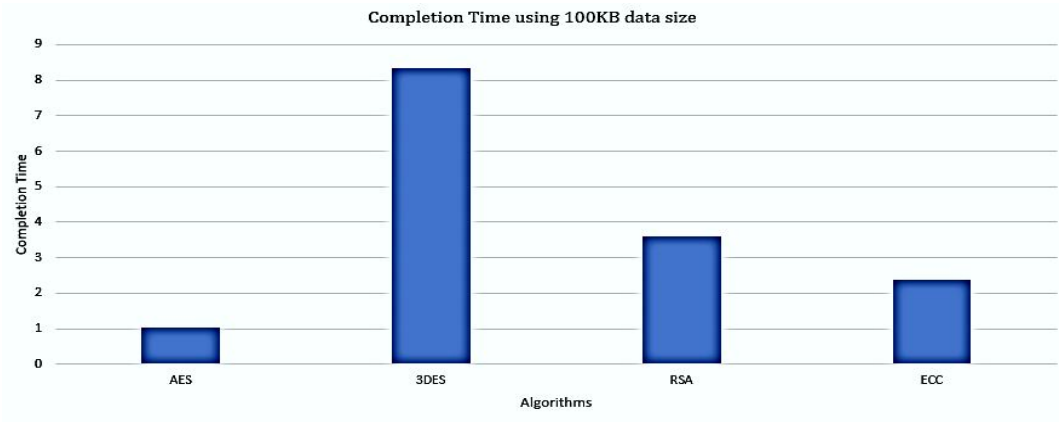


Figure 5.5.4: using 100KB data size comparative performance of the different cryptography algorithm AES, 3DES, RSA and ECC in our simulation model analysis.

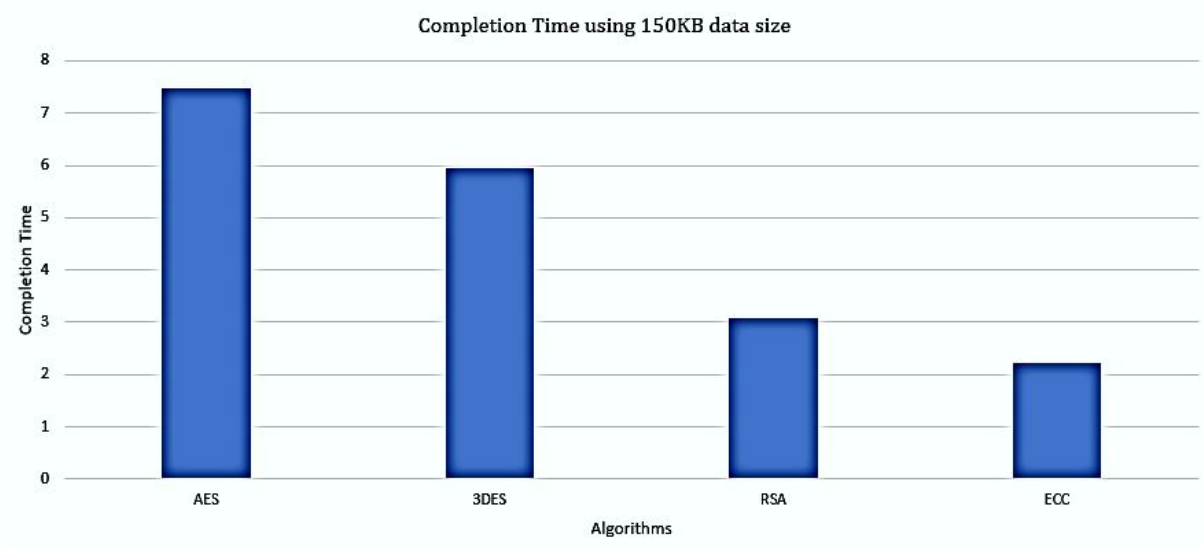


Figure 5.5.5: using 150KB data size comparative performance of the different cryptography algorithm AES, 3DES, RSA and ECC in our simulation model analysis.

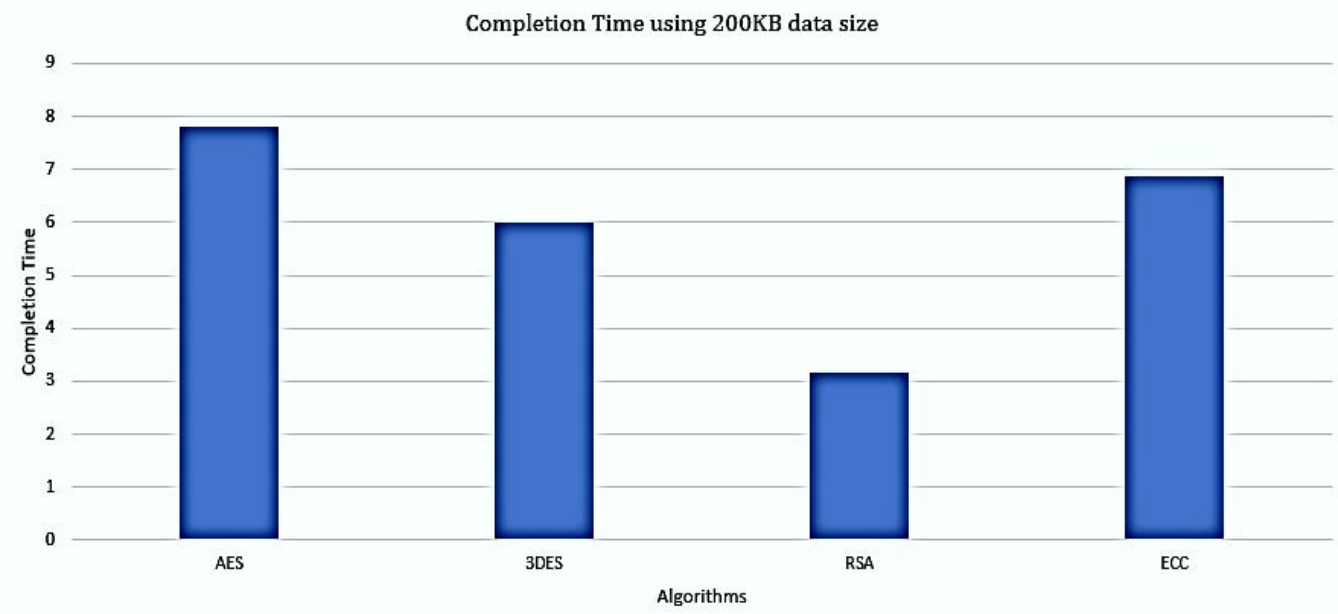


Figure 5.5.6: using 200KB data size comparative performance of the different cryptography algorithm AES, 3DES, RSA and ECC in our simulation model analysis.

6. Conclusion and Future Scope

The process of key generation simulates in MATLAB environments. MATLAB is well known algorithm analysis and communication-based tools. These tools provide the function and script file for the process of simulation task. These tools also encapsulate communication protocol applied on internet of things communication models.The simulation process deals in two environments such as indoor and outdoor environments. The scenario of indoor and outdoor environments deals with obstacle and without obstacle. The process of obstacle attenuates the strength of RF signals and the performance of the IoTs system is degraded. The process of simulation also focusses on two mode of communication such as LOS and NLOS. Both, these two conditions have different challenges for the generation of key. In both cases the proposed algorithm performs better instead of skyglow and DCT based key generation methods. Validation and evaluation of the performance of key generation methods is very important phase. For the validation of proposed algorithm measure five standard parameters such as BER, KAR, KLR, KE and SBP. The proposed algorithm reduces the value of bit miss match, due to this reason the value of BER is decreases. The parameters value of KLR (key leakage rate) also decreases. The decrease value of KLR indicates the efficiency of proposed algorithm. The overall estimation and validation of proposed algorithm improves 5-8% instead of pervious algorithm such as skyglow and DCT. The improve efficiency of proposed algorithm enhance the reliability of IoTs enable communication system.

7. Acknowledgement

I would like to thank Mr. Amit Kolhe, Managing Trustee of the Sanjivani College of Engineering, Kopargaon, India and the Dean, Faculty of Engineering, MPU, Bhopal also the HOD of Computer Department, MPU, Bhopal for providing the infrastructure required to carry out the proposed research work.

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IMPACT OF FLEXIBLE WORKING TIMES ON WORK-LIFE BALANCE

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ABSTRACT

The purpose of this paper is to examine the effect of flexible hours on work-life balance or stress between work and life. A systematic literature and Meta-analysis technique is used to achieve our objective. Publication bias was checked through Funnel Plot. Forest Plot is used to analyze the impact of all studies with the weighted mean. The finding of our study is showing a summary effect of all studies with the Random effect model.

Keywords: *Work-life balance, Summery effect, Meta-Analysis, Publication bias*

I Introduction

Due to technological and economic changes, expansion of the service sector, and the global economy, the demand for 24 hours services has increased. Non-standard working hours can disturb employed mothers (Hwang, 2019). Due to technological and economic changes, there are significant changes in the family composition and an increase in dual-career couples at the workplace. It has changed lifestyle and career priority (Shanmugam & Agarwal, 2019). Researchers have examined the impact of menopausal women on work-life balance (Viotti et al., 2020)

Work-life balance practices help in attaining personal and professional goals. These are the reason to leave and stay in an organization. (Dousin et al., 2020). Practices of work-life balance such as flexible arrangements alleviate work-life balance problems and the intention to leave jobs in countries such as Malaysia. Inflexible working hours can lead to job intensification and tension at work. (Dousin et al., 2020).Flexible employment conditions are an integral part of employee satisfaction and retention in the workplace. Flexibility at work will mitigate the detrimental effects of work-life balance (Wynendaele et al., 2021). A correlation exists between arrangements for working time and work-life balance. Employees work and private life may be impacted by longer working hours.(Brauner et al., 2020) .

Flexible hours/flexible refers to the willingness of the employee to adjust their work schedules. Tele-working and employees' flexibility over the amount of work and their time can also be included in flexible working. Flexible working can increase employees' performance by reducing sickness/absenteeism (Chung & van der Horst, 2020). Flexible working can help employees preserve their workability by giving them time to take care of their health. Flexible working can improve health and help in improving work-life balance (Viotti et al., 2020). Family-friendly policies like leave, flexible working hours, and supervisor support help reduce parent stress (Viotti et al., 2020). To motivate and retain workers, decision-makers should bring flexibility and work autonomy in the working environment (Ogbuabor & Okoronkwo, 2019). Flexitime offers greater work autonomy and higher quality and results (Jackson & Fransman, 2018). A flexible schedule with employee choice can reduce work conflict (Hyatt & Coslor, 2018)

This research is intended to investigate the following:

To check the heterogeneity within studies

To analyze the summary effect of all the existing studies

To check the publication bias between studies

II Research Methodology

We are using existing studies with a correlation value on the impact of flexible hours on work-life balance. To gather the overview impact of all research, the meta-Analysis approach is used. Our Research is organized in the following structure

- Identifying and defining the search terms
- Selection of studies through Web of Science Database

- Include/Exclude study according to specified criteria
- Selection of study with correlation value

➢ Conduct Meta Analysis through Jamovi software

Table No 1: Identifying and Refinement of Search Terms

1	Identifying the search terms through Web of Science: .(impact of flexible hours on work-life balance) [n=21)
2	Refinement of search terms: i. (((Flexible hours) AND (Work-life balance OR work-life conflict OR work-family conflict))) [n=133] ii. ((Flexible hours) AND (Work-life balance OR work-life conflict OR work-family conflict)) [n=126]
3	3. Total records screened • English language paper included • Qualitative paper excluded • Not related to topic excluded • Paper with correlation value included
4	4. Total studies included in Meta-Analysis N=24

Table No 2: Studies included

Sr. No.	Authors	N	r
1	Dousin, O; Collins, N; Bartram, T; Stanton, P	379	0.12
2	Brauner, C; Wohrmann, AM; Michel, A	8580	-0.22
3	Viotti, S; Guidetti, G; Converso, D; Sottimano, I	1069	-0.03
4	Hwang, W	223	-0.16
5	Ogbuabor, DC; Okoronkwo, IL	87	0.56
6	Shanmugam, MM; Agarwal, B	203	-0.677
7	Jackson, LTB; Fransman, EI	252	0.05
8	Hyatt, E; Coslor, E	799	0.86
9	Chen, Y; Fulmer, IS	17895	0.26
10	De Menezes, LM; Kelliher, C	2617	0.05
11	Uzoigwe, AG; Low, WY; Noor, SNM	173	0.196
12	Tang, YP; Hornung, S	179	0.17
13	McNamara, TK; Pitt-Catsouphes, M; Matz-Costa, C; Brown, M; Valcour, M	1851	0.07
14	Golden, TD	316	0.02
15	Valcour, M; Ollier-Malaterre, A; Matz-Costa, C; Pitt-Catsouphes, M; Brown, M	2025	0.16
16	Bohle, P; Willaby, H; Quinlan, M; McNamara, M	179	-0.295
17	Wajcman, J; Rose, E; Brown, JE; Bittman, M	850	-0.15
18	Grotto, AR; Lyness, KS	1178	-0.15
19	Carlson, DS; Grzywacz, JG; Kacmar, KM	607	-0.17
20	Lautsch, BA; Kossek, EE; Eaton, SC	90	0.07
21	McNall, LA; Masuda, AD; Nicklin, JM	220	0.32
22	Breaugh, JA; Frye, NK	96	-0.23
23	Hornung, S; Rousseau, DM; Glaser, J	887	-0.05
24	Brough, P; O'Driscoll, MP; Kalliath, TJ	398	-0.17

III Meta Analysis

Meta-Analysis is a quantitative method by summarizing all past research that provides views about a particular subject. This technique includes all studies, whether published or unpublished. Meta-Analysis is a method to objectify the literature review process. Inclusion and exclusion laws are an integral component of meta-analysis.(Stanley

& Jarrell, 2005). Meta-analysis is a tool used to calculate the strength of relationships between variables using effect size (Shelby & Vaske, 2008). The meta-analysis technique takes data from different studies and calculates all studies' combined effect with a weighted mean.

Fixed and Random effects Models in Meta-Analysis

The choice between two models depends on the homogeneity of the parameters of the effect size. We use the fixed effect model if all studies predict a similar effect size, but we use random effects models if studies use heterogeneity(Hedges & Vevea, 1998). Different tests are used to choose between fixed and Random Model. In Figure I square value is 99.48% more than 95% it means we can use Random effect model to calculate summary effect. More I square imply more variability across studies.

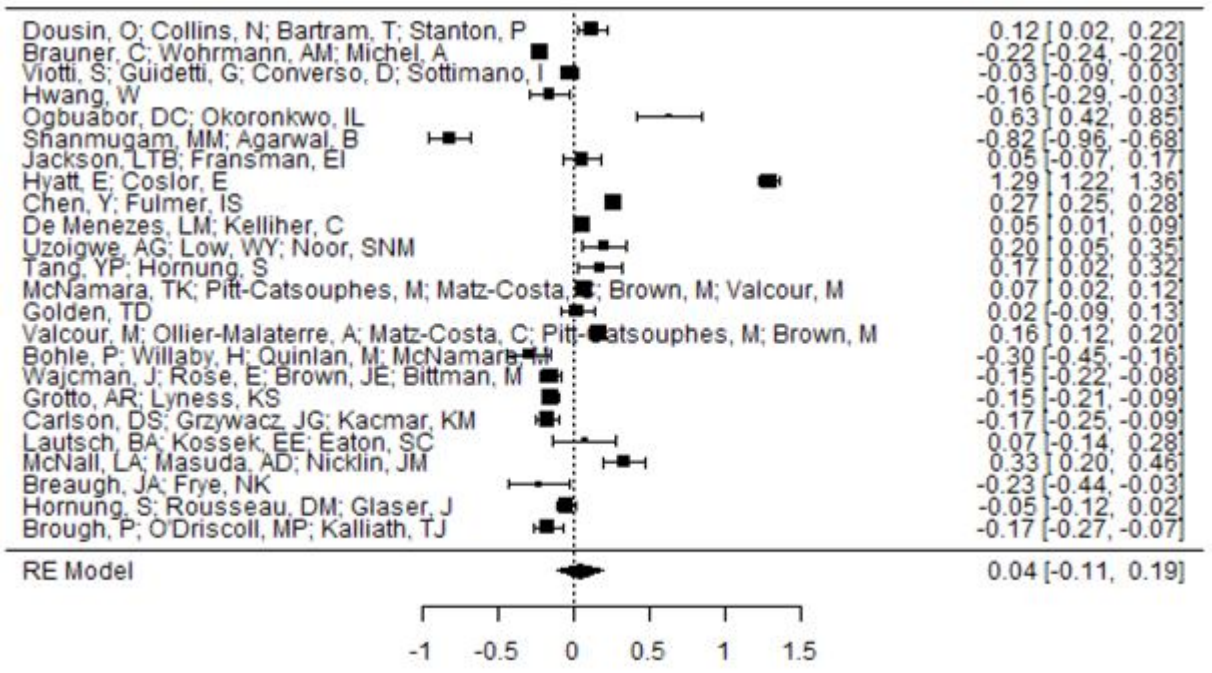
Table No 3: Heterogeneity Statistics

Tau	Tau²	I²	H²	R²	df	Q	p
0.377	0.1419	(SE= 0.0429)	99.48%	192.368	23.000	3045.165	< .001

Forest Plot

Forest Plot is a graph that represents information from all studies studying the same thing. The figure represents the diamond below the Forest plot, which is the weighted average for all studies. There is a longer confidence interval (1.22,1.36) of the study Hyatt, E, representing less reliable results. The larger the box in the plot represents, the more the sample size. Diamond is touching the line of no effect, which shows results are not statistically accurate. The summary effect here is 0.04 at 95 percent confidence interval with confidence intervals are -0.11 and 0.19. Confidence interval crosses the line of no effect; therefore overall all result is not significant.

Table No 4: RE Model



Here we are using standardized mean differences, therefore Z value is used to determine P value. P value is 0.607 which is more than alpha level of 0.05, so summary effect is statistically insignificant.

Table No 5: Random-Effects Model (k = 24)

	Estimate	se	Z	p	CI Lower Bound	CI Upper Bound
Intercept	0.0400	0.0779	0.514	0.607	-0.113	0.193

Note. Tau² Estimator: Restricted Maximum-Likelihood

Egger's Regression	-0.122	0.903	

Note. Fail-safe N Calculation Using the Rosenthal Approach

Publication Bias

Publication bias is one of problem in meta-analysis and systematic review. Publication bias is due to the fact that not all research carried out in practice is included in the meta-analysis(Jin et al., 2015). In Figure According to Egger's Regression P value is >0.05, it means no biasness. In Kendalls Tau, also P value is >0.05, means no biasness.

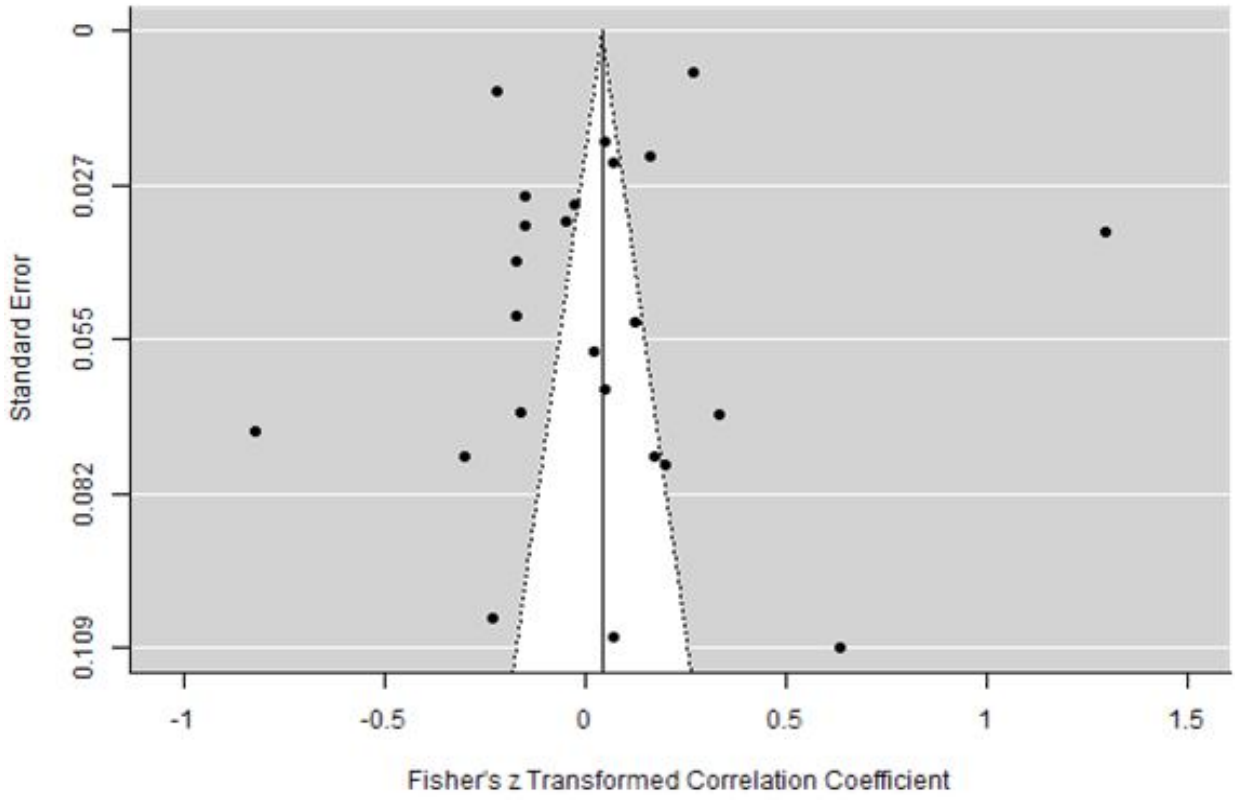
Table No 6: Publication Bias Assessment

Test Name	value	p
Fail-Safe N	688.000	< .001
Kendalls Tau	0.156	0.286

Publication Bias Assessment through Funnel plot

Funnel Plots are used in Meta-Analysis to test the probability of publication bias Funnel Plots are used to define bias or systemic heterogeneity as a visual aid. Dot in Funnel Plot represents each study. If the standard error is small, it means sample size is large. Funnel Plot is symmetrical and inverted; it means most of the important study is included.

Chart No 1:Fisher's z Transformed Correlation Coefficient



IV Limitations

The Meta-analysis has some limitations. One of the limitations is that the studies which we have taken are less in numbers. Second, we have taken studies from the web of science, which is a part of publication bias. Other researchers can try to remove this bias after taking published or unpublished studies. The study considers only one variable of work-life balance, but other variables also affect work-life balance. We are taking studies with

correlation values. Other studies that do not have correlation values, we are not considering here.

V Results & Discussion

This study is using a Random effect model due to Heterogeneity in the study. The total summary effect of all studies is 0.04 with a confidence interval of -0.11 and 0.19. The diamond effect touches the line of no effect, which shows the summary effect is not statistically significant. This bias can be removed with the help of including more studies from different databases, one of the limitations of this study. This study gives future researchers future opportunities to consider more studies related to work-life balance variables and consider effect size other than correlation values for getting a significant result.

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STABILIZING THE VARIABILITY IN ACCURACIES OF STATE-OF-THE-ART MODELS USING BEFITTING TECHNIQUES IN PLANT DISEASE DETECTION

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ABSTRACT

Recently, numerous attempts have been made to accurately detect plant diseases in the early stages using Machine Learning and Deep Learning techniques. State-of-the-Art Deep Learning architectures along with Computer Vision techniques have delivered commendable results in plant disease detection, requiring lesser time, effort, and resources when compared to traditional methods. In this paper, four Deep Learning models have been compared and evaluated, namely Denset169, DenseNet201, Xception, and Inception-V3. Two approaches to data augmentation were used, which improved the model's accuracy and reduced varying class-wise accuracies due to imbalance of class distributions in the dataset. The PlantVillage dataset that was used to train these models is a publicly available dataset consisting of 54,306 images of diseased and healthy plants. It consists of 14 crop species and 26 diseases. Each model was evaluated based on its performance in identifying individual classes of the dataset. The final accuracies are reported for the experiments without data augmentation and then after applying the two data augmentation approaches. DenseNet169, DenseNet201, Xception and Inception-V3 achieved an accuracy of 98%, 97%, 91% and 92% respectively (without any data augmentation). The data augmentation approach 1 worked better for the Inception-V3 model whereas, for DenseNet169 and Xception, approach 2 worked better. The Densenet201 model achieved a stable accuracy of 98%, with or without data augmentation. The high variance in the accuracies of specific classes was also stabilized and increased when proposed augmentation methods are used.

Keywords: *Deep Learning, Data Visualization, Image Classification, Image Processing, Plant Disease Detection*

1. Introduction

With the COVID-19 pandemic, one of the industries, which have been worst hit, is the agricultural and food industry. In order to control the spread of infection, most of the countries adopted lockdown protocols and travel restrictions. The latter affected all phases of the food supply chain with a huge impact on food distribution. The impact caused by this pandemic in the domain of supply and demand, might lead to food security being at risk [1], shortages of pesticides and unavailability of professional care. These are due to the supply chain barriers that are entailed by the global trade disturbance due to which farmers have faced the shortage of agricultural inputs like seed, fertilizer and pesticides [2]. Though the latest technological advances have made it possible to produce enough food to meet the ever-growing demand, food-security still remains as one of the biggest concerns today [3] and more than 50% of the causes of crop loss are due to pests and diseases [4]. All around the world, most of the farm producers are facing the common problem of work force shortage. The travel ban imposed due to the pandemic has made the shortage of seasonal and informal farm workers [5]. So, it is difficult for medium to huge sized farm owners to pay attention to accurately predict and diagnose plant diseases spread across the farmland. When basic inputs of agriculture like seeds, fertilizers and pesticides are not in the reach of a major chunk of farm owners and when very less manpower is on field to monitor the growth of plants in the farm lands, there is a huge spike in the problem of pests and diseases. Various efforts have been made to ensure early diagnosis of plant disease that is not only accurate but also sustainable. Early diagnosis of plant diseases plays a pivotal role because only after accurate diagnosis the farm owners will be able to adopt improved crop protection strategies in preventing such damage and loss, to increase production and make a substantial contribution to food security. Numerous attempts have been made to accurately detect plant diseases in the early stages using Artificial Intelligence. One of the most promising technologies in image

classification has been the use of state-of-the-art Deep Learning architectures along with Computer Vision techniques. They not only deliver propitious results in plant disease detection but also require lesser time, effort and resources when compared to traditional methods of getting a professional to analyze the plant leaf in laboratories. Even though training deep neural networks is a very time-consuming task, the trained models can classify images very quickly, which makes them usable in consumer applications. Plant diseases show significant impact on crop yield and quality, thus reducing the resource-use efficiency [6]. Another important aspect of developing such a model is finding enough data to train the model on, which helps the neural network to generalize the dataset better. Data augmentation has been used in several studies to scale up the dataset, which eventually provides better results.

*1.1.*Related Works

There have been numerous works carried out in plant disease detection and classification. Primarily they are categorized into three categories namely molecular techniques, spectroscopic techniques and image processing techniques. The current work majorly focuses on image-based plant disease detection; hence, this section is restricted to the works inclined to image-based analysis for plant disease detection. Jayme Garcia and Arnal Barbedo et al. presented a state-of-art survey on digital image processing techniques for plant disease detection, intensity quantization, and classification. The survey was particularly focused on the stem and leaf part of the plants. The detailed survey revealed that most often used techniques are neural networks and color analysis [7].

Rumpf et al. deployed a procedure for the early detection and discrimination of sugar beet diseases with the help of Support Vector Machines (RBF Kernel). Nine spectral vegetation parameters as features for automatic plant disease classification were considered. The binary classification model for disease detection achieved 97% and detailed accuracy of multiple classes is around 86% [8]. P. Chaudhary et.al designed an automatic model for disease spot segmentation of plant leaves using image-processing techniques on Dicot and Monocot family plant leaves in noise free and noisy environments. Various color transformation techniques like CIELAB, HSI and YCbCr color space on RGB image for better segmentation of disease spots were applied and compared [9]. Traditional and well-known machine learning algorithms like K-Means, Support Vector Machines, K-Nearest Neighbors classifier, Neural Networks and Random Forest classifier were exploited in the early diagnosis of plant disease prediction [10-14]. The amalgamation of computer vision and deep learning gained a lot of attention in multitudinous applications like Object Detection, Image Classification, and Image Analysis. In this direction, notable research works are carried out in the literature for plant disease detection.

Geetharamani G. and Arun Pandian J et al. designed nine-layer CNN architecture with transfer learning on PlantVillage dataset and attained an accuracy score of 96.46% [15]. Many research articles experimented on the PlantVillage dataset deal with the classification of a subset of classes instead of studying all the classes at once. Barbedo et al. deployed a ConvNet on the PlantVillage dataset with 12 different species and 56 diseases. They investigated the effect of dataset volume and background of the image in plant disease prediction [16]. Guan Wang et al. exploited various deep learning models for disease severity estimation. They tried with VGG-16, VGG-19, Inception-V3 and ResNet50 and claimed that VGG-16 outperformed with 90.4% accuracy on the test dataset [17]. Edna Chebet, et al. conducted a comparative study by fine-tuning the existing deep learning models for plant disease detection. A depth wise separable convent, a kind of pruned version of MobileNet for appropriate real-time disease prediction in resource constrained [18]. Saumya Yadav et al. developed an early disease detection tool by incorporating imagining techniques on peach leaves in order to detect bacteriosis. They cropped the disease-affected area by image processing method and compared with AlexNet, VGG-16, and VGG-19, and claimed that the proposed method outperformed the other methods [19]. Goncharov, P., et al. explored the power of

Siamese Networks for learning data embeddings on grape leaves for detecting diseases like Esca, Black rot and Chlorosis [20]. Even after getting substantial overall accuracies for classification of plant diseases, the individual accuracies of certain classes lag behind often. The imbalance in the number of images of individual classes in the dataset is the reason behind this anomaly. The main aim in this work is to detect individual crop types and diseases by analyzing class-wise best performing models. Utilizing the details of precision, recall and f1-scores metrics for individual classes, the trend of all the 38 classes of the PlantVillage dataset was analyzed on multiple experiments. In this paper, four state-of-the-art Deep Learning models have been employed to evaluate their performance on each class. In addition, two approaches to data augmentation have been proposed to improve the accuracy and to reduce the varying class-wise accuracies that are a generic problem in multiclass classification task.

2. Materials and methods

*2.1.*Dataset

In this paper, the Plant Village dataset has been used, which contains 54,306 images and 38 classes. It consists of 14 different plant species, out of which 12 are healthy and 26 are diseased [21]. The 14 plant species in the dataset have been summarized in **Figure 1**. The dataset consists of colored, grey-scale and segmented versions of the plant images but only the colored images have been used in this study.

Figure 1 Plant Village Dataset images – Apple, Blueberry, Cherry, Corn, Grapes, Orange, Peach, Pepper Bell, Potato, Raspberry, Soybean, Squash, Strawberry and Tomato (left to right, top to bottom)

*2.2.*Exploratory data analysis

The initial investigations on data may help to spot anomalies, to test the hypothesis and to check the assumptions based on summary statistics as well as graphical representations. This gave key insights about the data set that it is an imbalanced set having the class distribution shown in **Figure 2.** The highest number of images belong to Orange Huanglongbing class (10.14%) and lowest belonged to Potato healthy (0.28%). So, even if the final accuracy of the model is high, it does not necessarily mean that the accuracy of each class is also good. The f1-scores of individual classes are compared using a confusion matrix and classification report.

Data augmentation strategies can aid in this situation by increasing the quantity of useful data in a dataset. In the first case, only the classes that had highly varying accuracies through all the runs and those classes that had less accuracy in the final classification reports of each of the models when compared to others were augmented. This was done to exploit the possibility of getting better classification accuracy in these classes and to solve the anomalous variance in the accuracy of individual classes. In the second case, those classes that have less than 1% of the total images were augmented. The results achieved by training the dataset in its original form without any data augmentation were compared to the results obtained by employing two distinct methods of data augmentation.

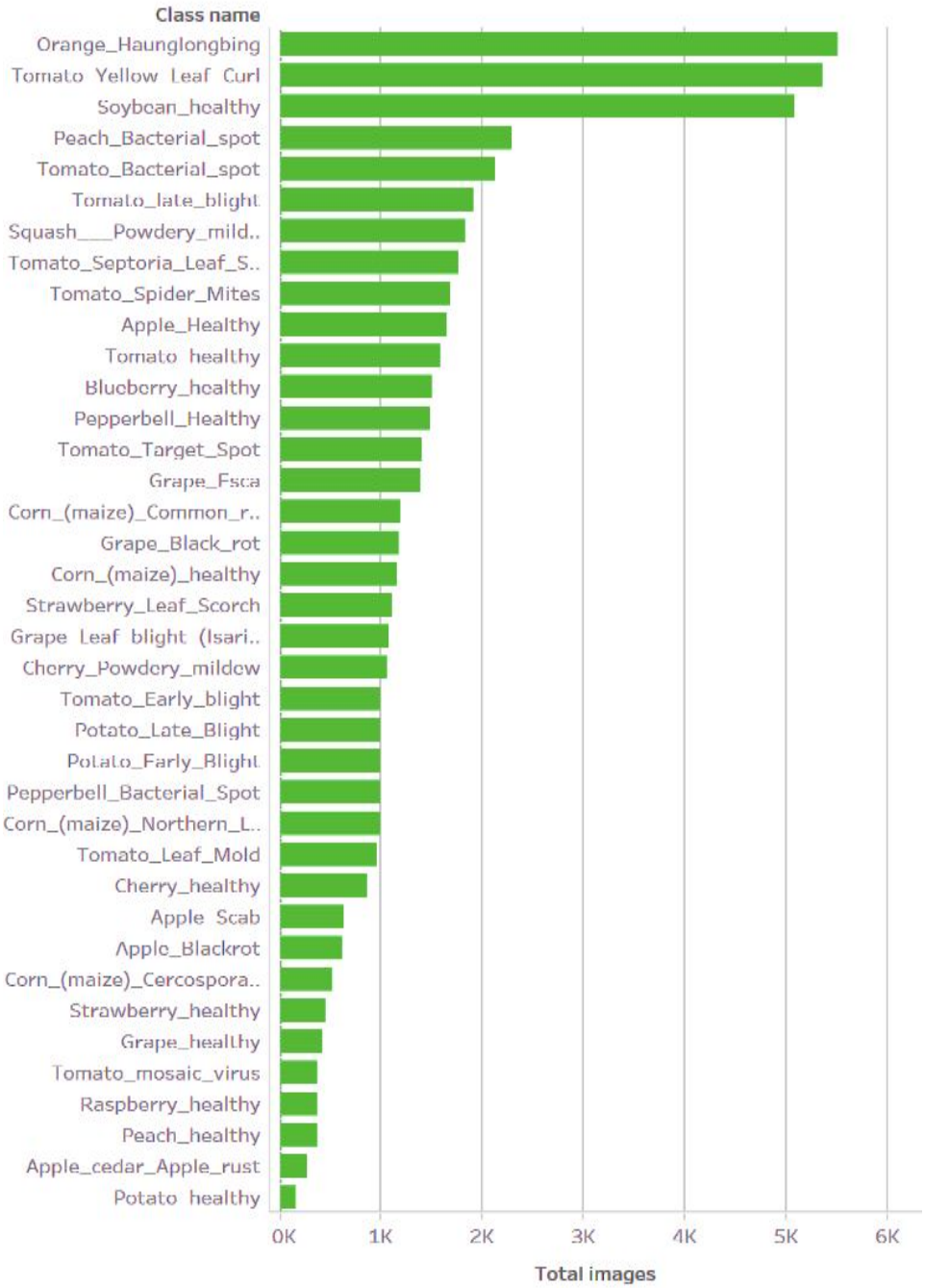


Figure 2 Class wise distribution of the dataset

3. Methodology

The whole dataset was split into 80:10:10 ratio as train: validation: test sets which was kept consistent across all the models. The Adam optimizer with a learning rate of 0.001 was used, activation function was set as SoftMax and loss function was set as categorical cross entropy. Batch size of training was 256 images and batch size of test /validation was 128 images for running the models. For training the augmented dataset the batch size used were 512 images for train and 256 images for test /validation. State-of-the-art CNN architectures Xception, Inception-V3, DenseNet169 and DenseNet201 have been compared [22-25]. The details of the models have been summarized in **Table 1**.

Table 1 Parameters and Depth details of the four models used in the study

Model	Parameters	Depth
Xception	22,910,480	126
Inception-V3	23,851,784	159
DenseNet169	14,307,880	169
DenseNet201	20,242,984	201

Confusion matrices and classification reports for each of the models were analyzed. The classification reports were generated using the metrics such as precision, recall, support and F1-score for each class. The anomalous variances in the accuracies for certain classes that have been observed were also given special attention. Irrespective of whether the model performed well or not, few classes had a varying accuracy in each of the experiments. Furthermore, different models performed better for different classes irrespective of the final maximum accuracy achieved by the model. The best performing model was determined for each class while keeping in mind the classes that had highly varying accuracies with each model. In the first augmentation approach, the classes that have less accuracy and the ones that have a high variance in their accuracy when compared to others were augmented. This resulted in better performance of some of the models for those classes. The experiments have been carried out five times on this data. In the next approach, the percentage of images in each class was taken into consideration and the classes with lesser than 1% of the total images were augmented to increase the number of images for those classes.

4. Results and discussion

*4.1.*Without data augmentation

Table 2 summarizes the performance of the four models trained on the dataset without data augmentation. A few classes showed a wide range of varying accuracies throughout the experiments i.e., for each iteration the accuracies are significantly different for those classes. Each model had different classes that showed such variances. Also, a particular model that worked better for certain classes and not so good for other classes. Although the model might have achieved an excellent maximum accuracy, the class-wise accuracies might not be up-to the mark for few of the classes. This may lead to a model not being able to predict the accurate output if it has to be used to predict that certain class.

Table 2 Performance of each model without data augmentation

Model	Maximum Accuracy
DenseNet201	98%
DenseNet169	97%
Xception	91%
Inception-V3	92%

*4.2.*High Variance of Accuracy in Specific Classes

Considering DenseNet169, a few classes performed consistently well throughout the training process. The final accuracy achieved by DenseNet169 model on the dataset was 97%. Furthermore, analyzing the classification matrix it was observed that, the classes of Orange Huanglongbing [80%, 64%, 76%, 84%, 51%], Grape Black Rot [78%, 89%, 90%, 97%, 67%], Bacterial Spot [82%, 29%, 82%, 62%, 96%] and Corn Gray Leaf Spot [98%, 92%, 85%, 68%, 95%] had a wide range of varying accuracies throughout the experiments.

Similarly, for the Xception model, the classes, Apple Scab [82%, 90%, 72%, 12%, 68%], Potato Early Blight [4%, 35%, 98%, 97%, 93%], Black Rot [80%, 58%, 36%, 43%, 53%], Tomato Mosaic Virus [98%, 96%, 29%, 64%, 80%], Cherry Healthy [74%, 62%, 97%, 96%, 86%] and Blueberry Healthy [96%, 92%, 86%, 80%, 58%] showed varying accuracies. For the DenseNet201, classes of Grape Isariopsis [96%, 79%, 98%, 94%,91%], Orange Huanglongbing [84%, 4%, 71%,72%, 91%], Peach Bacterial [81%, 70%, 87%, 79%, 87%], Corn Gray Leaf [92%, 79%, 93%, 86%, 92%] and Peach Healthy [91%, 75%, 85%, 84%, 90%] showed accuracies which varied highly while running the model multiple times.

Lastly for Inception-V3 the classes which had the maximum variance in their accuracy values were Tomato Bacterial [93%, 91%, 92%, 94%, 22%], Corn Gray Leaf [59%, 60%, 78%, 79%, 8%], Peach Healthy [41%, 49%, 74%, 69%, 11%], Peach Bacterial [62%, 42%, 56%, 59%, 9%] and Corn Healthy [16%, 80%, 55%, 87%, 69%].

*4.3.*After applying data-augmentation

To address this issue of high variance in few classes for different validations and for different models, two data augmentation

techniques discussed earlier have been implemented. With DenseNet169 model, it was observed that the maximum final accuracy achieved was 94% after type-1 augmentation, which is lesser than the results obtained without data augmentation but the variances in accuracy had decreased and was in the range 90% to 94%. Hence, the high variance in accuracies was stabilized and all the classes performed decently well. The overall performance of the type-2 of augmentation worked better on DenseNet169. An accuracy of 96% was achieved. The Xception model obtained an overall accuracy of 92% after performing data augmentation type 1 that is slightly more than the accuracy obtained without data augmentation. The accuracy range was that of 88% to 92%. While implementing augmentation type 2 on the dataset, the maximum final accuracy was 93% that is again more than the accuracy obtained without data augmentation. The performance of the classes that had less accuracy also increased. Accuracy range lied in the range of 85% to 93%.

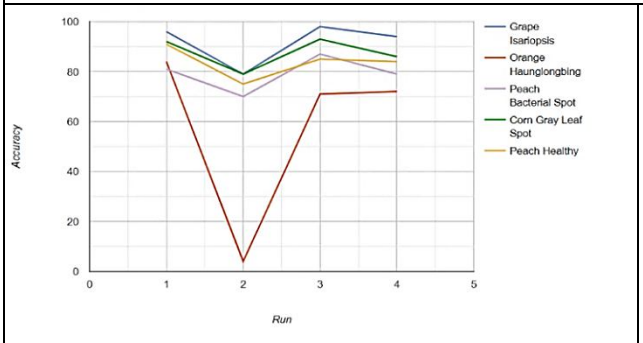
DenseNet201 achieved a maximum accuracy of 98% was obtained with and without augmentation. The high variance in accuracies of five of the classes was greatly minimized without affecting the overall accuracy. The range of accuracy for both types of data augmentation was in the range of 94% to 98%. Inception model achieved an accuracy of 86% with type-1 data augmentation and 83% with type-2 data augmentation. This lower than what it achieved without data augmentation but the variances of class-wise accuracies were less when the data was augmented and all the classes performed decently well without having any class with very low accuracy. **Table 3** summarizes the performance of each model after applying data augmentation approaches. **Table 4** summarizes how the high variances in specific classes were mitigated after using data augmentation in each model respectively.

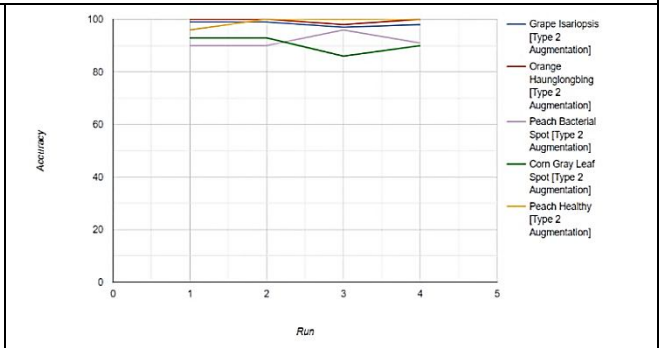
Table 3 Performance of each model with data augmentation

Model	Type 1	Type 2
DenseNet20	98%	98%
DenseNet16	94%	96%
Xception	92%	93%
Inception-V3	86%	83%

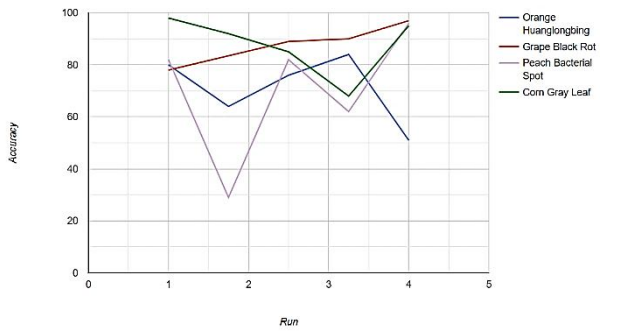
Table 4 Issue of High variance in accuracy in specific classes [Left] mitigated by applying one of the two data augmentation techniques mentioned [Right]

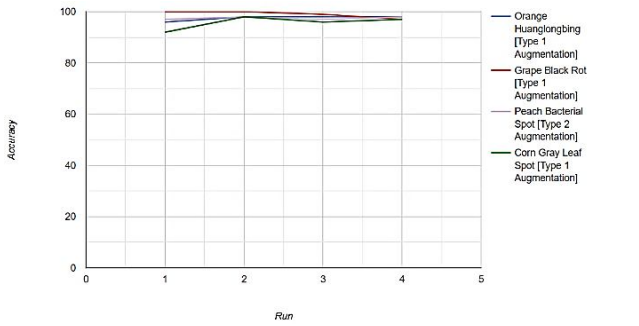
DenseNet201



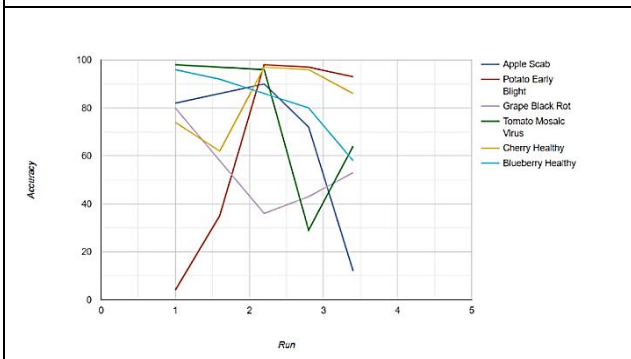


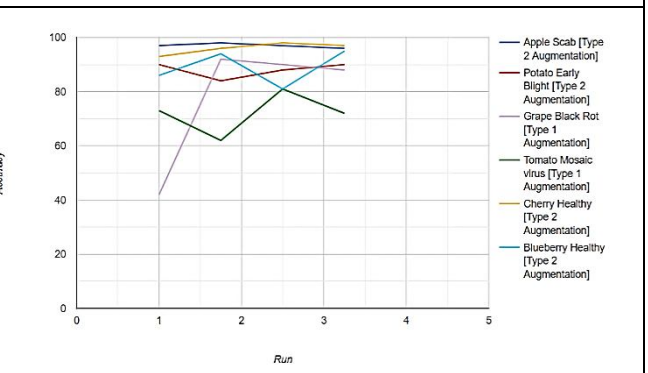
DenseNet169



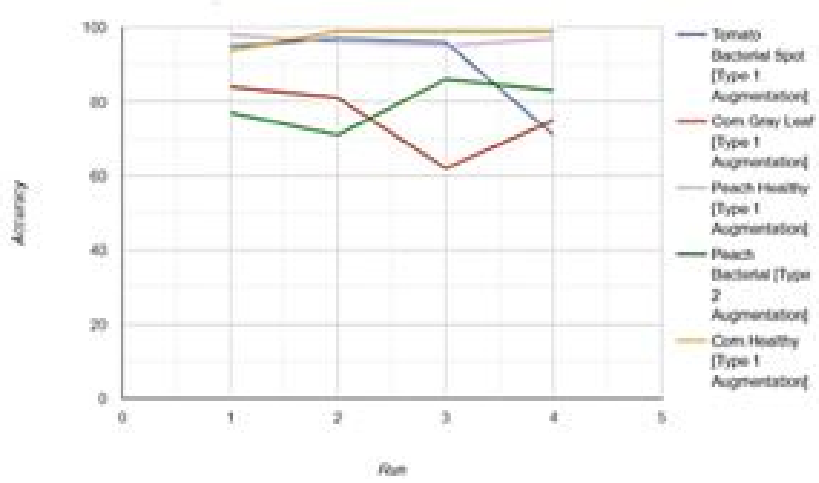


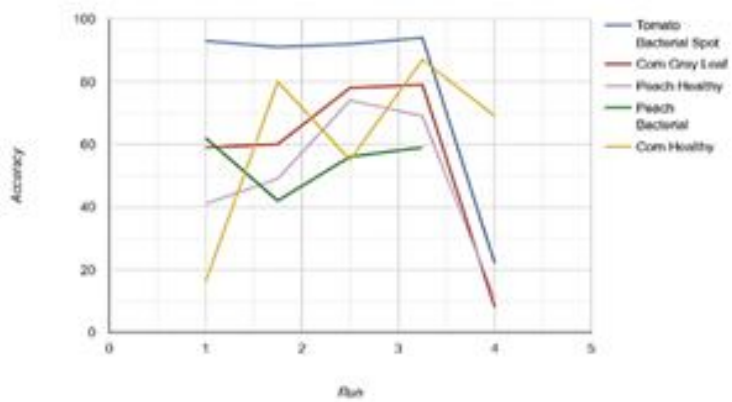
Xception





Inception-V3





For a deeper analysis and understanding, the F1-scores have been analyzed from the classification report and the models, which worked for the individual classes the best, were noted. **Table 5** shows the class-wise analysis for the 38 classes along with their best-fit accuracies. Even after performing the class-wise analysis, the original motivation behind the research of having a species-wise analysis was to be properly differentiated.

Table 5 Best performing model for each class

Class Name	Best Model
Apple black rot	DenseNet169 (99%), Xception (99%)
Apple cedar rust	DenseNet201 (97%), Xception (97%)
Apple healthy	DenseNet169 (100%), DenseNet201 (100%)
Apple scab	DenseNet201 (95%)
Blueberry healthy	DenseNet201 (100%)
Cherry healthy	DenseNet169 (100%)
Cherry Powdery Mildew	DenseNet169 (99%), DenseNet201 (99%)
Corn Gray leaf	DenseNet169 (92%)
Corn healthy	DenseNet201 (100%)
Corn leaf blight	DenseNet201 (100%), Inception-V3 (100%)
Corn common rust	DenseNet201 (98%)
Grape Black rot	DenseNet201 (97%)
Grape healthy	DenseNet169 (100%), DenseNet201 (100%)
Grape Esca	DenseNet201 (93%)
Grape Isariopsis	Xception (98%)
Orange Huanglongbing	DenseNet201 (92%)
Peach Bacterial spot	Xception (96%)
Peach healthy	Xception (97%)
Pepper bell healthy	DenseNet201 (97%)
Pepper-bell bacterial spot	DenseNet169 (97%)
Potato early blight	DenseNet169 (100%), DenseNet201 (100%)
Potato healthy	DenseNet201 (99%)
Potato late blight	DenseNet169 (99%)
Raspberry healthy	DenseNet169 (100%)
Soybean healthy	DenseNet169 (100%), DenseNet201 (97%)
Squash powdery mildrew	DenseNet169 (100%), DenseNet201 (99%)
Strawberry healthy	DenseNet169 (100%), Xception (100%)
Strawberry leaf scorch	DenseNet201 (100%)
Tomato bacterial spot	DenseNet169 (98%)
Tomato early blight	DenseNet201 (97%)
Tomato healthy	DenseNet169 (100%), DenseNet201 (100%)
Tomato late blight	DenseNet169 (100%)
Tomato leaf mold	Xception (99%)
Tomato mosaic	DenseNet169 (100%), DenseNet201 (100%)
Tomato septoria	DenseNet169 (99%), DenseNet201 (99%), Xception (99%)
Tomato spider mite	DenseNet201 (98%)
Tomato target spot	DenseNet169 (100%), Xception (99%)
Tomato yellow leaf curl	DenseNet169 (100%), DenseNet201 (97%)

5. Conclusion

Early and efficient plant disease detection is key to food security and sustainability. Hence, it is indispensable to use the technological advances like machine learning and deep learning, which can provide insights about the disease prediction without any need for human

intervention. In this work, four state-of-art convolutional neural network architectures have been compared and analyzed based on their performance on the individual 38 classes of the PlantVillage dataset. Two approaches of data augmentation were applied, one was to augment the classes that had lesser accuracy when compared to other classes in the classification report when trained without data augmentation and other approach was to augment all the classes that had less than 1% of the total number of images. It was concluded that type-1 data augmentation model is the most effective for Inception-V3 model whereas for DenseNet169 and Xception, type-2 model worked better. Densenet201 gave the stable accuracy of 98% on the training dataset with or without data augmentation. The variances in accuracy of certain classes were significantly lowered after augmenting the data. A class-wise and species-wise best performing model analysis was also presented as a table. Since the dataset is imbalanced, this would be particularly helpful while using the models to detect plant disease for that specific species.

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COMPARATIVE ANALYSIS OF BREAST CANCER DETECTION USING ENSEMBLE CLASSIFIER AND FIREFLY ALGORITHM

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ABSTRACT

The early and exact detection of breast cancer saves the life of women worldwide. Today, breast cancer is the leading cause of death among women worldwide. Automatic and precise diagnosis, detection, and image classification provide a second opinion to the physician when planning treatment for breast cancer. The advancement of biomedical engineering enables the classification and detection of natural images. The classification and detection of natural images is a function of an artificial neural network. The artificial neural network generates a variety of models for breast cancer images, including supervised and unsupervised classification processes. Improved classification algorithms forecast a better outcome for breast cancer cells undergoing treatment. The proposed feature optimization-based breast cancer detection method is used to classify and detect breast cancer using a firefly optimization algorithm. The applied pulse coupled neural network model is more effective and accurate at classifying cancer cells. The model of a pulse coupled neural network has significant advantages over the model of a conventional neural network. The proposed algorithm is evaluated in MATLAB environments using the renowned breast cancer dataset CBIS-DDSM.

Keywords: *Mammogram, Computer Aided Diagnosis (CAD, Breast Cancer, Firefly algorithm, Ensemble Classifier, Feature Optimization.*

1. Introduction

Breast cancer is the most common cancer in women worldwide. Breast cancer has a very high mortality rate when compared to other diseases. Breast cancer patient survival is a significant challenge for the society of medical and biomedical engineering. Breast cancer patients benefit from early detection of the disease [1, 2]. Biomedical engineers have developed a variety of screening and computer-aided diagnosis (CAD) techniques for the early detection of breast cancer [3]. Mammograms are critical for early detection of breast cancer. Mammography is a critical medical imaging technique that is used to screen for and diagnose breast cancer early [4, 5]. Mammography is primarily used to test and examine the breast in order to detect abnormal tumor growth. The mammography procedure is as follows: the results are first recorded on the X-ray film or directly into the computer, and then examined by a radiologist. Mammography enables a gynecologist to see changes in the breast tissue that are not visible during the examination [7, 8]. This technique expedites the diagnostic process, increasing the percentage of requirements that can be mitigated. Much work has been done in this direction in recent years. Indeed, there is a need to improve breast cancer diagnostic methods due to the disease's prevalence and spread [10]. As a result, there is a need for useful tools and techniques in medical image processing for the detection, diagnosis, and classification of breast cancer tissue.

Advances in biomedical engineering have resulted in the development of automatic breast cancer detection machines that utilize a variety of neural network models and transform-based algorithms. Image processing is critical for breast cancer detection. Image processing enables the analysis of breast cancer through the use of tools and functions [4]. Numerous authors and researchers developed a model for detecting breast cancer using neural networks and transform processes. The transform function is used to extract features from cancer images. The texture of breast cancer is a prominent dominant feature. For breast cancer image processing, the wavelet transform function has a significant advantage over the feature extractor [5, 6]. The artificial neural

network addresses the issue of breast cancer symptom detection by designing single- and multiple-layer neural network models for training sample data and detecting breast cancer. The illustration depicts the location and extent of breast cancer in a mammogram image.

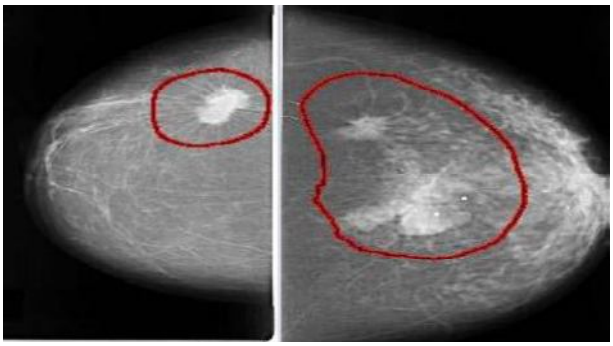

Figure 1. Mammogram specimens with a visible malignant tumour.

Despite the numerous detection methods for breast cancer, automatic detection at an early stage remains a difficult task [17, 20]. Several authors recently proposed a method for breast cancer detection based on feature optimization. The feature is the lower content of the mammogram image; it is the texture and boundary value of the mammogram image. The texture feature encompasses 70% of all feature components in a mammogram image [24]. The feature extraction technique is integrated into the transform methods, and these methods enable us to quickly identify a large number of dominated texture feature components. Thus, this feature extraction technique is applied in wavelet transform, which generates a variety of transform functions, including discrete wavelet transforms (DWT), continuous wavelet transforms (CWT), and a variety of others, including packet wavelet transforms. The primary bottleneck with DWT transform is that it can only process features with a low content, while those with a high content are pressed[41,42]. The feature optimization process made use of swarm intelligence techniques. The transform function family encompasses a wide variety of algorithms. This thesis is devoted entirely to the firefly algorithm. On a given image dataset, the FF algorithm determines the similar neighbours of a malignant cell. Breast cancer classification and detection methods are critical. Today, numerous classification algorithms are used, including machine learning, deep learning, CNN neural networks, and a variety of hybrid neural network models. This dissertation developed two neural network models for breast cancer detection and classification using mammogram screening images.

2. Principal of Breast Cancer

Breast cancer is the leading cause of death in the United States due to a lack of advanced techniques and methodology in medical institutions. Breast cancer detection at an early stage will result in an accurate diagnosis, which will save the majority of lives worldwide. The mortality rate is increasing rapidly as a result of breast cancers not being detected and diagnosed early. Breast cancer is a mass fusion that grows rapidly in women due to a variety of factors such as a western lifestyle, late childbirth, insufficient time breast feeding, and prior medical history. There are numerous techniques and methods for early detection of breast cancer, including digital mammography, digital breast tomosynthesis, synthesis mammography, and computer-aided detection using convolutional neural networks, deep learning techniques, and machine learning algorithms. When breast images are classified, three possible classes are identified: benign, malignant, and normal. On the basis of these three classifications, the severity of the disease can be determined and patients can receive precise and accurate treatment. The first point to consider is that feature extraction from the available data set, which may include mammograms and MRI images, must be performed accurately. The literature survey mentions numerous techniques for the accurate detection and diagnosis of breast cancer.

Deep neural networks are a widely used technique for detecting breast cancer and classifying breast images into benign, malignant, and normal. The second technique is mammography, which is the most widely used method for breast image screening. The majority of physicians prefer mammography for breast cancer detection and diagnosis. Additionally, various statistical methods such as digital breast tomosynthesis and digital mammography are available for the detection of breast cancer. Convolutional Neural

Networks are a very popular and widely used type of deep learning algorithm for image detection and classification in medical imaging.

2.1 Transfer Learning.

Transfer learning is critical for data feature extraction and classification because it allows for the transfer of knowledge from one domain to another. The transfer learning phase is composed of the CNN model's three layers. The image net data is transferred to the histopatologic images in this model, where the classified images are classified into two types of classes: benign and malignant. The following figure illustrates the transfer of learning using three layers of the CNN model. Deep feature extraction is another important type of transfer learning because it allows for the transfer of knowledge from one domain to another for the classification of images based on tumour class. The three layers of the CNN model for the classification of two types of classes 1. Benign 2. Malignant is shown in the figure 2.

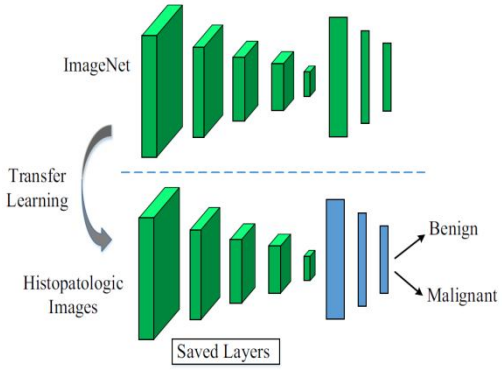

Figure 2. Three layers of the CNN model

2.2 Support Vector Machine Algorithm.

Machine learning is the most effective and efficient method for breast cancer detection and diagnosis. Machine learning algorithms will be used to generate the accurate result. There are three types of machine learning algorithms: supervised learning, unsupervised learning, and semi-supervised learning. The support vector machine (SVM) is a very popular and widely used algorithm for supervised learning in classification problems. Unsupervised algorithms such as K means are used for clustering. With the help of support vector machine we can find two separate vectors separated by positive hyperplane and negative hyperplane which is shown in Figure 3. For the SVM algorithm we can provide the labeled data which can be further modeled using training dataset. Then we can provide the new data which can be predicted with the help of prediction model. This code process of support vector machine is shown in the Figure 4.

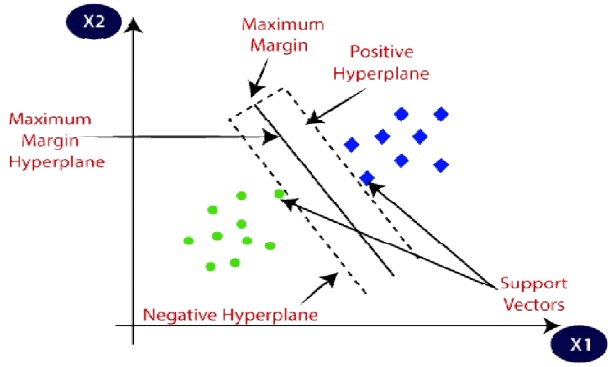

Figure 3. Support Vector Machine.

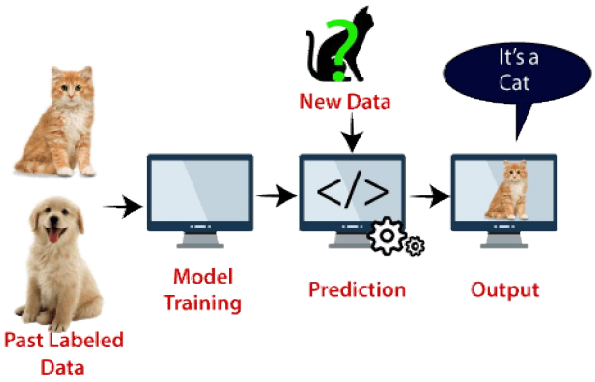

Figure 4. Code process of Support Vector Machine.

2.3 Types of Support Vector Machine Algorithms.

SVMs fall into two categories:

1. Linear SVM: If a dataset can be divided into two classes using a single straight line, it infers unambiguously to separate data; such data is referred to as unambiguously unmistakable data, and the classifier used is the Linear SVM.
2. Non-direct SVM: When a dataset cannot be assembled in a straight line, it is referred to as non-straightforwardly detached data. For such data, a non-direct SVM classifier is used, which is referred to as non-straight data and classifier.

Hyperplane: To isolate classes in n-dimensional space, different lines/decision cutoff points are used; to aid in depicting data

centers, decision makers must determine the most optimal decision limit. The hyperplane of SVM is then referred to as the optimal breaking point.

The arrangements in the dataset are required by the hyperplane components; as illustrated in the figure, there are two components that are accepting; a straight line will be drawn using the hyperplane. In addition to the three components expected, the hyperplane will have two estimation planes.

The Makers have created a hyperplane with an outlandish edge, which provides the best distance for data centers.

Support Vectors: The vectors or data centers that are closest to the hyperplane are named in reference to the impact on the hyperplane's circumstance. Because these vectors support the hyperplane, they are referred to as support vectors.

Linear SVM: A model can be visualized by utilizing the SVM estimation process. A dataset with two marks (green and blue) that indicate the relationship between expect makers and the dataset in which the two arrangements x1 and x2 are mentioned. To mastermind the pair(x1, x2), Makers require a classifier with blue or green headings.

3. Methodology

The methodology is primarily concerned with overcoming the limitations of the classification algorithm used for breast cancer detection. The first section discusses proposed methods for breast cancer detection, while the second section discusses how neural networks are used to detect breast cancer.

3.1 Feature Extraction

Breast cancer's primary process is feature extraction. The Discrete Wavelet Transform (DWT) method is used to extract features. The discrete wavelet transform is derived from the mother wavelet transform. The mammogram and wavelet transform both have a frequency-dominated nature. Now, the feature extraction process is described in detail.

The wavelet transform is a collection of fine-grained and approximate coefficients, which are expressed in terms of high- and low-frequency components. From the mother wavelet transform function, the wavelet transform function is derived [14, 15, 16].

Wavelet transform, denoted by $W(a,b)$,

$$W(a,b) = \int_t^{\cdot} f(t)\frac{1}{\sqrt{|a|}}\Psi\left(\frac{t-b}{a}\right)dt \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

A convolution of a function $f(t)$ is basically a Wavelet transform which consists a set of basic functions that are generated by the scaling and translation of a mother wavelet. There is a wavelet transform coefficient For every(a,b), where similar to the function $f(t)$ is represented in terms of scaled wavelet at location $t = (b/a)$.

In DWT, a signal is analyzed with a small number of scales with varying number of translations at each scale. A critical sampling of the CWT $W(a,b)$ is obtained by substituting $a = 2^{-j}$ and $b = k2^{-j}$ the scale and translation are integers representing j and k. Upon this substitution,

$$\Psi_{j,k}(t) = 2^{j/2}\ (2^j t - k)\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

These wavelets for all integers j and k produce an orthonormal basis. $\Psi_{0,0}(t) = \Psi(t)$ the mother wavelet. Dilation and translation of the mother wavelet produces other wavelets. Discrete wavelet transforms, denoted by $W(j,k)$, is hence given by

$$W(j,k) = \int_t^{\cdot} f(t)2^{\frac{j}{2}}\Psi(2^j t - k)dt\ldots\ldots\ldots\ldots(3)$$

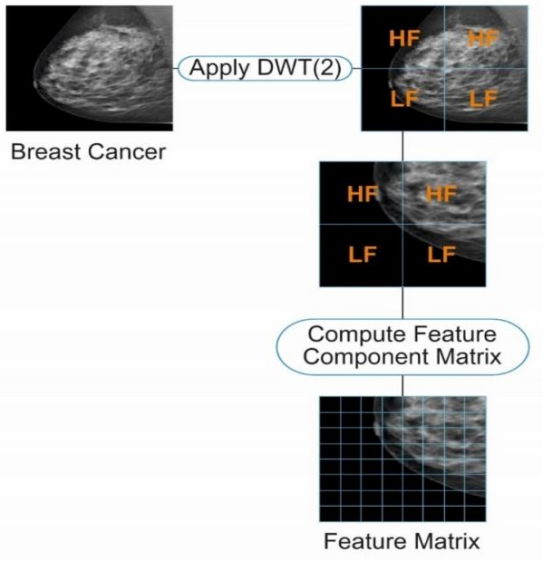

Figure 5. Process of feature extraction based on discrete wavelet transforms.

The wavelet packet transform operates similarly to the discrete wavelet transform. Both transforms are effective for extracting multi resolution feature points. The primary distinction between DWT (discrete wavelet transform) and wavelet packet transform is the level of decomposition used in the decomposition process. The DWT transform function is a feature extractor that is dominated by texture, but it has a significant limitation in that it can only process lower feature components. As a result, all possible feature components are disregarded. However, in the case of wavelet packet transform, both the energy and entropy of the approximate and detailed transform functions are estimated.

The wavelet packet transform is defined as

$$w_{s,t}^{m}(z) = 2^{\frac{s}{2}} w^{m}(2^{s}z - t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

The process of scaling, translation and modulation define as s, t and m.

For m=0,1 initial 2 wavelet packet, the mother wavelet function derives as

$$w_{0,0}^{0}(z) = \varphi(z) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$$w_{0,0}^{0}(z) = \psi(z) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

The level of decomposition of signal length m=2, 3,…….,n the function of WPT is

$$w_{0,0}^{2m}(z) = \sqrt{2}\sum_{t} h(t) w_{1,t}^{m}(2z - t) \ldots\ldots\ldots (4)$$

$$w_{0,0}^{2m+!}(z) = \sqrt{2}\sum_{t} g(t) w_{1,t}^{m}(2z - t) \ldots\ldots (5)$$

Finally, the wavelet packet coefficient $c_{s,t}^{m}$ is measure by this derivation

$$c_{s,t}^{m} = \left(f(z), w_{s,t}^{m}\right) = \int f(z) w_{s,t}^{m}(z) dz \ldots\ldots (6)$$

The ensemble classifier is composed of a base classifier M and successive classifiers NB and RF. The ensemble classifier can define the sample of data x as

$$f(x) = [s1, , , sm] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Where s1,................,sm denote the class feature attributes and Mc denotes the base classifier.

Consider each optimal feature component that has been mapped using naive bayes to be mapped using a base classifier on data sample x.

$$NB(x) = [Ei1, \ldots, Eik] \ldots\ldots\ldots\ldots\ldots\ldots\ldots (8)$$

Here E is entropy of feature of breast cancer image dataset.

3.2 Feature Optimization

The process of feature optimization is critical for accurate breast cancer detection. The transform data used the firefly optimization algorithm to optimize the feature components.

The firefly algorithms are named after the firefly's flashlight. Fireflies are unisex in nature and are attracted to other fireflies, forming a pattern of lights [21, 24, 25]. Fireflies are homogeneous in nature and are drawn to regular patterns of summer light. The three fundamental properties of firefly algorithms are as follows:

(1) Fireflies are exclusively unisexual.

(2) Attractiveness is proportional to their brightness;

(3) A firefly's brightness is affected or determined by the objective function's landscape.

On the basis of these three rules, the firefly algorithm's (FA) fundamental steps can summarized as the pseudo code

Define: objective function as f(x), x = (x1, ..., xd)T

define population of firefly as xi (i= 1, 2, ..., n)

the intensity of light Ii at xi is estimated by f(xi)

Define light absorption factor

while (t <MaxGeneration)

for i= 1 :n all n fireflies

for j = 1 :iall n fireflies

if (Ij>Ii), Move firefly itowards j in d-dimension; end if

Attractiveness varies with distance r via exp[−r]

Evaluate new solutions and update light intensity

end for j

end for i

Rank the fireflies and find the current best

end while

Postprocess results and visualization

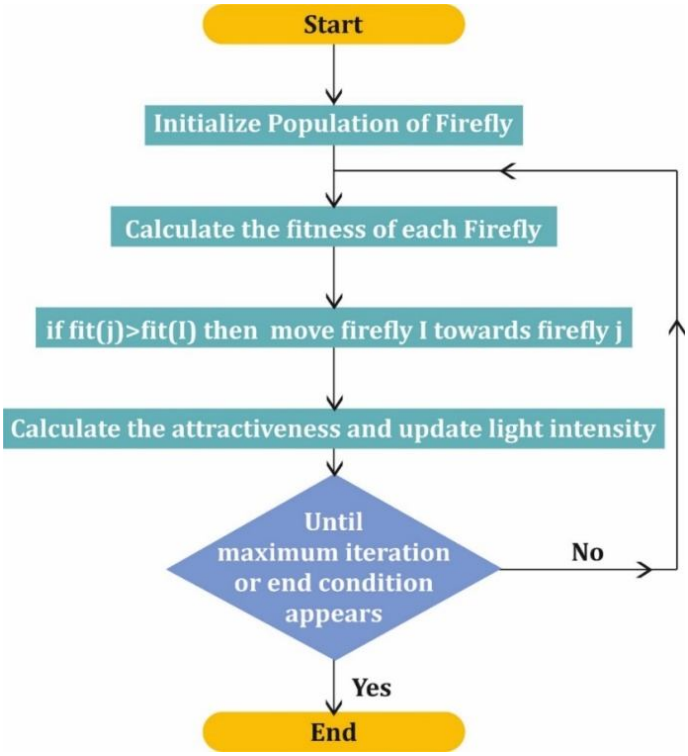

Figure 6. Firefly algorithm Process block diagram.

3.3 Proposed Hybrid Model.

The training set Trf of a base classifier M is derived pair-wise (x,[E1,.....,Ek]), where x represents the input features and [E1,.....,Ek] represents the malignant cell's target feature component.

$$E_j = \begin{cases} 1, if\ j = k \\ 0, \quad otherwise \end{cases} \dots\dots\dots\dots\dots\dots\dots (1)$$

The base classifier creates a map of the data's features for selection as

$$Cm = argmin \sum_{\forall(x,|E1,\dots,EK|)\epsilon Trf} \varepsilon b\left(m_{rf}(x), [E1,.,Ek]\right) \dots\dots (2)$$

Where εb is error function for the base class feature voting measure as

$$\varepsilon b = \sum_{k=1}^{k} |Ek - mc| \dots\dots\dots\dots\dots\dots\dots\dots (3)$$

Now the final voting of Rf class

$$rf = \frac{mj}{\sum_{j=1}^{mc} mc} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$

Algorithm (ensemble voting)

1. Input x=[E1,E2,.....,Ek] the base classifier Mc and the voting model Trf.

2. Output: classification of classes c1 and c2.

3. Calculate the entropy of feature components [s1,s2,s3..... .snb]

4. Evaluate random forest voting on all features of the base class.

5. Calculate parameter values.

6. Exit.

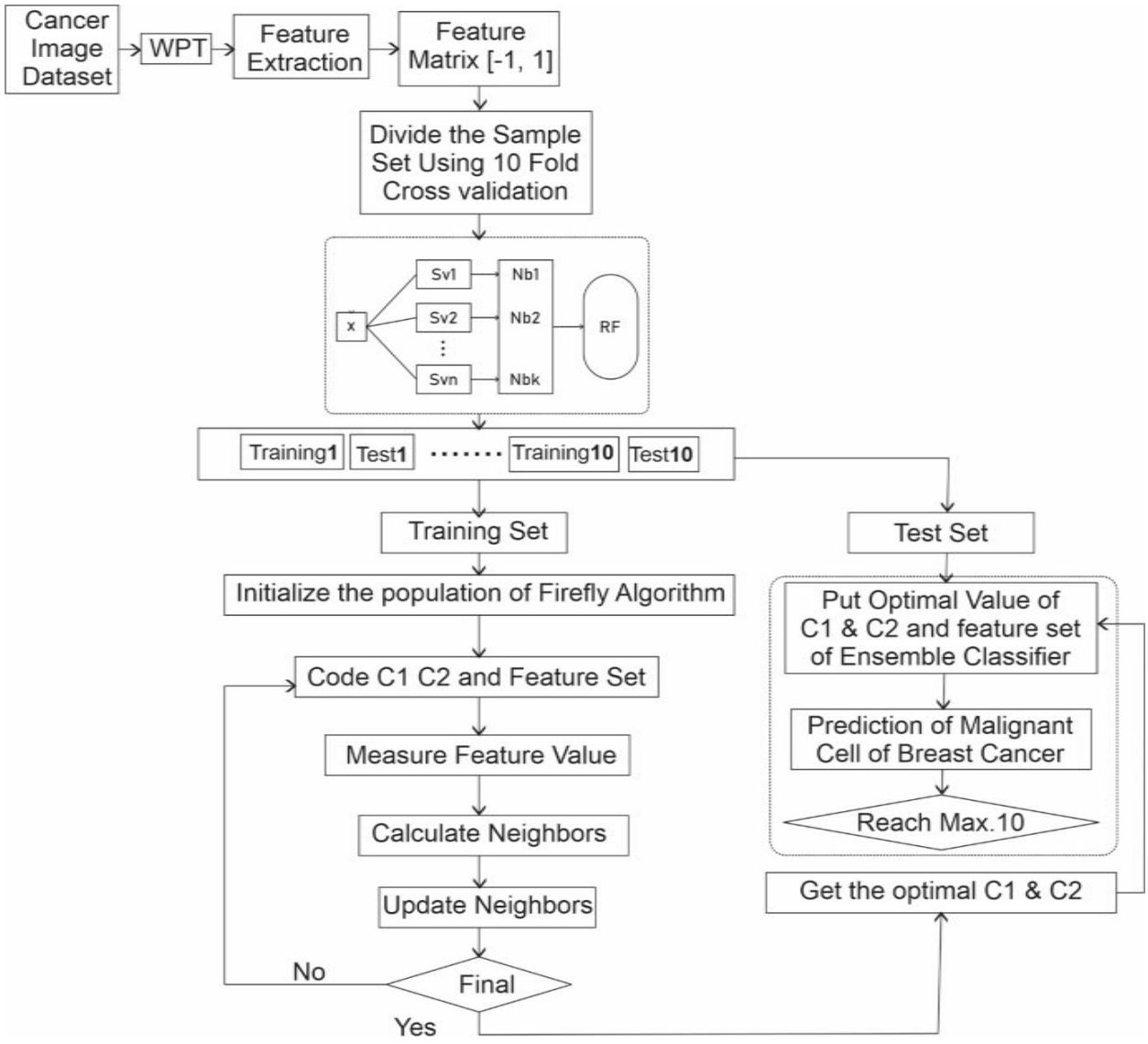

Figure 7. Ensemble classifier block diagram based on support vector machine, neural network, and random forest.

3.4 WPT-RBF Method

The proposed algorithm employs a wavelet packet transform in conjunction with an RBF neural network. The proposed algorithm circumvents the wavelet transform's limitation. Wavelet transform was used to extract features. The authors derive a family of (N, N) symmetric orthogonal wavelets, where N denotes the number of vanishing moments in the analysis high-pass filter and N denotes the number of vanishing moments in the synthesis high-pass filter. The interpolating transform (4, 2) is an example of this family of transforms. The integer representation of it, as described in [10], is used in the initial stage of our coding algorithm. The integer wavelet representation of a one-dimensional signal $A^0(n)$ with N nonzero samples is defined in this case as

$$\forall n: D^{i+1}(n) = A^i(2n+1) - \left[\sum_k pkA^i(2(n-k)) + \frac{1}{2}\right] \quad \ldots\ldots (1)$$

$$0 \le i < j, 0 \le n < 2^{-(i+1)}N$$

$$-2 \le k \le 1$$

$$\forall n: A^i(2n) = A^i(2n) + \left[\sum_k ukAD^{i+1}(n-k) + \frac{1}{2}\right] \quad \ldots\ldots (2)$$

$$0 \le i < j, 0 \le n < 2^{-(i+1)}N$$

$$0 \le k \le 1$$

Where [x] denotes the integer component of x, j denotes the number of scales, and Ai+1(n) and Di+1(n) denote the Approximation and Detail of the original signal calculated at the scales (i+1), 0 I j, respectively. The transforming function generates a feature matrix, which is then converted to a feature vector.

Dorigo and scholar propose the ant colony optimization algorithm. The proposed algorithm is inspired by biological ant behavior. The algorithm enables a dynamic population-based process to take place [17]. The ant colony optimization algorithm is based on the theory of continuity and shortest path estimation. Ants are creepy crawlies that live in colonies. Due to their visual impairment, they rely on pheromones to navigate their way from home to sustenance. The pheromone is the concoction material retained by ants that serves as the primary medium of communication between ants, thereby directing the assurance of the following development. However, ants find the shortest route possible in light of the pheromone's strength in various ways. Generally, the strength of the pheromone and the distance travelled are used to reenact insect structure. The ant colony optimization technique was used in this case to select local features during the fusion process. A hybrid neural network is a network that combines two distinct neural network models. Combining SOM and RBF neural network models results in the formation of a hybrid neural network. Clustering and classification are combined in the processing of SOM and RBF neural networks. The SOM neural network process generates a cluster map of the feature dataset. These feature map data are used to process the RBF neural network's input. The classified pattern is generated by the RBF neural network. This classified pattern is used to detect malignant breast cells.

The output of the feature selector maps into x1,x2,x3, , , xn.

Step 1 Initialization: - initialize the weight vector Wj with random values (0). The only constraint is that the initial weight vector Wj(0) must be unique for j=1.....l, where l denotes the number of output neurons.

Step 2 similarity matching: - determining the winning neuron Yc at time step t using the Euclidean criterion of minimum distance.

$$Yc = argmin\|x(t) - wj(t)\|, j = 1,2, \dots . . l \dots \dots (3)$$

Step 3 updating: - Using the update rule, adjust the synaptic weight vectors of all neurons.

$$Wj(t+1) = wj(t) + \eta(t)hi, Yc(t[x(t) - Wi(t)]) \dots \dots \dots \dots \dots \dots \dots \dots . . (4)$$

Where $\eta(t)$ is rate of learning and h. yc(t) is the winner's neighborhood function.

Step 4 Continuation:- repeat step 2 until no change is observed in the feature map.

In step 3, the learning rate should be time-varying. This criterion can be met by selecting an exponential decay for $\eta(t)$.

$$\eta(t) = \eta oexp\left(-\frac{t}{\tau 1}\right), t = 0,1,2 \dots \dots \dots \dots \dots . . (5)$$

Step 5: The output of the SOM neural network comes before the RBF model's input. The hidden layer of the RBF input is the radius of the SOM winner vector. Additionally, the ACP algorithm is used to adjust the weights of the RBF model.

Step A: To determine the extent of the hidden layer

$$Hj = \frac{e^{-\|x-cj\|^2}}{2\sigma^2_{\,j}}_{j=1,2,\dots\dots\dots\dots\dots,nh} \dots \dots \dots \dots \dots . \dots \dots (6)$$

Step B: To estimation of output layer

$$Yi = \sum_{i=1}^{nh} wijhi, j = 1,2, \dots \dots \dots \dots . n \dots \dots . . (7)$$

Step C: To estimate the error

$$ej = t_j - y_{j,j=1,2\dots\dots\dots\dots n} \dots \dots \dots \dots \dots \dots \dots . (8)$$

Step D: weight adjustment

$$w_{ji(k+1)=w_{ji(k)+\Delta w_{ij(k+1)}}} \dots \dots \dots \dots \dots \dots \dots . . (9)$$

$$\Delta w_{ij(k+1)=\partial.ej.f+\alpha.\Delta wji(k)} \dots \dots \dots \dots \dots \dots . (10)$$

I=1,2,……..nh; j=1,2,…….no;

Step E minimized the value of RMSE if not then got step 5

$$RMSE = \frac{1}{n}\sqrt{\sum_{i=1}^{n}\sum_{j=1}^{m}(tij - yij)^2} \dots \dots \dots \dots . . (11)$$

3.5 Neural Network based Classifier

This section discusses the neural network-based classifier used to detect breast cancer. Additionally, this section includes some machine learning-based classifiers for breast cancer classification.

The SOM (self-organized map) is used to accelerate learning because the predefined class cannot be used, but the neurons in the class are used to update local parameters. The network model used to convert the detected sample of X image data to mapped winning neurons is competitive, and the weight factor is adjusted after each iteration [29, 30,42].

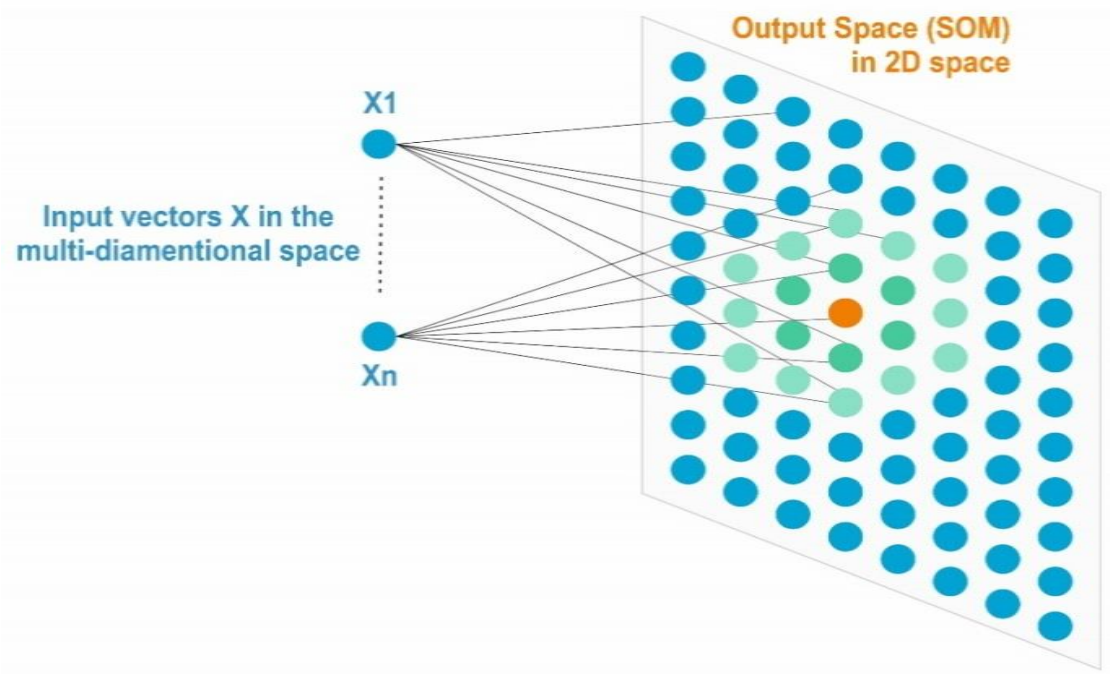

Figure 8. Diagram illustrating the process of mapping input data to output data using a SOM neural network model.

The algorithmic process is described in detail here.

1. Conversion of the extracted feature matrix to a vector of features.
2. Define the dimensions of feature vectors as a matrix of size k x m, where k is the dimension of the feature vector and m is the dimension of the data sample.
3. Some parameters define the number of clusters or classes as j, the size of the feature vector as I the weight of the internal 0 to 1 feature vector as Wij, the initial learning rate as a(0), and the number of iterations as e. (epoch)
4. Commence the iteration
5. Calculate the feature vector from 1 to m.

$$V(j) = \sum_{i} (Wij - Xm,i)^2 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Estimate the minimum value of V(J)

$$W_{ji}^{new} = W_{ji} + \alpha(Xmi - Wji) \ldots\ldots\ldots\ldots\ldots (2)$$

6. Update the learning rate for next iteration

$$\alpha(t+1) = 0.5\alpha(t) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

7. Terminate the rate of iteration and measure the difference
8. Update the value of weight Wij
9. Measure the optimal distance vector into cluster
10. Cancer detected.

3.6 Backpropogation Neural Network

The backpropagation neural network model essentially controls the rate of error in terms of the desired output difference that occurs in the source of the network, thereby increasing the rate of detection of given breast cancer sample data. The processing portion of backpropagation algorithms is divided into two sections; the first is the training section, and the second is the application section [29].

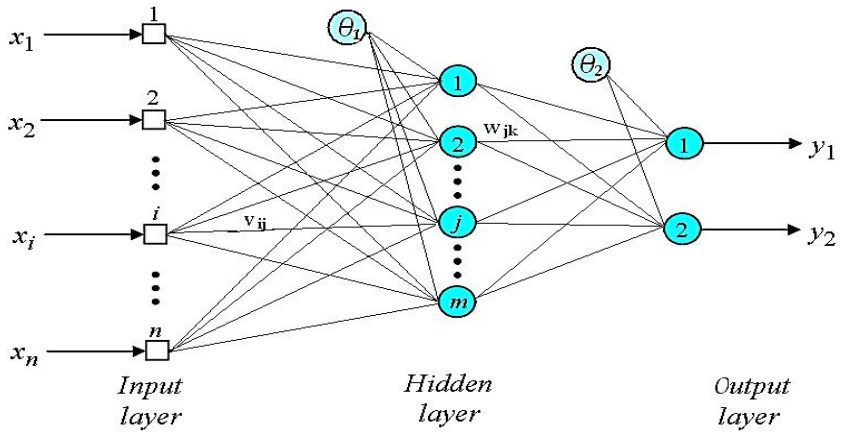

Figure 9. Block diagram of backpropagation neural network.

The following is the training algorithm:

1. The input unit (Xi, i=1,2,3,...,n) received the input signal Xi and mapped it to the signals of the hidden layer.
2. The hidden layer unit (Zj, j=1,2,3,...,p) adds the weight signal at the input.

$$z_{inj} = Voj + \sum_{i=1}^{n} xivij \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

With using activation function to get output signal value$Z_{f=f(Z_inj)}$

And sent that signal to all unit and it above layer

3. Output unit (Yk, k=1,2,3,…….,m) sum input weight signal

$$y_{ink} = W_{o,k} + \sum_{j=1}^{p} ZiVj,k \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

With using its activation function to get output signal

value $yk = f(Y\_in_k)$

4. The output unit (Yk,k=1,2,3,.....m) accepts one pair of target and training patterns and counts the error.
5. $\delta_{k=}(B^I - YKfYink$……(3)

$$count\ weight\ correction\ Wjk$$

$$\Delta wik = \alpha\delta kZi$$

Bias vector correction

$$\Delta wik = \alpha\delta kZi$$

6. Finally estimate the final output Yk

4. Implementation and Result

Implementation/simulation process of breast cancer detection using the proposed algorithm and other neural network-based algorithms for the analysis and detection of breast cancers is summarized here. This section introduces the implementation tools, describes the parameters, and describes the dataset. Additionally, describe how the results vary when using a different classifier with the proposed algorithm.

4.1 Performance Parameter

Earlier applications of isolated feature reduction on datasets had higher accuracy than later applications of feature reduction and improved POS method when compared to the earlier applications. Additionally, the true positive and true negative detection ratios have both increased significantly, while the false positive and false negative detection ratios have decreased significantly. The result is therefore accurate due to the direct improvised method used. In order to demonstrate the consequences for accuracy, precision, and recall for data sets, we present the results of the confusion matrix (true positive, true negative, false positive, false negative) in the form of a confusion matrix (true positive, true negative, false positive, false negative).

Precision is a measure of the proportion of predicted positives and negatives that are actually positives and negatives, respectively.

Remember that it is the proportion of actual positives and negatives that are predicted to be positive and negative respectively.

Precision = $\frac{TP}{TP+FP}$

Recall = $\frac{TP}{TP+FN}$

DATABASE: The breast cancer dataset is made available to the public for the purposes of research and education on the disease. The image dataset used in this study was the CBIS-DDSM. The left and right breasts are represented by sample images in this dataset, which contains a total of 2000 sample images. The dataset's description is broken down into different types of cancer patients' case studies.

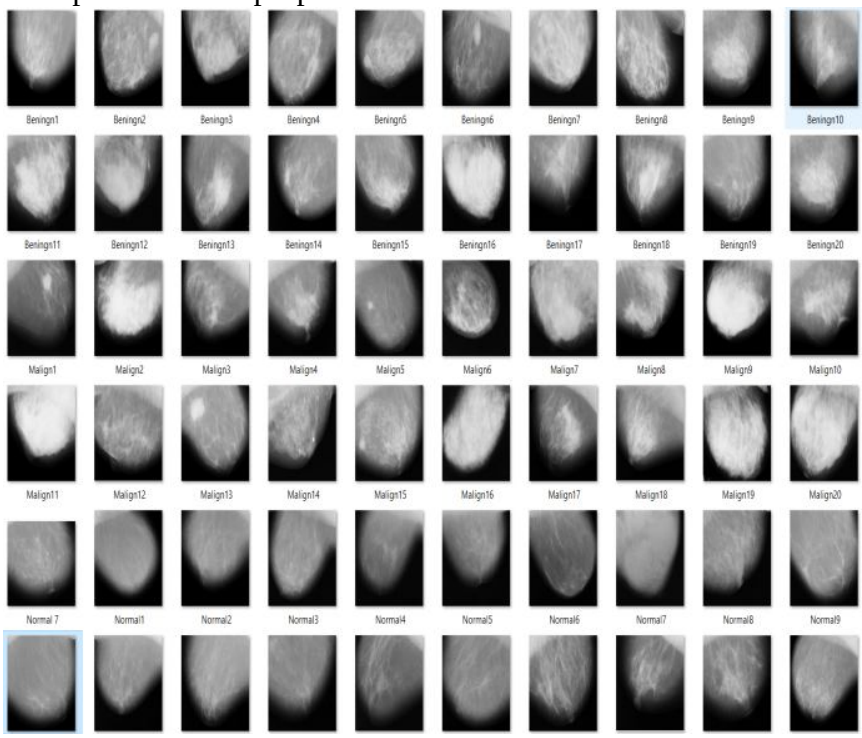

Figure. 10 The dataset for breast cancer is displayed in the window.

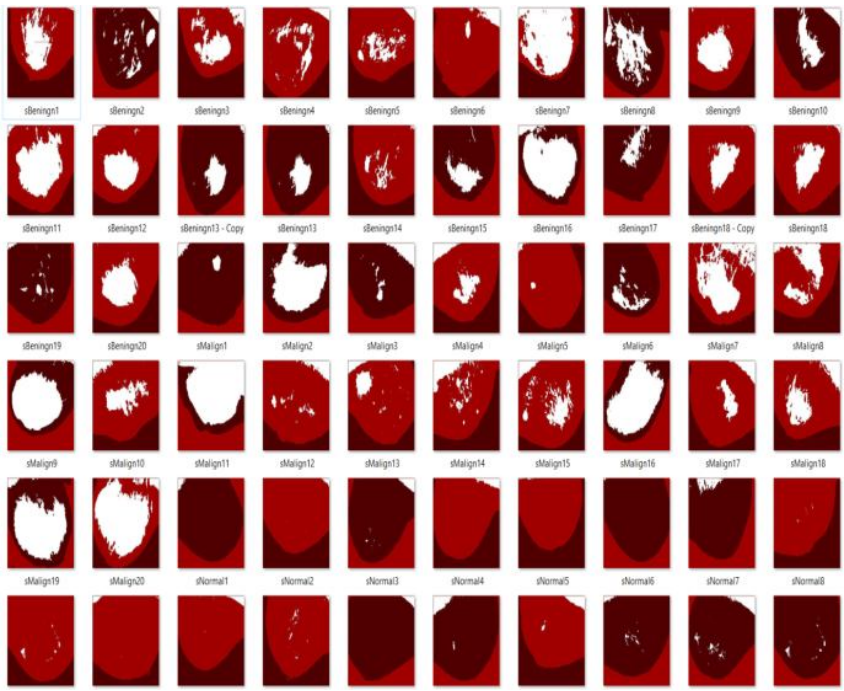

Figure 11 The preprocessing of the breast cancer dataset is displayed in the window.

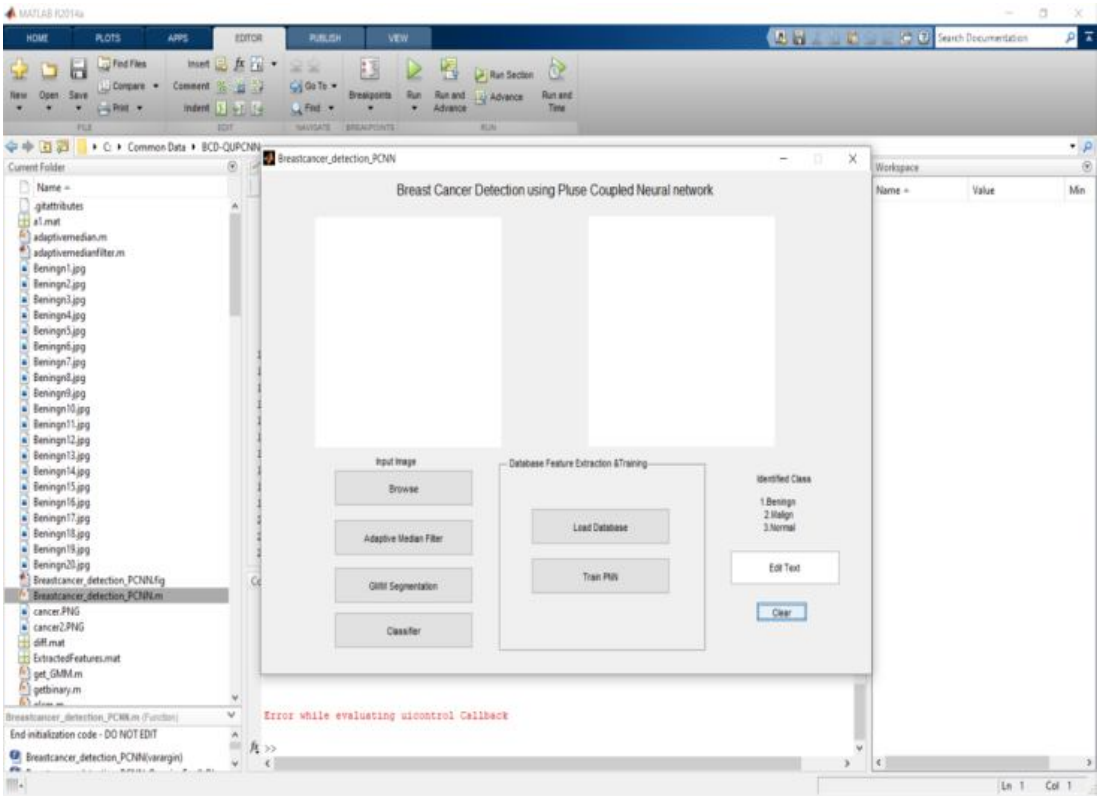

Figure 12. The window illustrates the execution of our MATLAB implementation model.

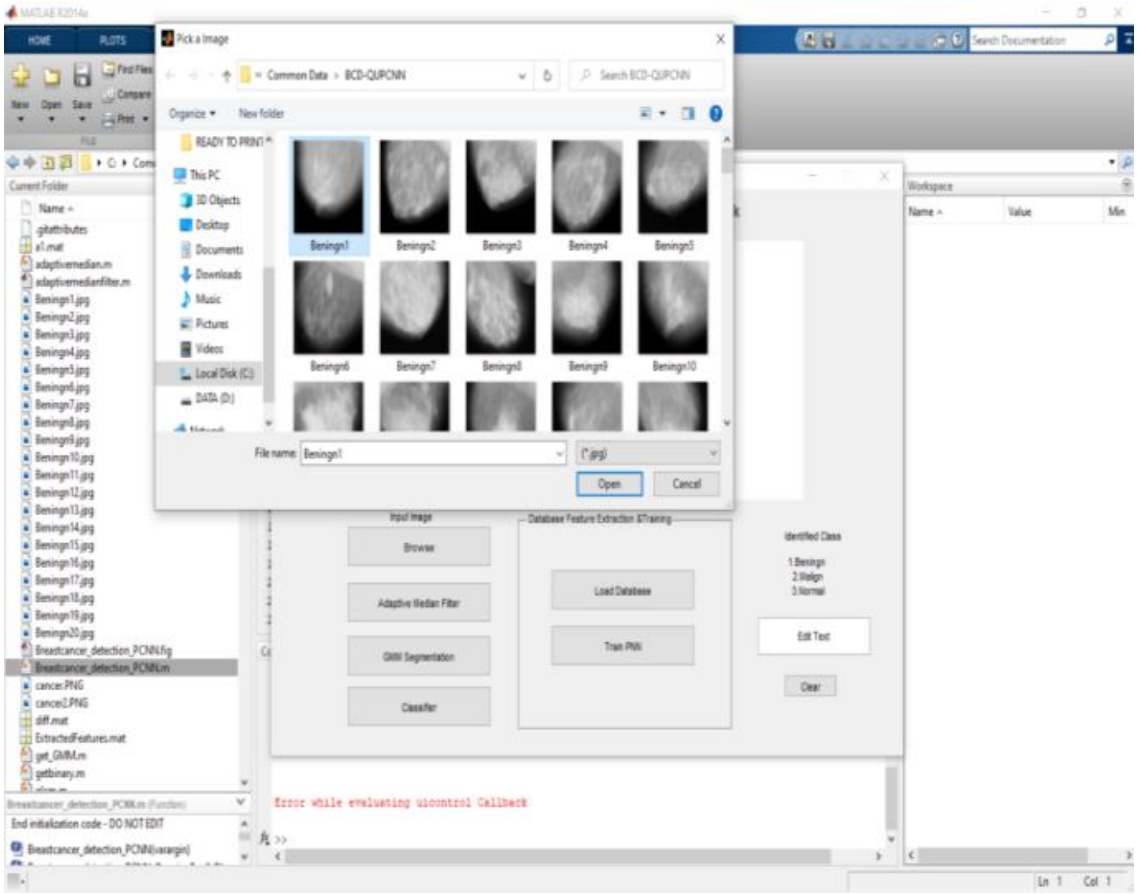

Figure 13. Window show that the execution process with load a input image of our implementation model in MATLAB.

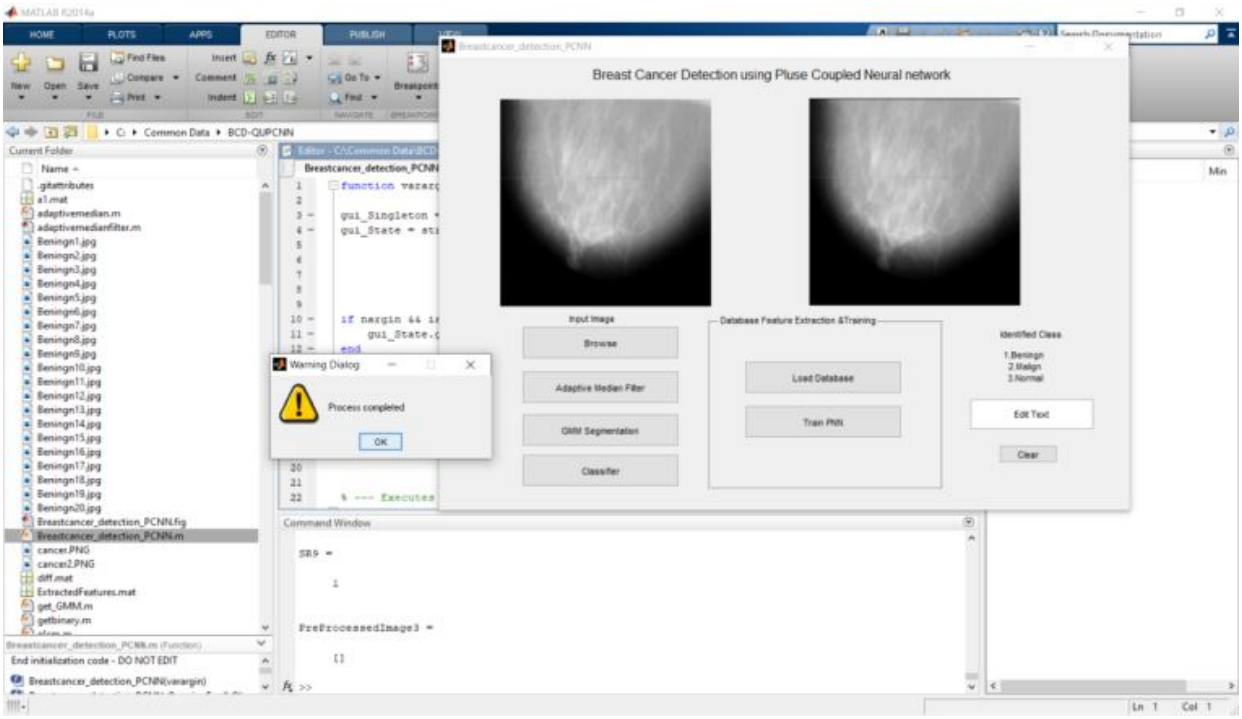

Figure 14 Window show that the execution process of adaptive median filter in our implementation model in MATLAB.

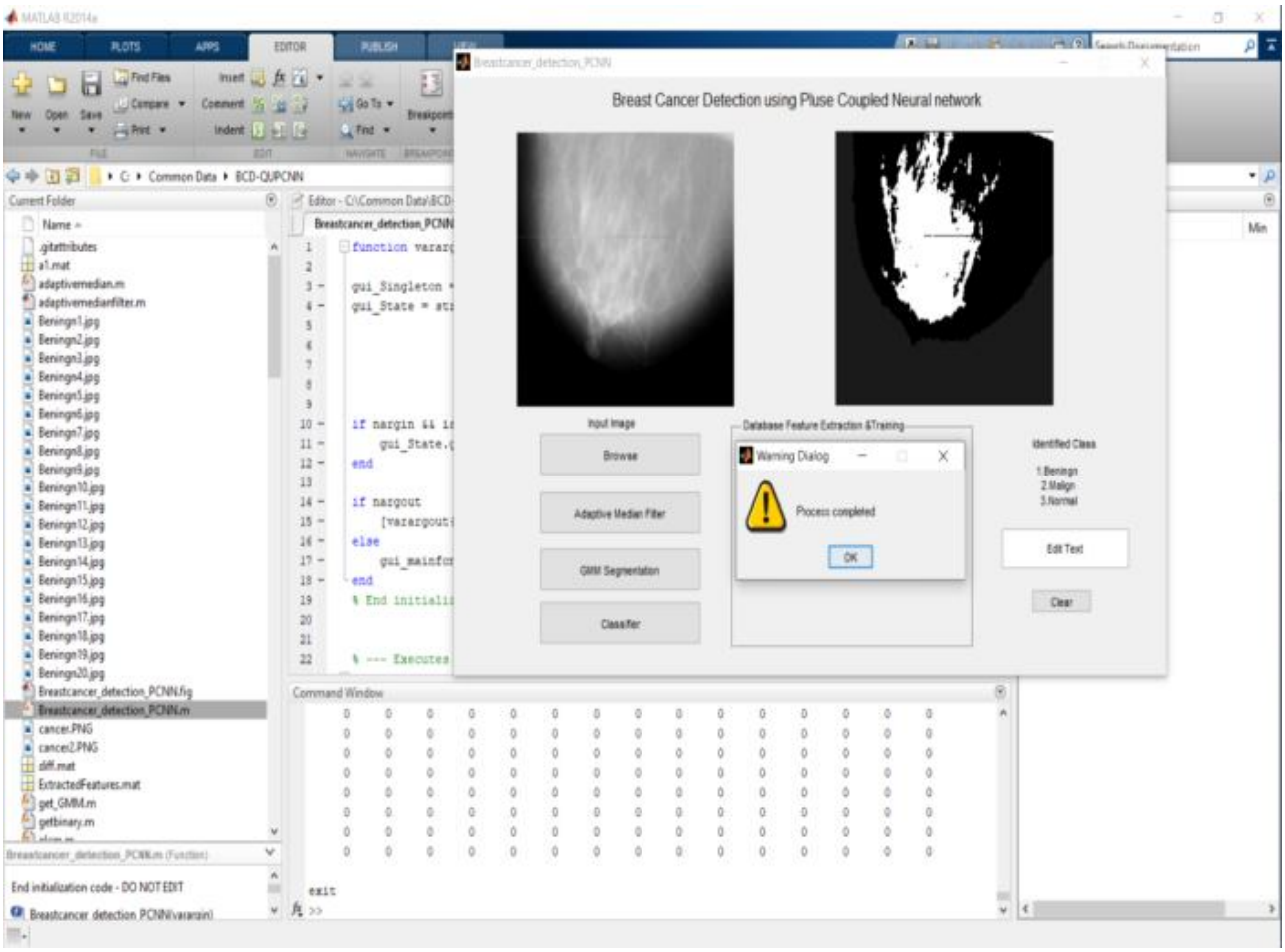

Figure 15 Window shows that the GMM segmentation process completed in our implementation model in MATLAB.

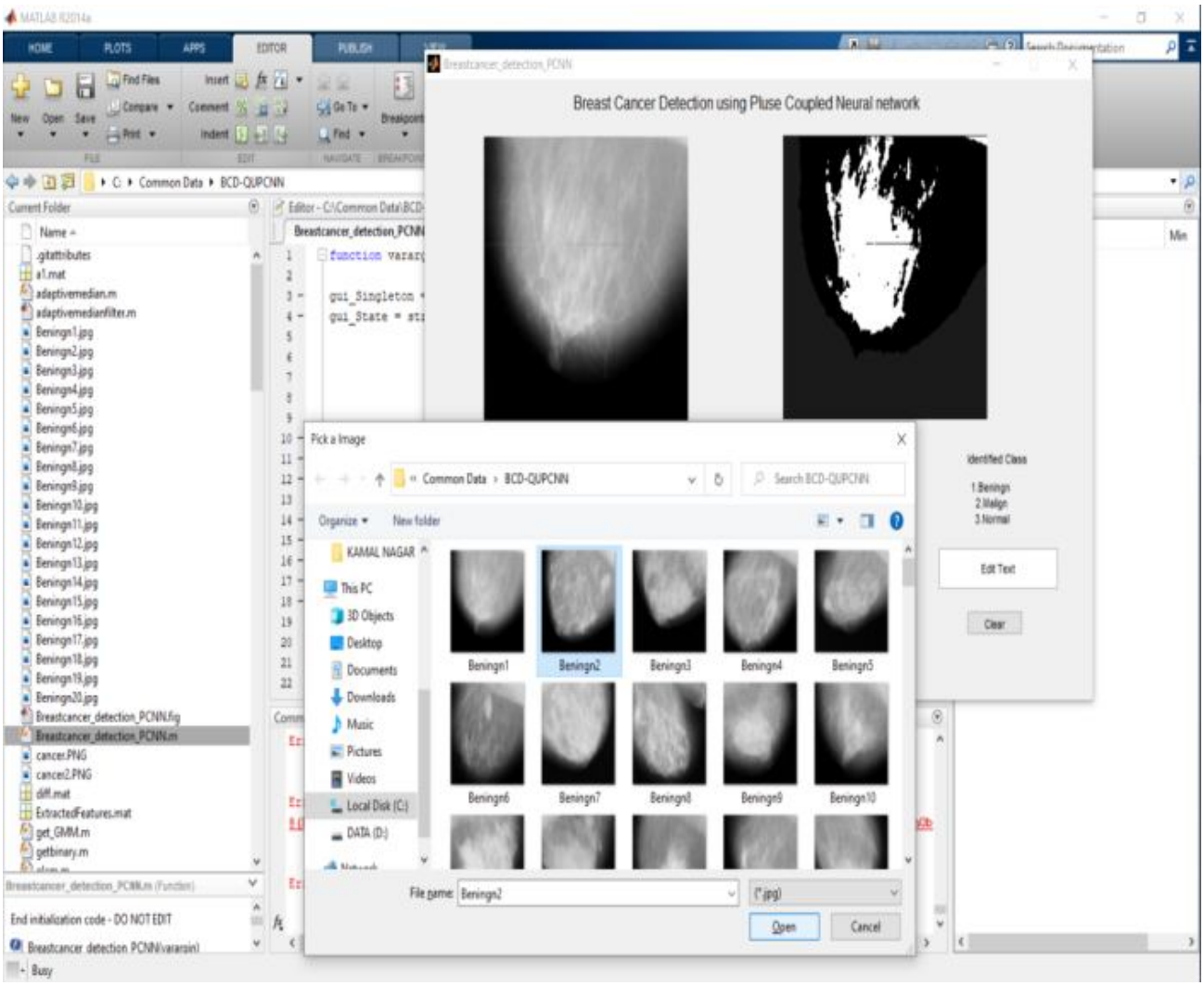

Figure 16 Window show that the input image loading window in our implementation model in MATLAB.

4.2 Result and Performance Analysis

4.2.1 Case Study I

Techniques	Accuracy	Precision	Recall	Attributes
BP	80.2414	81.2454	84.2544	3
SOM	82.6337	80.6337	79.6337	
SVM	87.6337	82.6337	83.6337	
BP	80.2659	78.2659	77.2659	
SOM	87.8709	82.8709	83.8709	
SVM	88.4746	85.4425	87.4892	
BP	92.2459	90.2585	80.1485	11
SOM	82.8709	80.8709	79.8709	
SVM	98.9401	97.9401	85.9401	
BP	85.2659	80.2659	81.2659	15
SOM	86.4852	82.8894	84.2479	
SVM	88.2415	82.9657	87.6425	
BP	85.2659	80.2659	81.2659	18
SOM	95.9401	93.9401	92.9401	
SVM	97.4325	94.4879	94.6548	

Table 1: Comparative study of accuracy, precision and recall using BP, SOM, SVM with number of attributes is 3, 11, 15, 18.

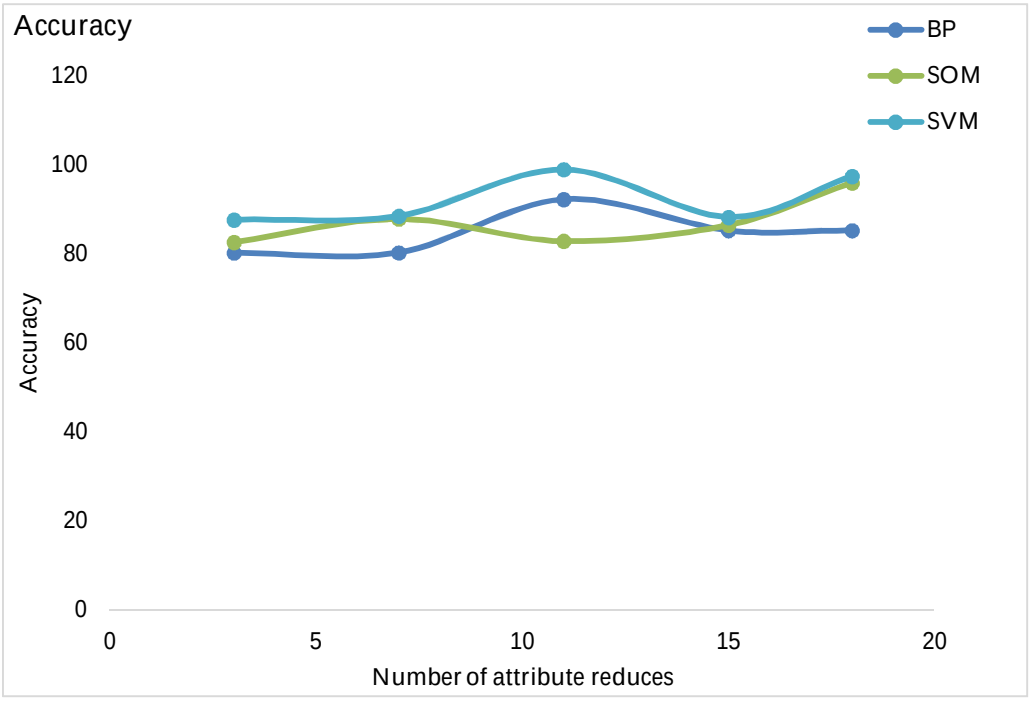

Figure 17. Comparative performance analysis of accuracy using BP[30], SOM[29], and SVM[30] techniques with input of 3, 7, 11, 15, 18. In this case, we see that the SVM outperformed the other two techniques, BP and SOM.

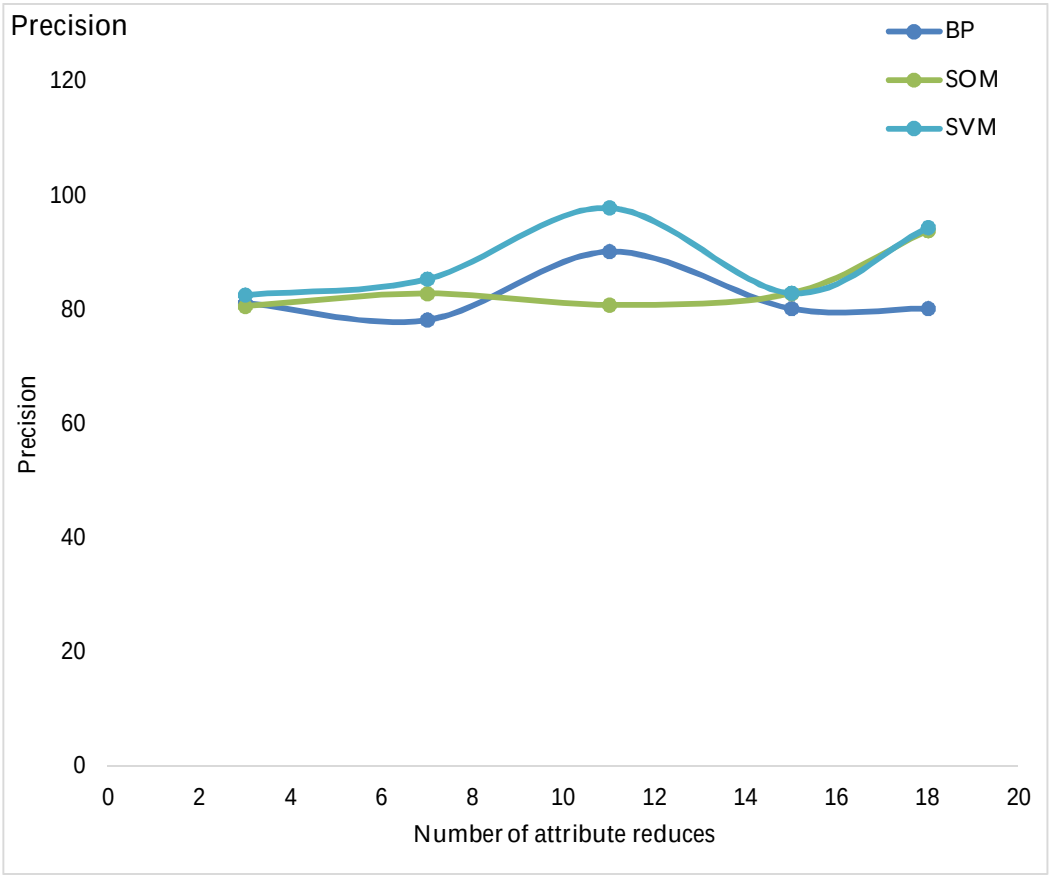

Figure 18. Precision performance analysis using BP[30], SOM[29], and SVM[30] techniques with input of 3, 7, 11, 15, 18 attributes reduces 3, 7, 11, 15, 18. Here, we see that the SVM outperformed the other three techniques BP and SOM.

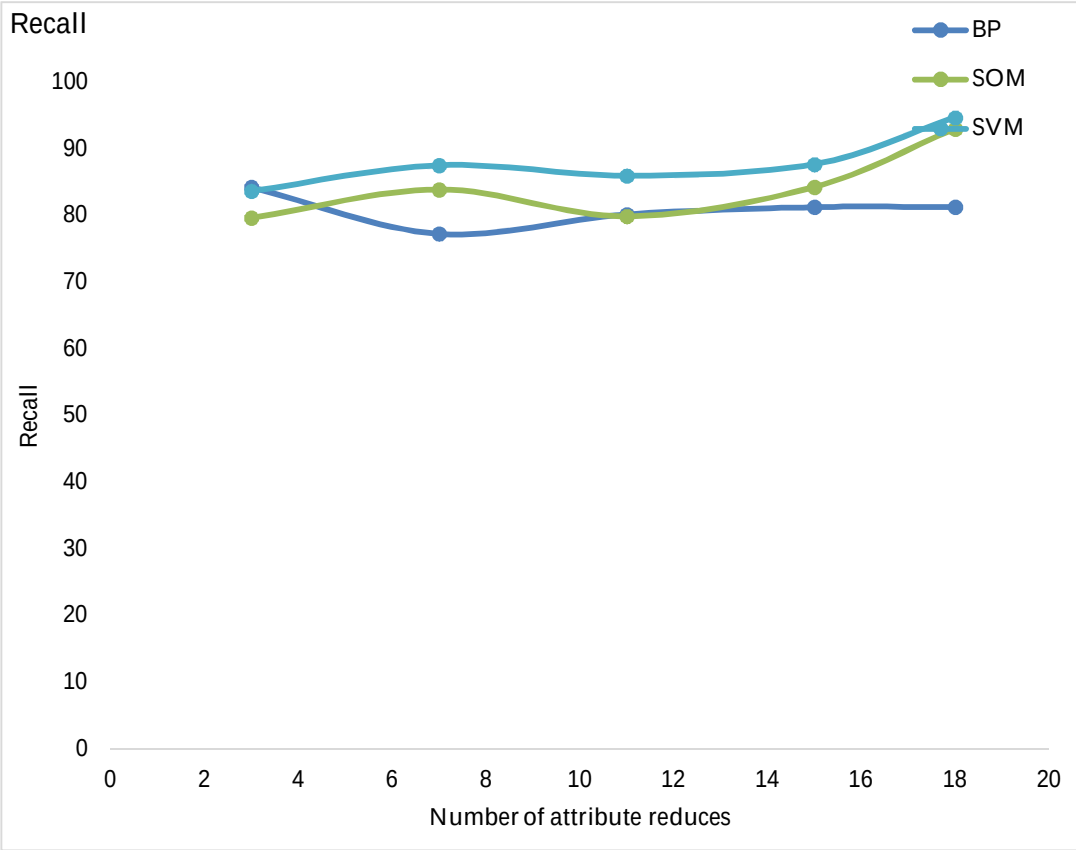

Figure 19. Comparative recall performance analysis using BP[30], SOM[29], and SVM[30] techniques and input of the number of attributes reduces the number of attributes by 3, 7, 11, 15, 18. Here, we see that the SVM outperformed the other three techniques BP and SOM.

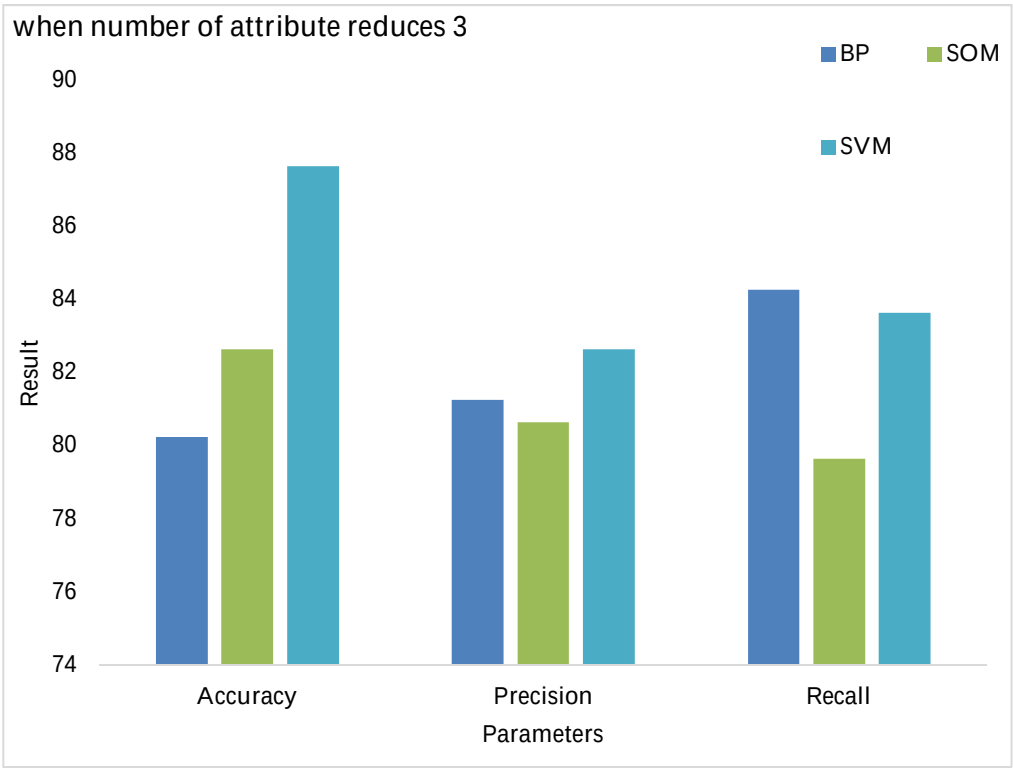

Figure 20. Comparative performance analysis of accuracy, precision, and recall using the BP[30], SOM[29], and SVM[30] techniques, as well as the input of the number of attributes reduces 3. Here, we see that the SVM outperformed the other three techniques BP and SOM.

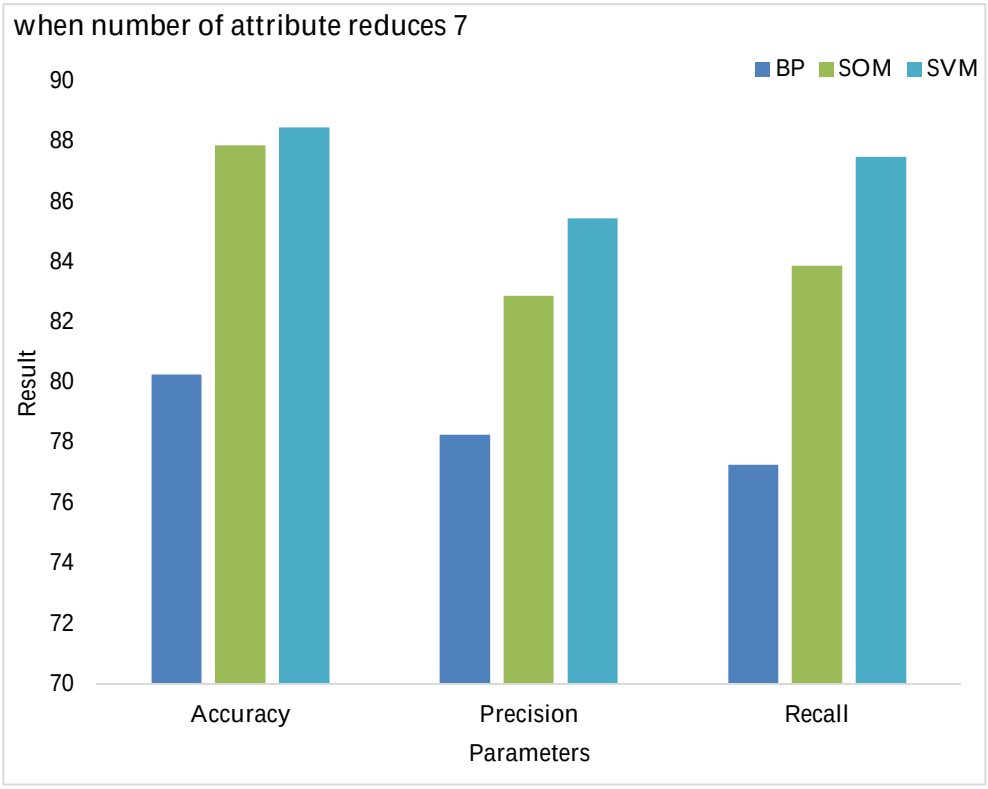

Figure 21. Comparative performance analysis of accuracy, precision, and recall using the BP[30], SOM[29], and SVM[30] techniques, as well as the input of the number of attributes, reduces 7. Here, we see that the SVM outperformed the other three techniques BP and SOM.

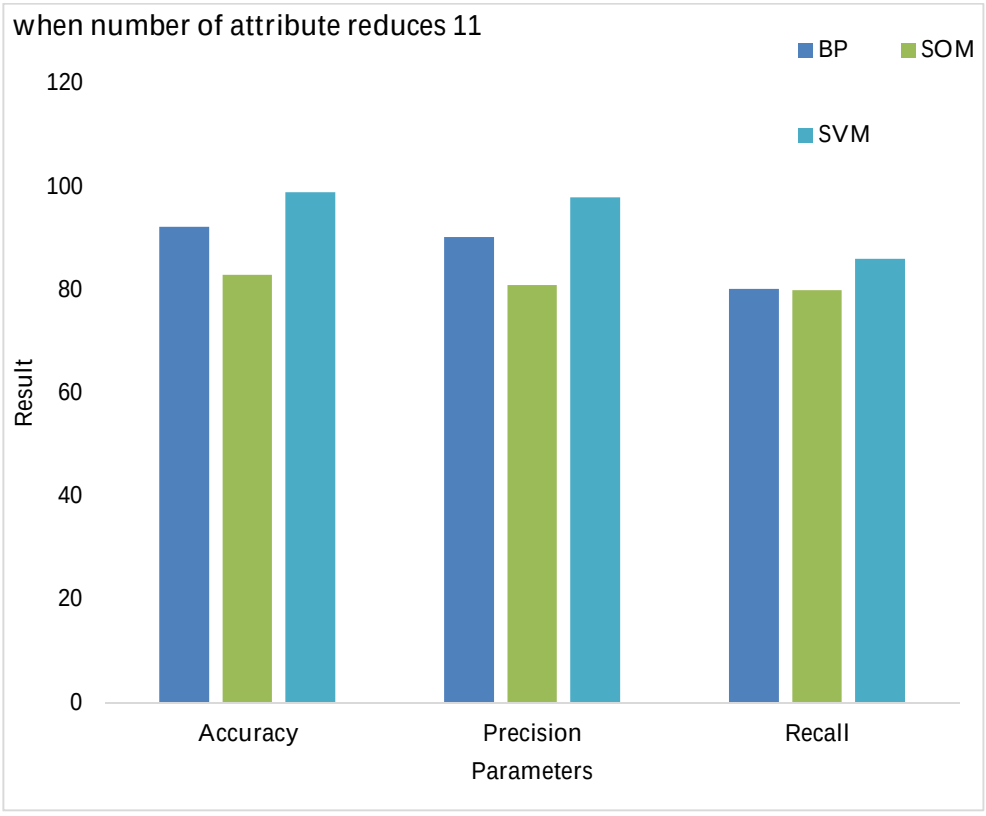

Figure 22. Comparative performance analysis of accuracy, precision, and recall using the BP[30], SOM[29], and SVM[30] techniques, as well as the input of the number of attributes reduces 11. Here, we see that the SVM outperformed the other three techniques BP and SOM.

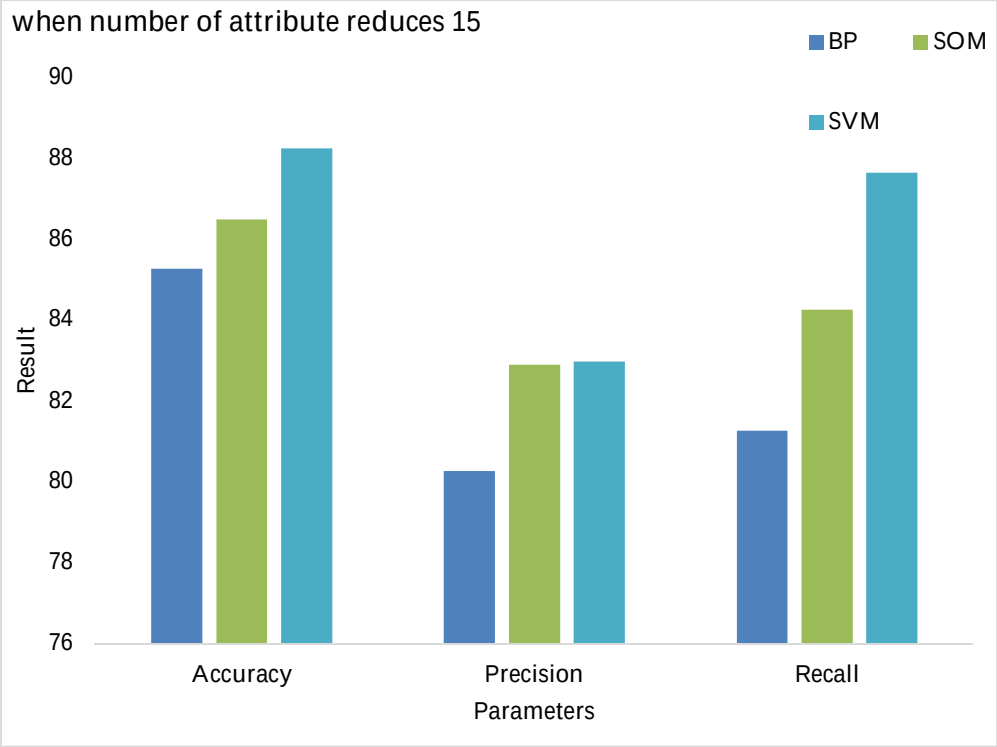

Figure 23. Comparative performance analysis of accuracy, precision, and recall using the BP[30], SOM[29], and SVM[30] techniques, as well as the input of the number of attributes reduces 15. Here, we see that the SVM outperformed the other three techniques BP and SOM.

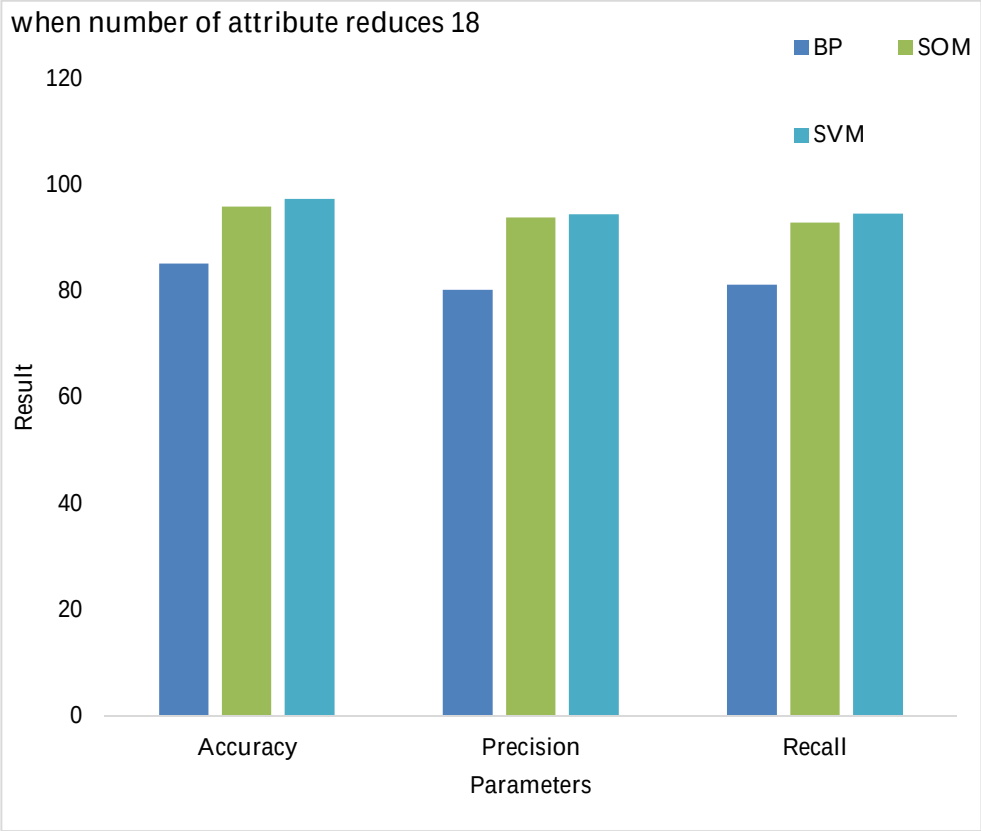

Figure 24. Comparative performance analysis of accuracy, precision, and recall using the BP[30], SOM[29], and SVM[30] techniques, as well as the input of the number of attributes reduces 18. Here, we see that the SVM outperformed the other three techniques BP and SOM.

4.2.2 Case Study II

Methods	Accuracy	Precision	Recall	Number of attributes
KNNFS	81.241	83.541	85.276	2
KNN	84.633	84.785	83.685	
PROPOSED	90.633	87.785	86.685	
KNNFS	79.265	77.990	75.290	5
KNN	85.870	80.988	78.819	
PROPOSED	86.474	81.501	84.489	
KNNFS	90.245	91.526	84.141	8
KNN	87.870	91.988	89.884	
PROPOSED	90.940	93.127	90.927	
KNNFS	88.265	79.989	83.289	12
KNN	89.485	80.441	84.224	
PROPOSED	90.241	82.965	86.655	
KNNFS	95.265	84.989	91.289	16
KNN	93.940	95.127	90.927	
PROPOSED	96.432	96.988	92.622	

Table 2. A comparative study of accuracy, precision, and recall using KNNFS, KNN, and PROPOSED with 2, 5, 8, 12, and 16 attributes.

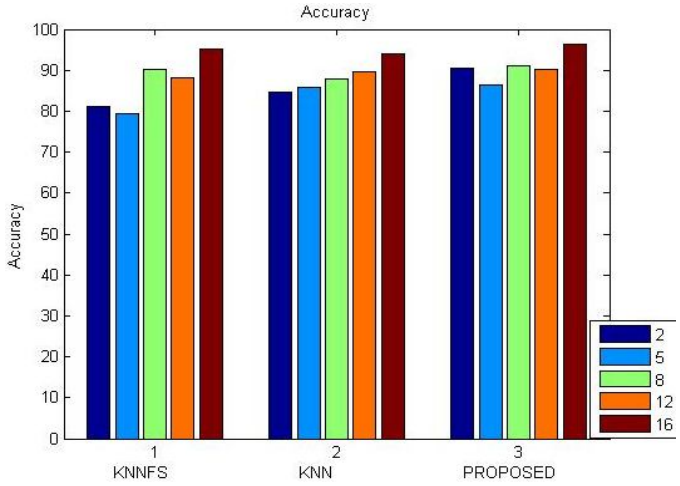

Figure 25. Accuracy performance analysis with inputs of 2, 5, 8, 12, 16 attributes and using KNNFS[2], KNN[2], and proposed methods. Here, we discover that the Proposed method outperforms the remaining methods KNNFS and KNN.

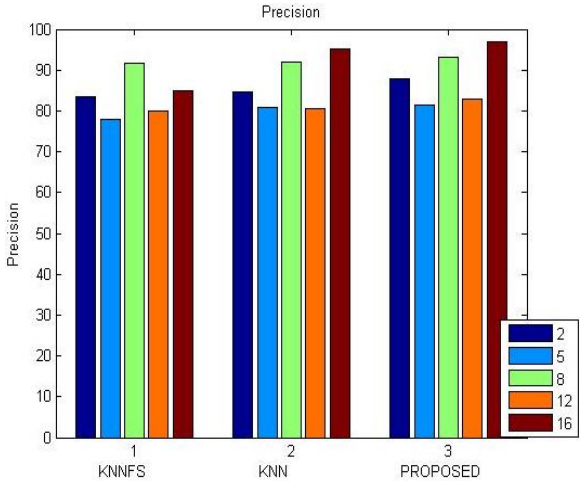

Figure 26. Precision performance analysis with inputs of 2, 5, 8, 12, 16 attributes and using KNNFS[2], KNN[2], and proposed methods. Here, we discover that the Proposed method outperforms the remaining methods KNNFS and KNN.

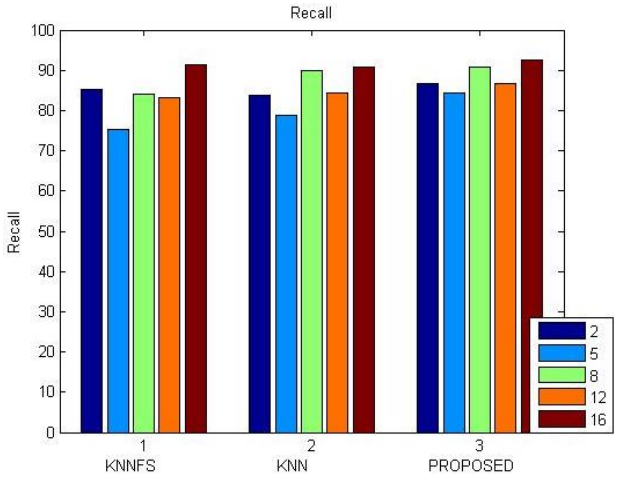

Figure 27. Recall performance analysis with inputs of 2, 5, 8, 12, 16 attributes using KNNFS[2], KNN[2], and proposed methods. Here, we discover that the Proposed method outperforms the remaining methods KNNFS and KNN.

4.2.3 Case Study III

Methods	Accuracy	Precision	Recall	Number of attributes
SVM	71.2	65.1	95.2	4
KNNFS	74.6	64.8	93.8	
Proposed	75.6	67.5	96.6	
SVM	66.1	73.9	82.3	8
KNNFS	65.8	75.8	85.7	
Proposed	66.4	78.5	88.8	
SVM	72.2	80.6	70.4	12
KNNFS	75.8	81.9	75.4	
Proposed	78.9	85.7	76.7	
SVM	66.2	85.9	83.9	16
KNNFS	67.4	88.1	84.2	
Proposed	69.2	89.9	86.5	
SVM	85.2	94.9	71.9	20
KNNFS	83.9	95.1	70.2	
Proposed	86.4	96.8	72.2	

Table 3. Comparative study of accuracy, precision and recall using SVM[12], KNNFS[1] and PROPOSED with number of attributes is 4, 8, 12, 16, 20.

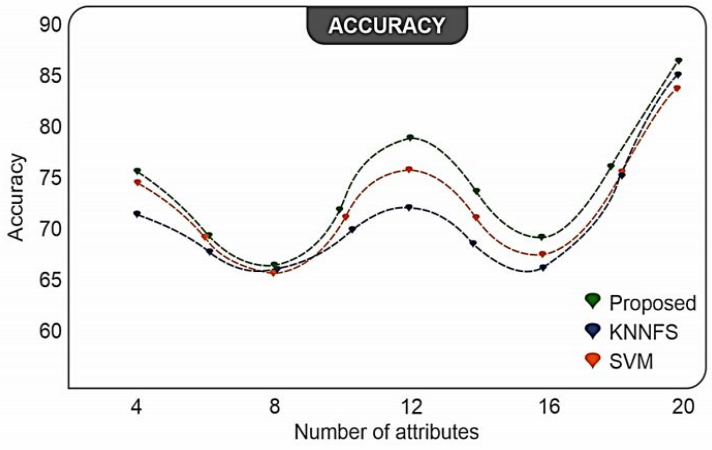

Figure 28. Performance analysis of accuracy using SVM[12], KNNFS[1], and proposed methods with inputs of 4, 8, 12, 16, 20 attributes. Here, we discover that the Proposed method outperforms the remaining methods SVM, KNNFS.

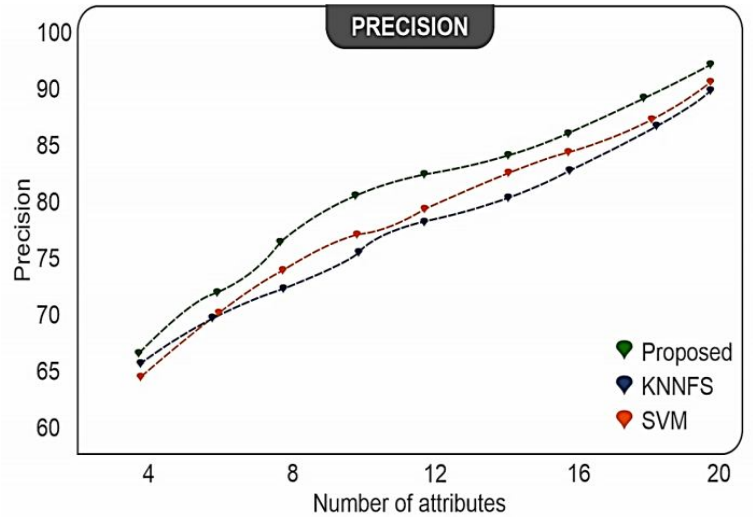

Figure 29. Precision performance analysis with inputs of 4, 8, 12, 16, and 20 attributes using SVM[12], KNNFS[1], and proposed methods. Here, we discover that the Proposed method outperforms the remaining methods SVM, KNNFS.

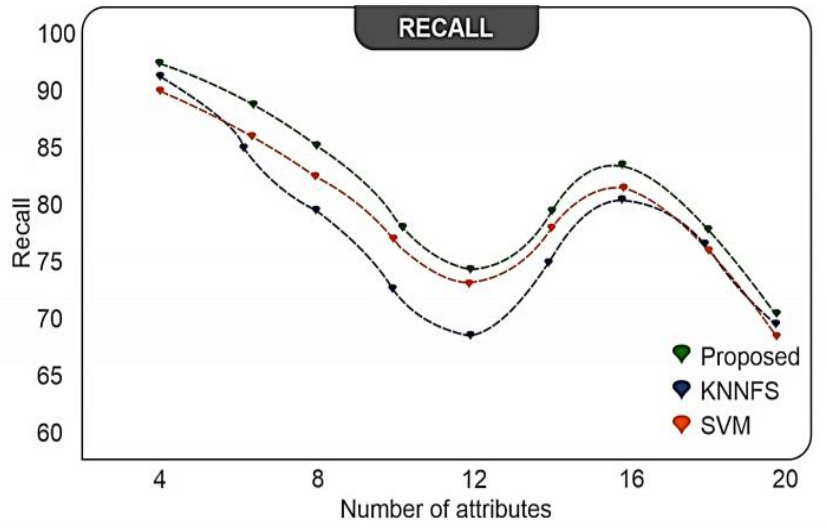

Figure 30. Recall performance analysis with inputs of 4, 8, 12, 16, 20 attributes using SVM[12], KNNFS[1], and proposed methods. Here, we discover that the Proposed method outperforms the remaining methods SVM, KNNFS.

4.2.4 Case Study IV

Techniques	Accuracy	Precision	Recall	Number of attributes
SOMNN	80.240	81.245	84.256	3
BPNN	82.635	80.685	79.685	
Modified-SVM	87.785	82.685	83.685	
SOMNN	80.990	78.265	77.265	5
BPNN	87.88	82.888	83.868	
Modified-SVM	88.664	85.442	87.487	
SOMNN	92.362	90.226	80.143	7
BPNN	82.988	80.878	79.988	
Modified-SVM	98.127	97.927	85.947	
SOMNN	85.989	80.269	81.269	9

BPNN	86.296	82.881	84.247	
Modified-SVM	88.568	82.963	87.642	
SOMNN	85.989	80.289	81.269	12
BPNN	95.127	93.927	92.947	
Modified-SVM	97.584	94.488	94.652	

Table 4. The accuracy, precision, and recall of SOMNN, BPNN, and SVM with a large number of attributes are compared 3, 5, 7, 9, 12.

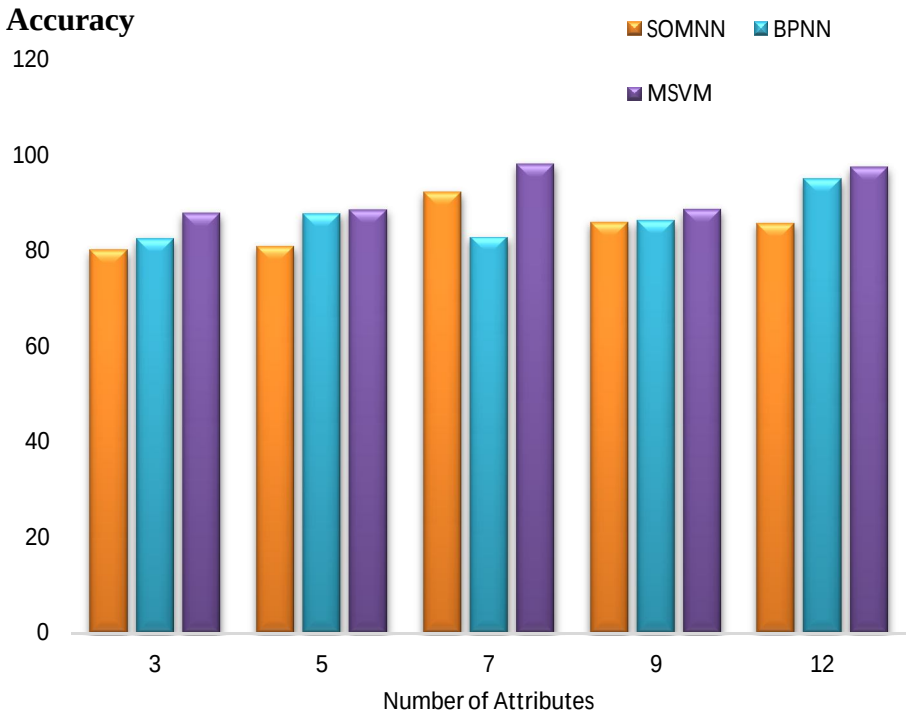

Figure 31. Comparative performance analysis of accuracy using SOMNN[3], BPNN[5], and MSVM techniques with input of 3, 5, 7, 9, and 12 attributes. In this case, we see that the MSVM outperformed the other three techniques BPNN and SOMNN.

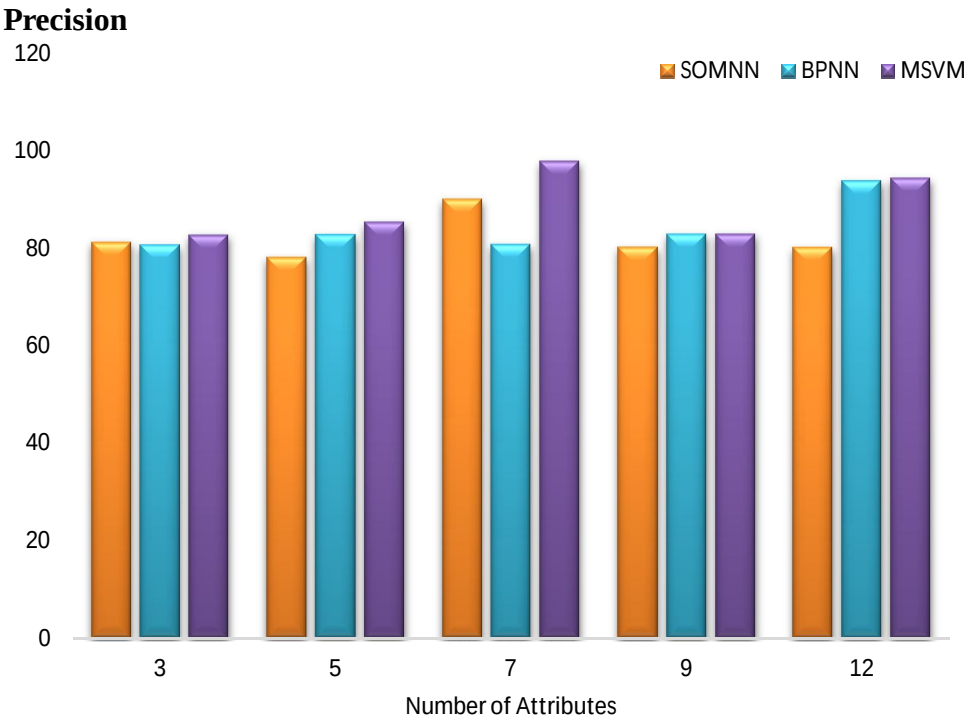

Figure 32. Precision comparison analysis using SOMNN[3], BPNN[5], and MSVM techniques and input of the number of attributes reduces 3, 5, 7, 9, 12. In this case, we see that the MSVM outperformed the other three techniques BPNN and SOMNN.

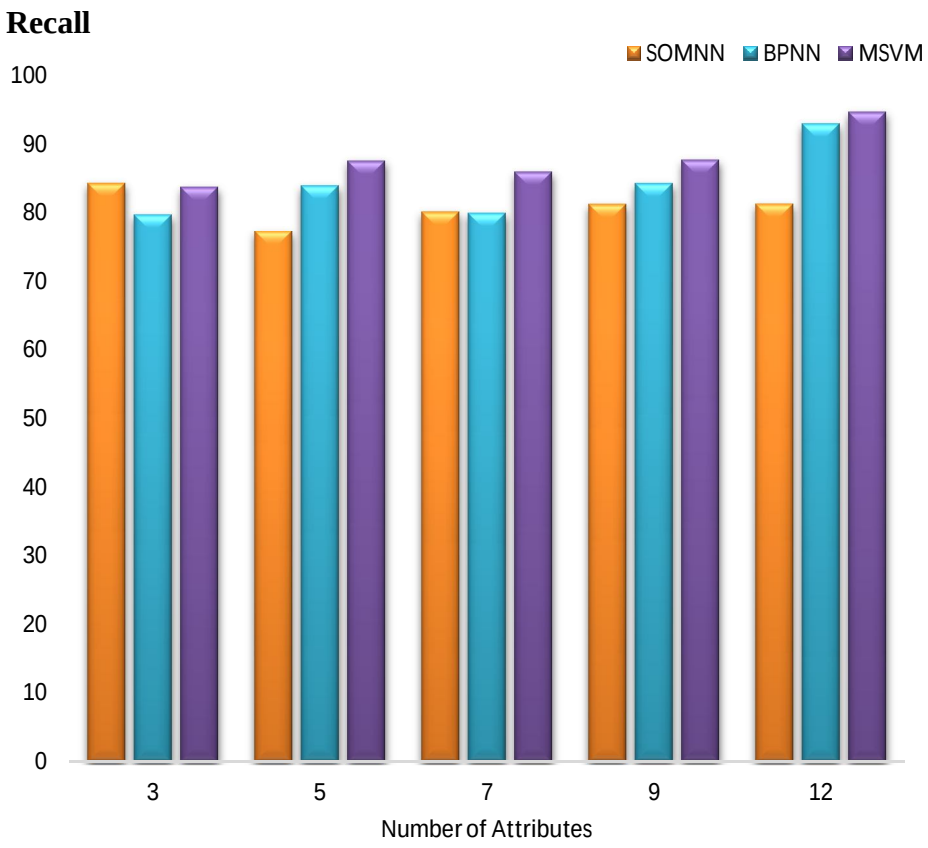

Figure 33. Comparative recall performance analysis using SOMNN[3], BPNN[5], and MSVM techniques with input of 3, 5, 7, 9, and 12 attributes reduces 3, 5, 7, 9, and 12. In this case, we see that the MSVM outperformed the other three techniques BPNN and SOMNN.

5. Conclusion and Future work

The efficiency and efficacy of computer-assisted diagnosis in detecting breast cancer alters cancer patients' perceptions. The ability of a machine and an imposed algorithm is to detect breast cancer at an early stage and save the lives of millions of women. A result analysis's methodology is as follows.

The self-organized map, backpropagation, and support vector machine methods were used to increase the classification and detection rate of breast cancer when compared to conventional and data mining techniques. The feature extraction process using wavelet transforms makes a significant contribution to breast cancer detection. The wavelet feature extraction process extracted feature components from all resolution components, thereby improving the mapped feature space and classification rate. Breast cancer detection using neural networks has a positive effect on the CAD process. The detection accuracy motivates researchers to develop a new model of neural network for breast cancer detection.

The proposed algorithms perform admirably well when projecting and extracting features from the left and right breast. The discrete wavelet transforms function extracts the entire feature component of the breast cancer image in terms of texture features. The extracted texture features are dominated by the feature set of a mammogram image with breast cancer. The process of feature selection (FS) accelerates the classification process. The firefly feature selector determines which features to display based on the value of the new feature set's movement. The optimised feature set is fed into the ensemble classifier simplified model, which is used to detect damaged breast cells in images. The proposed

algorithm compresses KNNFS and neural network models with a reasonable degree of accuracy. Classification accuracy is improved by 5-8 percent when compared to KNNFS. These increases in detection value pave the way for a new era of CAD-based breast cancer detection.

The quantum neural network eliminates undesired features and noise during the classification process. QNN generates the optimal feature set. The optimal feature set fed into the PCNN (pulse coupled neural network). The dedicated approach of PCNN, both supervised and unsupervised, improves the classification and detection ratios for breast cancer. Additionally, the QNN model minimizes training error and generates a large scale of feature space. The proposed algorithm was validated using the MIAS cancer image dataset and MATLAB software. MIAS is a collection of images that have been rotated and angled in order to verify the presence of cancer cells. The method in proposed work is to compared support vector machines and ensemble KNNs (FSKNN). The classification rate for breast cancer is 95.5 percent.

The results were applied to the DDIMS database and compared to the proposed method based on the accuracy, sensitivity, and specificity of the three performance indices. The concluding result demonstrates how the proposed system outperforms other methods.

Future Direction

A novel method for breast cancer detection is proposed in this research study. The proposed algorithm is extremely accurate at detecting early-stage cell features. All confusion matrix parameters, such as accuracy, sensitivity, and specificity, are validated using the proposed algorithm. The results analysis indicates that the proposed algorithm is extremely efficient, with some future directions of work mentioned here.

1. To validate the proposed algorithm on a real-world CAD machine.
2. To develop a real-time analysis of breast cancer's various behaviors.
3. Implementation of the proposed algorithm using VLSI fabrication.
4. As the complexity of the proposed algorithm increases, the time required for efficient processing will decrease in the future.
5. The proposed research can be applied to a variety of fields within biomedical engineering.

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THE NOVELS OF TONI MORRISON : A POSTCOLONIAL STUDY

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ABSTRACT

In spite of the fact that focusing only on the verbalization of African-American involvement with her fiction, Toni Morrison, the person of color writer and the Nobel Prize winner, contacts the whole world. As an observed American writer, she is enormously worried about the life and issues of African Americans. The focal theme of the greater part of Morrison's works is the job that race plays in American life. The novel brings out history of dark creative mind point outs the races and history in America, the encounter with the truth of slavery. The status of women in the nations which were colonized was much more terrible and more convoluted. This paper examines the comparative cycle of self-enunciation, concealment, and reappearance of the discouraged part of social orders.

Keywords- *Postcolonial, subaltern, racial segregation, suffering, exploitation*

Toni Morrison is an incredible 20th century writer to whose works we can apply matters of race, gender, sexuality, social class and assault. As an observed American writer, she is enormously worried about the life and issues of African Americans. She won the Pulitzer Prize in 1988 for Beloved and the Nobel Prize in 1993. Morrison offered motivation to individuals of color writers and created another sort of readership that was more ready about issues of race and gender and furthermore more anxious to accomplish a more full comprehension of these issues. The focal theme of the greater part of Morrison's works is the job that race plays in American life. Among the issues she addresses are the exploitation of blacks, racial segregation, parenthood, and the passionate and mental issues presented to African Americans in a predominantly white society.

In the African-American literature, the blacks are correspondingly mistreated by an overwhelming white American culture. In the first place, by and large the mistaken assumptions between American and African-American happen in view of a profoundly established, inborn white American bias that they are better than the last just by the excellence of being white. This unrivaled disposition is utilized as a whipping lash for the African-American. In this paper I propose to examine the comparative cycle of self-enunciation, concealment, and reappearance of the discouraged part of social orders. In spite of the fact that focusing only on the verbalization of African-American involvement with her fiction, Toni Morrison, the person of color writer and the Nobel Prize winner, contacts the whole world, yet most explicitly to the underdeveloped nations like India. Arising as it does from a particular political economic, social and social experience, Morrison's work has significant interest for the Indian public. The African-American experience and the postcolonial Indian experience have numerous likenesses. The inclination of colonized to copy the colonizers perspective appears to last a lot subsequent to accomplishing opportunity. The tendency with respect to the Indians to approve their musings and thoughts concerning western philosophy uncovers a need to reevaluate them and to recover their own legacy and culture as accurately is the situation of African American.

The novels of Morrison accomplish more than advise us regarding what sort of daily routine or experiences individuals of color in America lead. What they try to do is to make us see encounters from the dark planned. In her novels, plot, character, activity and language pass on, through a roundabout turn of events, the way dark society live, however a path for anybody to live. Her novels are studies of being and as such propose techniques for endurance in reality as we know it where the individual faces unmistakable, quick dangers just as unoriginal and conceptual perils. Through her novels, Toni Morrison presents the non-straight African-American socio historical reality. Her novels show the

exploitation of individuals of color inside the setting of a bigoted social request. In one of her meetings she says: "I would prefer not to bow out with simple responses to complex inquiries. It is the multifaceted nature of how individuals act under white pressure that is important to me."

About her specialty she says;

"In the case of anything I do, in the method of composing novels (or whatever I write), isn't about the town or the network or about you, at that point it isn't tied in with anything. I am not keen on entertaining myself with some private, shut exercise of my creative mind that satisfies just the commitment of my own fantasies - or, in other words truly, the work must be political… I can't help suspecting that the best craftsmanship is political and you should make it undeniably political and unalterably lovely at the same time."

The contrary genders are fundamentally restricted by the women society. In her previous novels Toni Morrison depicts the women has dark and concealment of nature and outrage fight their control in American culture. The novel brings that powerful to the historical backdrop of time confronted the slavery and encourage by the individuals of color. Toni Morrison's eye while vision is loaded with dark book and an assortment of Afro-American. In days of yore the people groups used to kill the young lady youngster because of the reality of confronting men's mastery in our general public. The little youngsters are utilized to confront slavery in their circumstance. Toni Morrison has done an extraordinary arrangement and dynamic in the novel "*Beloved*". In her novels there is a move from the specific to the general and it very well may be said that the individuals of color's discourse has the probability to address not just the issues identified with the enslaved life universe of the individuals of color yet additionally those of the subalterns as a rule. Morrison breaks the generalization of the voiceless and the mistreated women who can't dissent. Beloved is a feeling of novel and women as a maternal part in this story against the slavery. She was lived in blue stone street with her daughter. Denver and relative child suggs saw the sethe's experience was looked by women as a subaltern and sufferings in this novel. The creator brings the glimmer method of individuals of color. She remembers the recollections of being slave, Mrs. Earn in homestead house; she lived in an overall home that is overseen by gather.

"Men everybody, don't think so, gather".

She is sharp and confronting challenges in a ranch house work. They deals with like a slave and observer of fume has done her youngsters in workshed. The nephews used to beat them in a pony twin. The African view is brimming with mother's existence looked in generalization style and perplexingly related with slave women, so the mother needs their security and safe life while nursing different victims. In this portrayal mother demonstrates the method of composing white and dark people group's racism under their world. Child suggs recognized in the start of their life is loaded with women as subaltern and confronting margin of slaverism among the African public. Because of the imprudence the fume loses her family from her mom relationship. Fume is an ideal of dark mother. She is an individual of color in racism and sexism. It shows the maternal fondness to her mom's world. They wonder the suggestion of fumes thought by Paul-D Whom Beloved herself tries to be a youthful couple. She feels and retains the describing in brainless inclination to be alive" (265). *Beloved* is the state of an imagine women remind their involvement with the novel. The value of "Beloved" shows the experience looked by "women as Subaltern and Marginalization" in the basic circumstance responded by male control among men in the contemporary society.

The three prostitutes in *The Bluest Eye* are bad-to-the-bone prostitutes, not 'the arrangement and touchy kind'.

"… These women disdain men, all men without disgrace, statement of regret or separation… ". As opposed to the endeavors of Pauline and Pecola to isolate them from the legacy, they appear to have an arrangement that their lives have esteem. They reveal to Pecola that regardless of the amount they are disdained by others, their lives have meaning in light of the fact that these women characterize themselves instead of depending on the decisions of pariahs. They make no

assumptions about being something besides "prostitutes in prostitutes' apparel" and along these lines furnish Pecola with a difference to her mom, who attempts to change who she is to fit white society's diktats. Claudia, the youthful protagonist, abhors "old sideways Shirley Temple". She despises "all the Shirley Temples of the world". She doesn't feel good lying down with the "hard steadfast appendages" of such a doll. She would prefer to break or attack pieces. She is exceptionally basic about the white society and can scorn them at whatever point the need emerges. In Morrison's second novel Sula, Sula Mac Peace is a "living analysis of the horrendous existences of abdication different women live". She dismisses "conduct guidelines, all things considered" and endeavors to "depend entirely on herself". Jadine in Tar Baby is the image of a freed African- American woman. She will not pick between the clear contrary energies offered to her, or to disguise an outside picture either dark or white-as meaning of self. "I have a place with myself," Jadine tells Son, and she turns out to be generally shocked at him when he attempts to force a dualistic meaning of her. Claudia narrates parts of *The Bluest Eye*, sometimes from a child's perspective and sometimes from the perspective of an adult looking back. Like Pecola, Claudia suffers from racist beauty standards and material insecurity, but she has a loving and stable family, which makes all the difference for her. Whereas Pecola is passive when she is abused, Claudia is a fighter. When Claudia is given a white doll she does not want, she dissects and destroys it. When she finds a group of boys harassing Pecola, she attacks them. When she learns that Pecola is pregnant, she and her sister come up with a plan to save Pecola's baby from the community's rejection. Claudia explains that she is brave because she has not yet learned her limitations—most important, she has not learned the self-hatred that plagues so many adults in the community.

Home is the tale of a gathering of women in the white network of the United States who attempts to have their own home lastly; subsequently, their personality. One of these women is Ycidra, known as Cee, her family had to leave their home in Bandera County. This forced travel is the primary test for Cee to the extent she was brought into the world out and about with no rooftop over her head. This is the reason her progression grandma, Lenore, anticipated it as a "corrupt, useless life" *(Home* 44) for her future. She didn't get any fondness from her mom due to her persistent effort on manors from morning till night and when she grew up she went gaga for a city boy, name Prince, who deserted her in Atlanta. Consequently for picking up cash she needed to work for a white specialist who did eugenic analyses on her belly and she got fruitless. *Home* is about the women like Cee and Lily, Lillian Florence Jonse, enslaved by pilgrim power; then again, they have been denied of their rights by male-overwhelmed society. Despite the fact that Liliy longs for her own home, she has been overlooked fisrt; as a result of limitations with respect to her race in her ideal area, and second since her better half can't comprehend her energy for having her own home. Hence, Toni Morrison depicts marginalization and twofold colonization of the African American women in this novel. They have been marginalized actually and profoundly in wether colonized or male centric social orders due to their darkness and being a woman.

In another novel *Sula*, the protagonist is weary of all that binds her to submission, and has thus decided to follow her own way of life. The analysis is held from a Postmodern perspective. Toni Morrison portrays her female protagonist, Sula, as an autonomous figure, possessing a mysterious power that skins her from the depths of gender subalternity. We cannot fail to observe her individual preservation within a broken society, whose ground rule hinges on presentiments and credulity. "The meaning of the birthmark on her eye; that was not a stemmed rose, or a snake, it was Hannah's ashes marking her from the very beginning." (*Sula)* The author emphasizes the psychological state of Sula, which displays a substantial presence of emotional as well as bodily aspects, disclosing Morrison's philosophical vintage point. She is not captivated by rational, objective reasoning; quite the contrary, she foregroundspostmodern aspects pertaining to culture, gender, body and emotion through her novel. Therefore, unlike the conceptual spaces of the traditional

philosophies (some of which are reason, truth, certainty, essence and objectivity), *Sula*, the novel, is a literary work presented from a Postmodern stance. "Postmodernists reject the search for underlying truth, certainty, and essences. They do not believe it possible to find universal principles that explain the natural and the social world; they reject standard notions of rationality and objectivity and the idea of a stable, knowing self… Postmodern discourses create the kinds of conceptual spaces that many feminists find appropriate for their intellectual work." (Garry and Pearsal) Many movements, Feminism to be included, have aspired to Postmodernism, as it helps, on the one hand, in the castrating of the representational process, social marginalization, racial discrimination and cultural alienation. On the other hand, it substantially stresses freedom and self-reflexiveness. Subaltern mobs have been witness to a long history of representation since the Ancient Greeks, to the Dark Ages, the Enlightenment, the Modern Age, among other historical junctures.

In her novel *God Help the Child* (2015), she discusses some of their problems, such as racism and child abuse. Morrison explores both problems through the eyes of the novel's main character, the marginalized child, Bride. As Bride grows up, things gradually change. Her discrimination as a child affects her childhood and her life as an adult as well. The novel highlights the problem of child abuse by presenting many examples of abused children. Besides racism, Morrison focuses in her novel on the marginalized as subalterns. One can argue that subalternity shapes the novel by emphasizing both racism and child abuse as major problems that the marginalized suffer from and cause them to become subalterns. The main character, whose name is originally Lula Ann Bride, calls herself Bride, which indicates change; she is not the same person as when she was a child. Bride, as a name, refers to joy, beauty, and her way of getting dressed. As mentioned at Lionel Shriver's review, Bride "chooses to wear only white. The colour sets off her striking complexion, which, in a more progressive era, has transformed from bane to asset" (Shriver 144). The change of her name and wardrobe shows the current postcolonial status of black people in United States of America. Accordingly, it can be considered a better change, but still not enough for their healing, as Bride observes: "memory is the worst thing about healing" (qtd. In Italie). All these references shape her life as an adult. First, she is a successful regional manager at a cosmetics business. Second, she is very beautiful and attractive, though her mother predicts that "her color is a cross she will always carry" (*God Help the Child* ch.1 para.7). Finally, Bride always wears white because it shows and compliments her beauty. The other important character is Sweetness, Bride's mother. Her name clearly shows love and kindness. According to Gras (5), naming the first chapter after its narrator, Sweetness, "recalls Beloved's plantation life in the nineteenth-century Sweet Home, [...] nothing is sweet about Sweetness's parenting or life in Sweet Home, the plantation in Beloved." At the beginning of the novel, Sweetness is portrayed as the bad racist mother; however, she shows the sweet motherly love towards her daughter only at the end of the novel. Sweetness keeps talking about the difficulties of being a mother and how happy she is for her daughter to become a mother. Morrison chooses to give Sweetness the first and last chapters in the novel in order to clearly indicate the positive change that took place in her character. Another possibility is that her name might be ironic. A mother is a symbol of sweetness, love, and kindness, but Sweetness is not as sweet or kind as a mother, her daughter lacks any sincere affection from her. In addition, one can see how Sweetness narrates the events of her life in a very racist way.

One of the main topics in individuals of color writers' fictions is twofold colonization and marginalization of the people of color in the Western nations. They are persecuted and stifled by the overwhelmed power, the Whites and the dark males, particularly the male individuals from their own family including their dads, siblings and their spouses. Morrison's goal through her composing is to rethink and reclassify the covered up, disjoined and distanced Afro American presence in American standard discourse and guarantee that Afro Americans are not any more mediocre human creatures. Dark legend, dark

music, their language and all the fantasies and customs of Black culture are the most noticeable components in Toni Morrison's composition. She feels a solid association with her progenitors and thinks it is the duty of Afro-American writers to uncover that obliterated history and secure the significance of it in the creation of American human advancement. Investigating the multifaceted nature of dark female involvement with white America, Morrison endeavors to determine the inconsistencies characteristic in her African-American personality. As an 'Individual of color Writer' , Morrison professes to be worried, most importantly, with the possibility of a 'African American community'- what such a network once implied, how it has changed, and how regardless of those changes, it is and should be kept up. In a meeting with Salman Rushdie, she says, "I don't know what the word 'Negro' signifies, which is the reason I write books. What is a dark youngster/woman/companion/mother? What is an individual of color? I can't help suspecting that there are numerous to such an extent that educates darkness. One of the advanced characteristics of being an African-American is the motion is the fluidity, the inconsistencies." Normally her novels are the investigation of the significance of obscurity blacking in white America, to be a person of color in a white male domineering society, to have faith in an indigenous African culture. Her novels record the victory and complexities of dark life from the difficult past of bondage to the disappointing, bigoted present. Morrison discusses her composition as "archeological investigations"' one of her significant concerns being the modifying of African American history from a dark female point of view. Verifiable encounters of dark African-Americans are utilized as a foundation in practically all the novels of Toni Morrison. In *Beloved* woman is under the weight of man centric society and bondage while in Sula characters have a uniqueness in the character. They are attempting to show the abstract consciousness by striving hard to adapt to their free self. As Sethe calls attention to, "liberating yourself was a certain something; asserting responsibility for liberated self was another". Dearest speaks to between relatedness among the individual character and the collective personality of the blacks. The novel in its striking depiction of the Negro people group, total with their craving and inconveniences, shows that a colored man resembles any man. Dearest tends to the worry of whether it is smarter to persevere through the treacheries of a savage people or to battle against them. Her novels rescue a significant part of the American experience once again from the marginal shadows and give American literature all in all a more complete and better measurement. Toni Morrison helps us to remember Anita Desai, a recognized contemporary Indian woman novelist in English, who delicately presents female estrangement and oppression in the post-pioneer Indian culture.

Like Toni Morrison, Anita Desai manages the universe of forlorn and delicate courageous women - Maya, Monisha, Sita and Nanda Kaul - who are set in opposition to the dehumanizing powers abroad in Indian culture. At the point when these champions look for a higher fellowship of free spirits, they are constrained to adjust but then are denied even the common solaces in marriage and parenthood. The impulse to prevail in similarity leads with to disdain themselves as on account of Toni Morrison's champions like Pecola, Sula and Jadine. Anita Desai's courageous women are a study of female mind estranged possessing to an absence of empathetic friendship. Their scrape is all the all the more contacting as these female protagonists long for the human touch, affectability and friendship of their spouses. Maya of *Cry, the Peacock* is spooky by the Albino's perusing of her horoscope and forecasted an early demise of one of the accomplices. She considers her significant other's non connection when she intensely yearns for his friendship. Right from the earliest starting point she instinctively feels that her significant other "knew nothing that concerned me". Monisha in *Voices in the City* is a delicate young lady who falls a prey to her checking parents in law. Her sister, Amala, is a painter who learns the endurance methods like Claudia and Freida, the MacTeer sisters in Morrison's *The Bluest Eye*. Sita in *Where Shall We Go This Summer?* is a charming character

who endures on account of her financial specialist like spouse, Raman. She doesn't need her child to be naturally introduced to the turbulent, obtuse reality where new life will be risked. Sita perpetually helps us to remember Sethe in Morrison's Beloved. Nandu Kaul in *Fire on the Mountain* endures deep rooted carelessness because of her Vice Chancellor spouse. Accordingly, in the fiction of both Morrison and Anita Desai, the significant issues of female estrangement and oppression are genuinely reflected and masterfully communicated.

Her work manages significant contemporary social issue like racism class and abuse differed in subaltern to the women looked by sufferings in their day to day existence. Her works offers a new viewpoint on dark life their set of experiences and gemology. Toni Morrison's novel shows the person in question. The novel brings out history of dark creative mind point outs the races and history in America, the encounter with the truth of slavery. Like the colonized countries overwhelmed by the colonizer nations, the women were ruled over by men as well. Yet, the status of women in the nations which were colonized was much more terrible and more convoluted. The women of the colonized nations are not upheld inside the network they speak to, in light of the fact that they can never be separated as far as they can tell, either as a woman or as an individual from a colonized community. A subaltern is someone with no voice; he/she usually lacks one or more right. According to Freud, Spivak, and other scholars, subalterns are usually considered to be victims. At the beginning of the twenty-first century in United States of America, and all over the world as well, many people become victims of many social problems, especially racism and child abuse. Their suffering seems to be similar to the suffering of the colonized people. The victims are the colonized, and the victimizers are the colonizers. Reading the novels of Toni Morrison, from a postcolonial view will shed more light on the suffering of all these people, especially in a changing time when it becomes difficult to decide who is really the victim and who is the victimizer, who colonized whom?

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STUDY OF ECONOMIC IMPACTS OF LOCKDOWN ON SMALL BUSINESSES IN THE CITY OF PUNE,MAHARASHTRA, INDIA

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ABSTRACT

The year 2019-20 has been very challenging for the entire world. The impact of the pandemic, the virus name COVID - 19 has an unpredictable and serious impact of the lockdown on small trade and business. The small business man and the trader, whose lively hood is depended on the daily work or daily income bases, showing their concern about the survival in the pandemic situation, many of the small businesses were restricted due to social distancing and have to shift their businesses according to the demand of the urgent need of people and earning. This paper provides the analysis of the impact of the lockdown situation on the small businesses in the city of Pune. Over all the paper contributes to our understanding of the monetary impact of COVID - 19 on the common people.

***Keywords**: COVID-19, Impact, Small businesses, Impact on economy.*

Introduction

Covid-19 has been the world shaking Pandemic of the century. Starting with China in January in 2020, it has widely spread within no time in the corners of the world at large. Developed as well as underdeveloped economies, densely populated as well as sparsely populated nations have been trapped by this pandemic over last one and a half year. Besides medical research to find out vaccination as an effective solution over this situation, a number of steps like social distancing, compulsory use of masks and time and again use of sanitization are some of the tools made mandatory by the government of India.

The effects of Covid -19 have harshly affected the civic life all around. Total lockdown, implementation of Section 144 (Curfew situation) were adopted as measures by the Goverment through the local bodies for months together. The public and private transport came to a standstill situation affecting human civic life. Except for very essential services, the trade and commerce of small and big businesses, schools and colleges, entertainment centers and hotels, religious places and personal get - togethers for marriages and other family functions came to a total shut down for months together. The present research paper is focus on the economic impacts of lockdown on small businesses in the various parts of the city of Pune.

Need for Research

The impacts of world wide pandemic situations were so sudden and unpredictable that have caused unbelievable repercussions on various parts of civic as well as social life. Particularly the business activity had come to a standstill for number of days in the different parts of the nation. The Central as well as State Government has taken stringent actions like application of Section 144 (Total Curfew, Total Lockdown, Partial Lockdown) all over the nation. The state of Maharashtra has also been badly affected over last one and half year.

We being commerce teachers have curiosity to understand the impacts of lockdown situation locally, in the vaious parts of the city of Pune, particularly on the small businesses. In fact, as yet the Covid-19 situation is not under total control. The State Government with the District Collectorate has been trying out different solutions to come out of the situation. On one hand survival of human beings all over is the prime motive but re-establishing civic life like transportation, working of trade and commerce and the movement of human beings in normal situations has to be balanced out. Perhaps, for well established medium and large scale businesses and industries it might not be so difficult to survive and pull on for few months also; but for tiny/ small businesses like street hawkers and peddlers it has been the worst experience. Hence the importance of the

present research.

Research Methodology

For the purpose of this research paper, the following research methodology has been adopted:

Primary Data: In order to understand this living burning problem of studying the economic impacts of lockdown it was essential to collect Primary Data. For this purpose the questionnaire method has been adopted.

Secondary data on Covid -19 is widely available through media and Goverment Publications over last several months. Suitable part confined to our present research paper has ben referred to. Hence, the Government notifications, statisitics on Impact of Covid – 19 through Print, electronic and social media has been compiled for this research paper.

Review of related Literature

Impact of Covid – 19 on various businesses Tilak, P., Deshmukh, M., Phadke, S., & Hakim, S. S. K. A survey on online examination during COVID 19 pandemic: Perception of Management Students. Mentioned in her research paper that The need of applying management principles in all aspects of life has long been stressed to management students. In today's world, an individual's emotional quotient is valued just as much as his or her academic talents. The epidemic of COVID 19 hastaught everyone the value of adaptability, flexibility, efficiency, and multitasking.

Kandalgaonkar, S. R., & Harchekar, J. (2018). Impact of technology on retail grocery business of pune.The essential needs of human life have long been acknowledged as food, shelter, and clothing. Food supplies are seen as the most crucial commodities in both developed and emerging countries, and in years of severe shortages, inhabitants must rely on other nations, even importing the same, to survive.

The COVID-19 epidemic in Somaliland has prompted numerous businesses and retailers to close, causing unanticipated disruptions in various industry sectors. Short-term difficulties confront retailers and brands, including those relating to health and safety, supply chain, workforce, cash flow, consumer demand, sales, and marketing (Donthu & Gustafsson, 2020).

Coronavirus illness 2019 has had a large economic impact in addition to its influence on public health. Just a few weeks after the outbreak, the pandemic had already caused major disruption among small enterprises; around 25% of businesses had temporarily closed, and nearly all of these closures were related to COVID-19 (Bartik et al., 2020). Various well-known brands in many industries are going to go bankrupt if consumers stay at home and economies shut down as a result of the COVID-19 (McKee & Tucker, 2020). This isn't only affecting the economy; it's affecting the entire society, which has resulted in significant changes in how firms and customers behave (Donthu & Gustafsson, 2020).

Impact of Covid – 19 on various businesses

Tilak, P., Deshmukh, M., Phadke, S., & Hakim, S. S. K. A survey on online examination during COVID 19 pandemic: Perception of Management Students. Mentioned in her research paper that The need of applying management principles in all aspects of life has long been stressed to management students. In today's world, an individual's emotional quotient is valued just as much as his or her academic talents. The epidemic of COVID 19 has taught everyone the value of adaptability, flexibility, efficiency, and multitasking.

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Hypothesis

For the purpose of this research paper the following hypothesis has been framed.

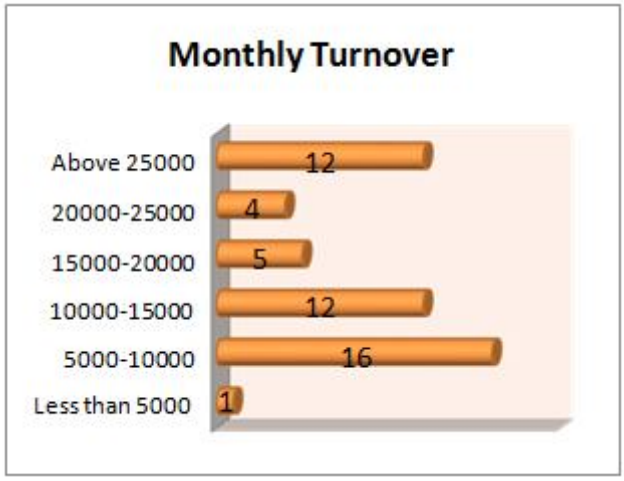
- Lockdown has affected adversely, the business activity in the city of Pune.
- Small Businesses in Pune have suffered an unusual situation including winding up of thebusiness.

Data Collection and Analysis

For the purpose of this research the data given below has been collected covering the following areas: Bhavani Peth, Katraj, Lavale, Khadakwasla, Maharshinagar, Swargate, Hinjewadi, Wanowrie, Hadapsar, Alandi, Bibwewadi,Parvati, Narhe and Kondhwa.

1a). Type of your business – A majority of respondents have undertaken the business of Vegetable Vending & Selling Food Items. Some other businesses under the scope were Skills Based Services, Retail, Providing assistance to Big Businesses, Stationery and a few other.

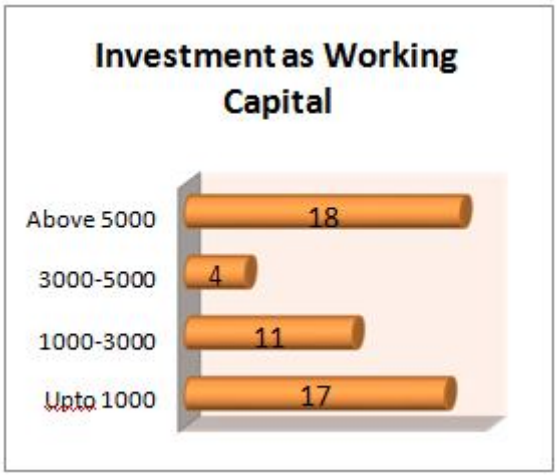
1b). Monthly turnover of your business



The overall range of Monthly Turnover of the respondents for this research was from Less than Rs. 5000/- to Above Rs. 25000/- however, majority of respondents fall between the range of Rs. 5000/- to 10,000/-

2. Description of the place of business – Most of the respondents operate their business at a place owned by them while the others run their business at a rented place or temporary place by the roadside or have small shops or have ahandcart.

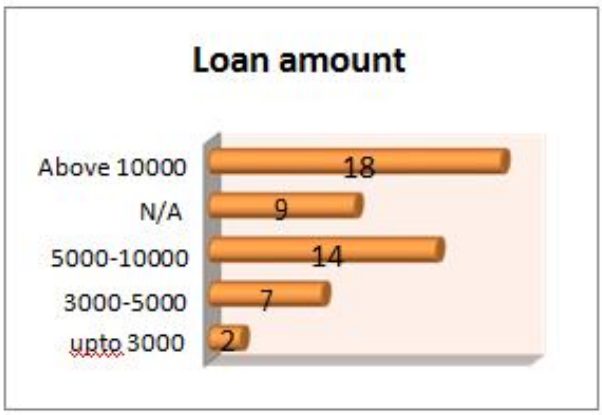
3a. & 3b. Approximate amount of investment – Majority of respondents have to invest in fixed capital to run their business using tables, chairs, utensils, etc. however, majority of respondents have to invest an amount of above Rs. 5000/- as working capital.



4(a). Do you take loans for investing in business? – Having a small business and given the lockdown situation, a majority of the respondents have to avail loans to run their business.

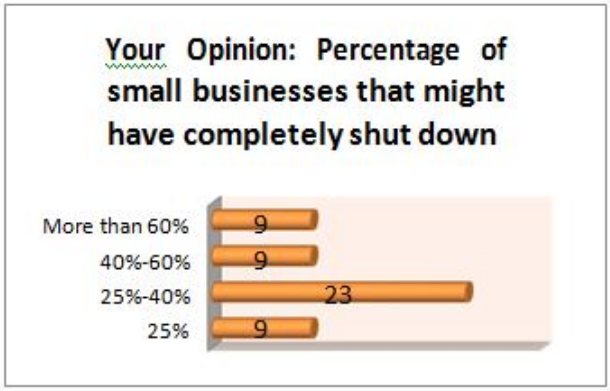
4(b). How much loan do you take for

business investment? -



To run their business, a majority of the respondents require loan facility amounting above Rs. 10000/- . Therequirements of other groups range from Rs. 3000/- to Rs. 10000/-

5. **For how long were you out of business due to lockdown? –** Owing to the situation due to lockdown, a majority of respondents had to keep their business shut for a time span of more than 5 months. Overall the respondents have stated that they had to keep their businesses shut for about 1 month to more than 5 months and only a small group of respondents were able to partially run their business.
6. **Did you find an alternative to your business during the lockdown?** - A majority of respondents tried to find an alternative to their business during lockdown as they couldn't run their business but were not able to get any. Other group of respondents managed to find and opted for an alternative to their business during lockdown.
7. **Was there an alternative to total lockdown? –** Majority of respondents of this research fall under the category of essential services and were able to run their business for few hours daily as per the timings allotted by the Government.
8. **What help do you expect from the Government for small businesses? -** Majority of respondents have opined that they expect financial help from the Government in the form of Subsidy. Some other groups have opined that cheap loan schemes or reduction in taxes or a permanent place of their own for running their business would be of help to them.
9. **According to you, what must be percentage of small businesses that must have completely shut down due to lockdown? –**



As per majority of the respondents, there is a probability of about 25% to 40% of the Small/Tiny businesses being completely shut down to the lockdown situation. Overall opinion of the respondents ranges from 25% to more than 60% of businesses being completely shut down.

10. **How long will it take for the economy to come back to normalcy? –** According to majority of respondents, the economy of the nation might take at least 6 months to regain normalcy.

Main Findings and Conclusion

- Majority of the type of business undertaken was vegetable vending & selling food items.
- Majority of the respondents have monthly turnover in the range of Rs. 5000/- to 10000/-
- Majority of the respondents operate from their own house or a small owned area as business place.
- Majority of them require loan amounting between Rs. 5000/- to10000/- only to run their business.
- Majority of the respondents have made investments in fixed assets like furniture, tables, vehicle, etc.
- Majority of the respondents expressed that, yes they need the support of Loan facilities while expressing about their expectations.
- Majority of the respondents expressed that they need working capital of up to

Rs. 1000/- only. Another group feels that it is little over Rs. 5000/-

- Majority of the respondents expressed that their business activity had come to a standstill for more than 5 months due to lockdown situation.
- Majority of them tried for alternative employment but could not get it.
- Majority of the respondents feel that, business units were allowed to remain open for at least few hours regularly with proper crowd control.
- A majority of respondents have opined that the Government should come forth by extending cheap loan facilities for the Small business units.
- Majority of the respondents feel that 25% to 40% of Small/Tiny businesses might have completely shut down during the period of Lockdown.
- It has been expressed by the majority of respondents that it will take a period of 6 months to one year for regaining normal business situations after lifting up of the lockdown.

Proof of the Hypothesis

On the basis of the analysis of the Primary data and the opinions expressed by the Trade Associations in Pune the hypothesis stands to be proved.

Future of the research

Similar Research can be undertaken about the impacts on salaried class, big businesses, trading organizations in the city of Pune.

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4. Press releases by the Trade Associations and
5. New items Published in the Standard Newspapers in Pune

UNDERSTANDING CULTURAL GOVERNANCE: A GLOBAL PERSPECTIVE

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ABSTRACT

The objective of the paper is to examine the literature within the domain of cultural governance across the globe to understand the contemporary theories and meanings, and trying to understand the various perspectives assigned to the domain of governance. Cultural Governance is still considered to be a new and upcoming concept, but many authors over the years, have categorically written and argued about the need for a proper definition and understanding of the same. Although cultural governance as a research and practice field is a young phenomenon, scholars and researchers have argued that it is still an outstanding research topic that has not been recognised and needs to be defined in order to better understand it.

This aim is achieved by reviewing the existing literature in the field of Cultural Governance in the global context, with the intention of examining and analysing aspects related to the understanding and applications of the system. The research is divided into two sections - first, discussing the concepts of Cultural Governance and connecting it with different theoretical perspectives like public administration, sustainable development, and participatory governance; and the second being the understanding of the current trends of cultural governance in the world, and the implications on the sustainable management of cultural heritage. Through this paper, the researcher has tried of understand the existing cultural governance framework across four major contemporary trends that have been suggested for better understanding of it. The first trend involves incorporating political, economic, and management issues into cultural governance to create or increase cultural heritage and its perceived value. The second trend is to incorporate the characteristics of good governance into the thinking of cultural heritage management. The third stream of concept area is the need of understanding the need of policy making within the realm of cultural basis, which would be a case-to-case basis. The last, but very prominent trend is to bring a semblance of sustainability in the process of cultural governance.

On the whole the paper highlights cultural governance as an emerging but much needed concept. It is quite clear from the review that the cultural governance cannot be a normative concept and as evident has evolved as per the needs of the context and culture. Simultaneously, the need of defining a system for cultural policy making has also been coming up with the help of intellectuals and experts.

Keywords: *Cultural Governance, Cultural Heritage, Governance, Heritage Management, Cultural Policy, Public Administration, Sustainable Development, Local Governments, Cultural Organisations, Decentralisation*

1. The Concept of Cultural Governance

Before starting the discussion on Cultural Governance, it is very important to understand the concept of 'Governance' and distinguish it from a government. Rosenau put the difference in a very simple manner, whereby Government is the legal ruling power, while Governance is the concept of how the government works (Schmitt, 2011). Rosenau enlarges "Governance […] is a more encompassing phenomenon than government. It embraces governmental institutions, but it also subsumes informal, non-governmental mechanisms […] Governance is thus a system of rule that is as dependent on intersubjective meanings as on formally sanctioned constitutions and charters. Put more emphatically, governance is a system of rule that works only if it is accepted by the majority (or, at least, by the most powerful of those it affects), whereas governments can function even in the face of widespread opposition to their policies" (James N. Rosenau, 1992).

King and Schramme (2019) write about three important components of governance – authority, accountability, and decision-making. They define Authority as the transparent structure of management and creating a top-down approach. Decision-making is about the range and associated complications that come with choice-making. Accountability is demonstrating and maintaining an effective and transparent system of managing public goods. King and Schramme thus define governance as a process involving various steps instead of just a formal system of rules and regulations.

Urban Governance Systems by Paproski (1993) explains governance as a practice of collaboration between the public and a group of actors in 'civil society'. As per Paproski, "the crucial distinction between government and governance is the notion of civil society, which can be defined as the public life of individuals and institutions outside the control of the state."

To start the discussion on cultural governance, let us go through a definition put forward by Jeremy Moon in The Social Responsibility of Business and New Governance.

"Cultural governance is defined as government's direct or indirect involvement in the promotion and administration of programs of cultural organizations (including museums) existing in specific geographic boundaries with unique financial and administrative arrangements."

- Moon (2002)

As put by Portolés, Čopič, and Srakar (2014, 184) Cultural governance is still a concept that defies precise definition and is not recognised as a distinguished research topic. If we look at the term in reference to 'governance of culture' then, Čopič and Srakar (2012, 6) have suggested that it is "composed of two sub-areas: (1) the new approaches to the formulation and implementation of sectoral cultural policy that is inspired by the interaction between the state, the civil society, and the market; and (2) the improvements in the steering and supervision of cultural organisations that lead to efficiently-, expertly-, independently- and transparently-operating cultural organisations" (ibid). The publication has tried to capture the essence of the concept of cultural governance through a multidisciplinary approach by correlating it with other theoretical areas like public administration, economics, sustainability, and decentralisation. The term 'governance' has been a matter of consideration for experts and academics since the 1990s. Numerous experts and international organisations have continued their search of developing an alternate system of cultural affairs, albeit with different motives and notions. They have also tried to provide a conceptual understanding of the term cultural governance together with the various definitions and evolution of the term 'culture, along with the ubiquitous term 'governance'.

Thomas Schmitt manages the idea of cultural governance from the viewpoint of cultural studies with a perspective of sociology (Schmitt, 2011). The author starts with exploring the concept of culture which serves as the base for the understanding of the concept of cultural governance. While discussing the concept at hand, Schmitt puts forward an interesting correlation between power and culture, and how power is shaping culture and vice versa. Apart from this, he also gives a brief description of all the existing theories of cultural governance. Thomas Schmitt presents the concept of cultural governance as a research concept for social science and humanities. The literature moves beyond the study of origins and the nature of governance knowledge by redefining its concept through the use of definitions given by scholars like Weber's definition of culture and Adorno & Horkheimer concept of cultural industry.

Schmitt also indulges in the broad understanding of the term 'Governance', reasons for the genesis for a particular form of governance, and how it is different from the term 'Government'. The publication very thoroughly defines governance as an analytical and contextual concept, and not a normative concept. Along with this, based on the commentary by Hyden, "governance has to build on earlier governance" (Hyden et. Al. 2004, 27). This concept is elaborated by Schmitt as he states that cultural governance cannot be an alien input and has to be embedded in a historical, social-cultural, and economic context, where the actors steer the situation through conscious negotiations. Furthering the discussion on the concept of cultural governance, Schmitt puts forth the wide as well as the narrow sense, where the latter is comprehended as the development of cultural policy based on the relationship between the administrative system and cultural institutions. This creates a situation leading cultural governance to be seen as a concept oscillating between cultural policy and cultural management. But sometimes the desired autonomy of cultural institutions is endangered due to direct and indirect political interference through rules and policies, which creates

incompatibilities that "lead to conflictive forms of cultural governance" (Schmitt, 2011: 49). The paper puts an emphasis that different concepts of culture co-exist in academia and public discourses.

Raymond Weber in his research 'What governance for Culture and the Cultural Sector?' distinguishes the various levels of governance – from Meta (vision and strategies) to Micro (organised participation and empowerment). In the discussion amongst the various aspects related to the realm of cultural governance, Weber includes international relationships, creative economy, knowledge generation, and information & communication technology. Unlike Schmitt, Weber puts the notion of cultural governance together with the political context. He importantly puts a very pertinent point of how the civil organisations emerge with a vision of forwarding the democratic view of democracy when the political nexus tends to monopolise the policy decision-making system as an exclusive entity. Weber also touches upon the aspects of reforms in political institutes, democratic structures, and political regulations for better cultural governance. He advocates the shift from government to governance as "our joint and uneven terms of engagement with the complex field of economic, social, political, and cultural power relations in which we are all 'stakeholders'" (Mercer, 2012). Weber also touches upon the idea of LPG (Liberalization, Privatization, and Globalization) and how it can help withdrawal of the state from the cultural sector.

Cultural governance by Weber has been discussed as a network of actors (state, market, and civil society) working towards a common objective decided in unison. He also stresses the fact that 'good governance' needs multi-stakeholder dynamics and the need to specify the responsibilities of the actors, and coherence of functions for better cultural governance. For creating a sustainable development approach, the author writes about the relevance of social capital. He also makes the reader aware of the neglect towards the lesser important aspects of culture when there is an intention of creating profit towards the justification of cultural funding. Also if culture is to be developed for the public good, certain standards like transparency, participatory democracy, democratisation, etc. need to be developed. It should also include features like capacity building, reiving cultural places for citizens, incorporating human rights, and cultural 'coproduction' involving private & civil society actors. Overall, Weber's text serves as a conceptualisation of cultural governance and as a list of standards towards creating a new 'cultural contract.'

2. Contemporary Cultural Governance - A Global Perspective

The contemporary trends in the field of cultural governance can be segregated into four main sections. These sections are made on the basis of which the researchers have assigned specific characteristics and research directions in the field of cultural governance. The first trend is about the inclusion of subject areas like policy, economics, and management within the governance of culture to create or enhance the value of cultural heritage and how it is perceived. Within this area, John Holden (2006) has developed a triangle model to explain the different values associated with cultural heritage. This triangle method has intrinsic, instrumental, and institutional as its three vertices. The intrinsic values relate to the subjective experiences of culture felt at an individual level – spiritually, emotionally, or intellectually; instrumental values are the ancillary effects of a culture where it is used for socio-economic development; while institutional values primarily talk about the processes, tools, and techniques adopted by cultural organisations towards serving the community. Holden, along with Baltà, have also summarised the debate and literature pertaining to the public value of culture in their paper (Holden & Baltà, 2012).

Another aspect of the value of culture is presented by David Throsby – the economic value. Such a value is created by various factors like use-value and cultural market or market for culture. On the other hand, Srakar and Čopič (2012) put a caution towards associating monetary value with culture and its governance. In such a scenario, only the market-friendly cultural aspects/products would be highlighted and the non-use or intrinsic values will get neglected. Even if

there is an economic value associated with these intrinsic values, it will be because of certain external benefits.

Thus, the governance of culture and the associated policies should consider all these different values, and also put focus on the intrinsic values. The current scenario, where the policymakers put a larger emphasis on the instrumental values of culture is a very dangerous precedent being established (Seaman, 1987). As Seaman mentions, it is like "choosing to play one of the weakest cards, while holding back their aces" (Seaman, 1987: 280).

The second trend talks about the idea of incorporating the characteristics of good governance within the governance of cultural heritage. It has become a very relevant area of concern these days, and a lot of researchers are creating good governance models within cultural institutions. Balancing Act: Twentyone Strategic Dilemmas in Cultural Policy discusses 21 key dilemmas related to cultural policymaking (Matarasso & Landry, 1999). The publication is divided into four parts talking about various stages of policymaking and the dilemmas faced in each. It touches upon the dilemmas of cultural democracy or democratisation of culture (framework dilemmas) and centralisation or decentralisation (management dilemmas). In another publication Governance Now: the hidden challenge of leadership (2009), several authors present governance codes that help develop good governance. The publication suggests that there is no need to alter the current model of governance, but only a change in the vision should be good. The publication also talks about the need of providing training for capacity building and establishing a peer networking and support group. There is also literature on the implications of good governance on culture, and how to create participatory mechanisms to involve all stakeholders (Toksoz, 2008).

Built on an extensive literature review Schramme et al. (2012) offer five general principles of good governance for culture. The first and second principal talk about the 'roles and powers of governance bodies' and careful composition of the bodies, and how these should align with the objectives and mission of cultural governance with clearly defined roles for each body. The third and fourth principles talk about the accountability amongst the governance bodies, and that they should have a transparent operating system as well as keep each other informed in decision-making. The fifth principle talks about the involvement of all the stakeholders and the value created by their involvement.

Taking the last principle mentioned above, another recent trend towards developing good governance for culture is working towards the concept of Participatory Governance in culture. The Open Method of Coordination document looks at participatory governance in culture as an "active involvement of all stakeholders, throughout the whole policy cycle (planning, decision-making, implementation, and evaluation) at multiple levels" (EU, 2018). Brigitte Geissel describes participatory governance as a 'participatory innovation' which is often not invented but reinvented or copied from other contexts/countries (Giessel, 2009). Vidović and Žuvela define participatory governance as sharing authority, rights, and responsibilities amongst stakeholders in conserving culture. (Kutura Nova, 2018).

They go on to say that though there are not many examples of participatory governance implementations, the concept has become a very popular word of discussion in the last two decades. UNESCO, in 1998, adopted the Action Plan on Cultural Policies for Development, which recognises the importance of civil society's role in cultural policy framework and these policies have to be made to address current and future needs, also are long-lasting (UNESCO, 1998). The 2005 Faro Convention emphasised democratic participation in cultural approach and putting a special focus towards developing 'legal, financial and professional frameworks which make possible joint action by public authorities, experts, owners, investors, businesses, non-governmental organisations and civil society' (Council of Europe, 2005: 5).

As cultural governance and its various forms are relatively a newer concept, researchers are still trying to develop methods of analysing them and understanding the outcomes. The parallel stream of development is policy making and cultural heritage - the third trend.

Within this field, a majority of literature is region-specific and how policymaking has integrated with governance or impacted culture. On the historical context of cultural policy-making, Bernié-Boissard gives an insight into its development and how the concept had different notions in public policy and social sciences during its development (Bernié-Boissard, 2011). Apart from showing the various implementation of cultural governance on the ground, she also shows the good & bad points of various implementation models and the actors involved. Eduardo. Nivón Bolán gives one of the better pieces of literature towards a regional study on cultural policy. He puts forward the system of cultural policies and ways of integrating public policy with cultural governance in the context of Mexico (Bolán, 2006). One of his main contributions is the insights into the evolution of cultural policies and public institutions. On the other hand, Poirier (2010) provides expert views on cultural policy-making and governance from people of various fields of interest and expertise with the French context. Together with Poirier, Ahearne (2010) talks about the involvement and contribution of intellectuals in cultural public policymaking in France. Bonet and Negrier (2011) give a framework for analysing cultural policies – institutional setting, instruments of intervention, distribution of governance, stakeholder capacity and priorities, objectives & values of cultural policies. Pascual (2008) very aptly defines the nature of cultural policymaking, and it is not only an administrative task but also incorporates a wide array of intangibles too.

"Cultural policies create the opportunities that no other public sphere provides. Cultural policies are built on the so-called intrinsic values of culture, which include concepts such as memory, creativity, critical knowledge, rituality, excellence, beauty, diversity"

- Pascual (2008)

The last, but very prominent trend is to bring a semblance of sustainability in the process of cultural governance. Similar to any other area of governance, cultural governance in urban areas has started to pose increased complexities for urban local bodies. This is largely because of increased values attached to the culture, resources, and policies (Baltà, Čopič & Srakar, 2014). This is clearly evident in the inclusion of culture in definitions of sustainable development, where it is shown as an interconnected pillar along with economic, social, and environmental pillars (Pascual, 2008). J Pascual, while quoting Jon Hawkes, suggests that the currently used triangle of sustainable development can be reframed as a square to include culture as the fourth pillar (ibid). As per the United Cities and Local Government's Agenda 21 for Culture, integrating culture with sustainable development gives an opportunity to create a long-term vision of culture.

Many authors and publications, like Sacco et. al., have talked about the involvement of a wide array of actors. They present the case of how development processes can be successful by involving a "variety of agents – the local government, civil society, universities, the educational system, the private sector, and culture producers – must be involved in the developmental process" (2009: 48). Fleming et al. also suggest the setting up of a 'Creative Commission' at the local and regional level, as "the major public-private partnership for sector development and the core means of ensuring agendas from education to regeneration, economy to arts, are joined up. This should also promote more socially-driven, inclusive, and 'bottom-up' approaches to creative development…" (2011: 11).

3. Conclusion

It is quite clear from the review that the cultural governance cannot be a normative concept and as evident has evolved as per the needs of the context and culture. Similarly, the need of defining a system for cultural policy making has also been coming up with the help of intellectuals and experts. The governance and policy should also look to identify various mechanisms of enhancing the cultural economics and support the cultural industry by creating opportunities for the private sector to get involved in different public private partnerships, government incentives and innovative funding mechanisms.

On the whole this literature review highlights cultural governance as an emerging but much needed concept. A lot of attention is being paid

to defining the concepts, the arguments provided by the experts from different regions pertaining the evolution & practice of cultural governance and the implications on the existing practices, coalitions & the culture itself. A few publications show the position of culture in the contemporary society and as a new field of policy making. There are a lot of current trends that have made an impact on cultural governance similar to other concepts like sustainable development. There is also a specific impetus being put on the role and responsibilities of each stakeholder group, especially civil society and academia, towards the better designing and implementation of the cultural governance. Similarly, the need of defining a system for cultural policy making has also been coming up with the help of intellectuals and experts.

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A CRITICAL REVIEW OF SOCIAL MEDIA ADDICTION MEASURES

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ABSTRACT

With the increasing trend of social media usage worldwide, some scholars have started to describe the negative effects of social media overuse leading to social media addiction. One particular aspect that has been of special interest to scholars has been conceptualizing and characterizing social media addiction. As the research in this domain is quite new, various scholars are consistently improving the earlier versions of social media addiction measures. This study is an important endeavour to explore social media addiction measures in the literature. This work shows the evolution of social media addiction measures from explicit to broader platforms over the last decade. This article also offers different suggestions to scholars on enhancing the existing scales on social media addiction.

Keywords: *Social Media, Social Media Addiction, Social Media Addiction Measures, Social Media Dependency, Online Addiction, Social Networks.*

Introduction

The inclusion of the internet platform into our domain (Durak, 2020), as well as various communication systems in the form of different social media platforms, such as Twitter, Instagram, and Facebook (Vahedi & Zannella, 2019), have enabled individuals to correspond with others while also providing an environment in which individuals can find space for themselves. Social media as a tool has also assisted disadvantaged groups by providing them informative content concerning their rights as well as possible prospects (Tarman & Yigit, 2013) and contributed immensely to education and human rights situation through communal mobilization (Mahmood & Saud 2019; Joseph, 2012; Livingstone, 2014). Many individuals consider it the language and representation of contemporary communal cohesion and societal connectedness (Kane, 2012; Rinaldi & Farr, 2018). However, social media usage on various platforms and networks has increased progressively as it has become an established free time commotion over the last many years now (Andreassen et al., 2016). It has been estimated that by the end of the year 2021, there will be roughly 3.09 billion social network users (Statista, 2020). Such networks present certain advantages to their users in terms of pleasure and satisfying information needs. However, there are also many disadvantages (Muller et al., 2021), especially for emotional and communal well-being. Although social media might lead to constructive job-related results; but, excessive use might also bring unconstructive results, such as addiction and lower performance levels (Moqbel & Kock, 2018). It has been observed that the majority of the time spent (60–80%) on social media is not related to work (Eslit, 2018). Multiple scholars argue that social media addiction could become a future basis of grave problems and deserve pressing consideration (Milosevic-Dordevic & Žeželj, 2014; Wang et al., 2014). More accurately, it has been referred to as "being overly concerned about social media, driven by an uncontrollable motivation to log on to or use social media, and devoting so much time and effort to social media that it impairs other important life areas"(Andreassen & Pallesen, 2014, p. 4054). Thus, over the last decade, there has been growing research into the domain of social media addiction. Scholars have also been many attempts to define, conceptualize, and develop an instrument for social media addiction (Liu & Ma, 2018). In the past, academicians have attempted to measure addiction in a non-virtual environment. However, online addictive behavior, especially social media addiction, is a topical trend; limited research concerning its conceptualization has been carried out.

One of the reasons scholars do not concur on a description of social media addiction is that both internet and social media addiction are not included in the Diagnostic and Statistical Manual of Mental Disorders (DSM). Van den Eijnden et al. (2016) also consider that the

existing scales (Caplan, 2010; Andreassen et al., 2012) that measure social media addiction are inherently deficient in measuring such addictive behavior in contemporary times. This is because newer social media platforms with different characteristics than earlier platforms are coming into existence which calls for a new approach to measure addictive behavior on such platforms (van den Eijnden et al., 2016). It is also vital for the research scholars to operationalize social media addiction with a similar approach to evaluate findings from various studies. Moreover, due to the scarcity of studies on addiction within social media, it is quite hard to determine the factors of social media addiction (Andreassen & Pallesen, 2014). The current social media literature shows that the bulk of the research has primarily been concentrated on social media's constructive aspects and considered it an affirmative incident that could lead to many constructive effects (Thadani et al., 2016).

Some literature reviews concerning social media addiction have been confined to its antecedents, consequences, usage, etc (D'Arienzo et al., 2019; Kuss & Griffiths, 2011). Although social media addiction studies have increased over the last few years, the studies that have focussed on the evolution of its measures/instruments are missing from the literature. Thus, this study aims to explore the literature concerning the scales that have attempted to measure social media addiction.

This article starts with the introduction section, followed by the literature review, which describes the social media and social media addiction concepts and theoretical background for social media addiction. It is followed by a section describing the method used for literature review for exploring the scales concerning social media addiction. Results of the literature review show the evolution of social media addiction instruments over time. The final section is the discussions and conclusion chapter.

Literature Review

Social Media

Social media has been illustrated as an internet-associated novelty that transformed our world through communication applications, social networks, gaming, interactive systems, and websites (Beig & Khan, 2018; 2019). Social media in recent times has been diversified into a variety of communication networks, which users employ to share their lives, form interpersonal relationships, and obtain information (Kreiss, 2016). Different social media networks like Facebook, Twitter, Instagram, etc., are used by people worldwide for interaction and other purposes (Dalvi-Esfahani et al., 2019). However, the world has witnessed surfeit usage of social media that has increased exponentially in recent years (Kizgin et al., 2018). Thus, there is an urgent need to anticipate its negative influence on an individual's psychosocial and political aspects (Kalpidou et al., 2011).

Social Media Addiction

In recent times, researchers have postulated a new type of addiction related to the use of social media, i.e., social media addiction. As per Andreassen and Pallesen (2014), social media addiction has been characterized as being excessively apprehensive concerning social networking websites, motivated by a strong inducement to use such networks, and dedicating huge time and endeavors to social media platforms that impede one is social life, work, interpersonal relations, or mental healthiness and well-being. It has also been described as a state in which users are concerned about their social media activities and an uncontrollable urge to realize the act and dedicate many efforts and time to it in anticipation that it may affect other vital life aspects (Turel et al., 2018). Although social media addiction shows similarity in terms of sharing the broad fundamental characteristics of erstwhile behavioral and other substance-associated addiction, nonetheless, seeing as the involvement in social media is divergent concerning the genuine expression of the Internet addiction, this occurrence seems laudable of personal deliberation (Kuss & Griffiths, 2011). Consequently, it is necessary to study the social media addiction phenomenon because it can unfavorably affect communal functioning, happiness, day-to-day well-being, and educational and employment performances amongst social media users (Kuss et al., 2013).

Theoretical Background

Uses and Gratifications Theory (UGT)

UGT is centered on the mass communication narrative. It offers a user-centered framework in elucidating why a distinct conduit or technology is being selected amongst other such options (Li et al., 2017). Contemporary researches concerning the gratification domain have enlarged the span to incorporate the psychological stimulus that compels the consumption of social media content. For illustration, the fundamental motivation for using and adopting platforms like Facebook and MySpace is searching for information and meeting up with associates (Raacke & Bonds-Raacke, 2008). Likewise, Kim et al. (2011) opined that the main intentions for social media use are to search for acquaintances, info, convenience, entertainment, and social support. Likewise, Ku et al. (2013) also emphasized that the main motive for social media usage is amusement, information seeking, sustain relationships, social bonding, and even style. The existing UGT work on traditional and recent media channels has revealed two trifling causes for media consumption, i.e., amusement and knowledge quest (Shao, 2009). Consequently, related to the studies of Hilvert-Bruce et al. (2018), these two groups were incorporated in investigating social media addiction. The interactive attributes and other entertaining feature

s on social media also make it easy for its users, particularly young individuals, to get into addictive the investigation of all users often indulge in creating, sharing, and communicating their content/message to their indented audience that ranges from explicit friends to the crowd. Individuals with a bigger social network and high usage levels are more likely to use social media mobile applications that lead to users spending extra time on these virtual social platforms (Leung et al., 2017).

The Method Adopted for Literature Review

The usage levels revolve around the measures of social media addiction and the process for development for a new instrument of the same. This meant that all the existing instruments of social media addiction and related concepts such as addiction on other online platforms such as the internet, gaming, etc., had to be thoroughly reviewed before proceeding further. Hence, this study searched the concerned literature from multiple sources and databases like Web of Science, Google Scholar, Proquest, and JSTOR. Moreover, various journals in reputed publication houses like Inderscience, Sage, Wiley, Springer, Elsevier, Emerald, etc., were also searched meticulously for the relevant literature. These four steps followed as per systematic literature review (Gough et al., 2017) are described below.

i. Identification

The first stage involved searching for the papers which had full access to the databases mentioned above. The search returned 7993 research articles from these sources.

ii. Screening

The second step involved screening for the articles based on the keywords, i.e. 'social media addiction,' 'social networking addiction,' 'social media dependency, 'technological addiction' 'gaming addiction' 'problematic social media use,' 'online addiction' and 'social network addiction.' 3233 articles that did not match the keywords were eliminated from the ensuing screening.

iii. Qualification

After screening, a review for certain sections of articles like abstract, introduction, and conclusion was carried out. The review in this step was focused on the relevant keywords. In the qualification stage, after analysis of the keywords and the article abstracts, 566 papers were considered for inclusion, and additionally, 1097 studies were eliminated. The third phase helped in removing further 3097 articles which did not fit the criteria match.

iv. Eligibility

In the final (eligibility) stage, 193 papers available in the English language were at last selected for the all-inclusive analysis. These papers consisted of the factors or constructs related to the addiction measures on various online platforms, including social media.

Inclusion and Elimination Criteria

The focus of the search was on the research study articles that were

i. Peer-reviewed and indexed in the journals that were issued only in the English language.

ii. The focus was on the studies concerning the measures of various forms of online addiction such as social media addiction, online addiction, internet addiction, etc.
iii. The papers published during the last twenty-one years (2000-2020) were considered for this study. This period has witnessed the revolution on the internet, its associated platforms, and the research concerning the same.

Research studies were excluded if

i. Research article or paper did not center around the keywords of interest concerning this work, and
ii. Journal's editorial reports, research editorials, editorial letters, study's data sets, research discussions, and book reviews were also excluded.

Ethical Concern

During the process of detailed literature review, it was comprehensively ensured that the correctness and objectivity of accessible intellectual facts and the accuracy of the references were maintained. The superfluous or duplicative publications, non-obvious results, and most importantly, plagiarism were completely avoided (Wager & Wiffen, 2011). Following are the next steps applied in this work.

i. Articles were only searched in sources like Web of Science, Google Scholar, Proquest, Google Scholar, and JSTOR and reputed publication houses like Inderscience, Sage, Wiley, Springer, Elsevier, Emerald, etc. These sources were accessed from the University of Kashmir with formal authorization.
ii. Only English written original studies with access were reviewed in line with the study objectives, and
iii. Only those articles or studies were used for this study that had ethical approval, informed sanction, and had a declaration of 'no conflict of interest.'

Results

Evaluation of Social Media Addiction Studies

Many academicians have tried to focus on the Facebook platform as it is a very trendy social media website for conceptualizing/developing the social media addiction measure/instrument. Some other academicians have developed social media addiction measures/instruments for social media networks in common.

Table 1: Measures of Social Media Addiction

Author/s	Approach	Instrument Details	Region of Study
Wilson et al. (2010).	Multi-dimensional.	'Addictive Tendencies Scale' (ATS) incorporated just three items strictly associated with the broad compulsion occurrence and the investigative studies/research relating to the excessive texting of messages. This scale/measure consists of three dimensions/factors: i. 'Salience.' ii. 'Withdrawal.' iii. 'Loss of control.'	Australia
Elphinston and Noller (2011).	Single dimension	'Facebook Intrusion Measure' was associated with the behavioral addiction phenomenon (Brown, 1997) and mobile phone attachment/problem (Walsh et al., 2010). This particular study illustrated that 'Facebook Intrusion' is linked with relationship problems and inconvenience.	USA

Wolniczak et al., 2013	Multi-dimension.	Facebook Dependence Questionnaire, in essence, measures seven aspects of addiction: i. Satisfaction. ii. Control. iii. Worries. iv. Time of use. v. Efforts to reduce it. vi. Concern, and vii. Other 'Facebook' activities. This instrument is based and conceptualized on the assertion of 'internet addiction' developed in Spanish (Echeburua, 1990).	Peru
Turel and Serenko, 2012	Single dimension.	Social Networking Website Addiction consists of five items. This measure/instrument is closely related to the work conducted by Charlton and Danforth (2007), which researched user involvement/dependence with video gaming.	USA
Andreassen & Pallesen, 2014	Multi-dimension.	The Bergen Facebook Addiction instrument/measure consists of six variables (dimensions) developed to evaluate the addiction behaviors amongst social media users on Facebook, i.e., relapse, tolerance, withdrawal, mood modification, conflict, and salience.	Norway
Andreassen et al. (2016) that		The Bergen Social Media Addiction Scale (BSMAS) includes six dimensions similar to the BFAS, i.e. ('tolerance,' 'mood modification,' 'salience,' 'conflict,' 'relapse' and 'withdrawal') that were initially put forward by Griffiths (2000, 2005) for measuring the social media addiction.	Norway
Liu and Ma (2018).	Multi-dimension	Social media addiction measure (Chinese context) The six constructs of social media addiction were: i. 'Preference for online social interaction' (first factor). ii. 'Mood alteration' (second factor). iii. 'Negative consequence and continued use' (third factor). iv. 'Compulsive use/withdrawal' (fourth factor). v. 'Salience' (fifth factor). vi. 'Relapse' (sixth factor).	China

The six categories of behaviors/activities linked with addiction on various social media networks/platforms (Brown, 1997; Griffiths, 1996, 2005) areas:

i. **Salience**

It can be best explained as a state/situation in which a social media application/usage becomes the excessively crucial part of one's life from rational/cognitive and behavioral standpoints (Andreassen et al., 2012). It may also be illustrated as an activity that can control the individual user is thinking process and actions (Griffiths, 2005; Andreassen et al., 2012). Scholars have also argued that such addicts (dependent on social media) spend an immense quantity of time deliberating/thinking on the issue of social media and often look for different ways which would let them expend added time on such sites/networks (Dalvi-Esfahani et al., 2019; Griffiths, 2005).

ii. **Mood Modification**

Mood modification illustrates the usage of the social platforms that may unceasingly/incessantly modify a person's mood/frame of mind (Andreassen et al., 2012; Griffiths, 2005). Usually, such users would spend time on such networks to diminish their feelings of responsibility, edginess, agitation, and glumness, and to disregard the individual problems through the usage of such platforms (Dalvi-Esfahani et al., 2019; Griffiths, 2005).

iii. **Tolerance**

This attribute can be described as the surplus build-up of users' social media usage with increasing time. It may also be portrayed as the magnitude of the doings requisite to realize preceding effects/consequences (Andreassen et al., 2012; Griffiths, 2005). Commonly, these addictive users dissipate extra time on such platforms/sites than their original target, as they sense there is an unyielding compulsion for an escalating usage to accomplish the similar delight strength (Dalvi-Esfahani et al., 2019; Griffiths, 2005). Additional time on these networks is necessitated for acquiring the basic mood adjusting effects.

iv. **Withdrawal symptoms**

This feature/characteristic may be portrayed as the symptoms or consequences, both bodily and emotional, that may ensue when the access/contact with social media is ceased for the individual user. It can also be illustrated as the prevalence of awful feelings in a person when his/her contact with social media is stopped or surprisingly diminished (Andreassen et al., 2012; Griffiths, 2005). Moreover, suppose the habit of using such websites is not allowed. In that case, addicts can get recurrently sidetracked, restless, bothered, or grumpy, and experience anxiety if they are powerless to access the social media web platforms (Dalvi-Esfahani et al., 2019; Griffiths, 2005).

i. **Conflict**

It often entails the disadvantageous influence of social media web usage on the interpersonal associations, occupation-related, and learning outcomes, and may also lead to the intra-psychic divergence (Andreassen et al., 2012; Griffiths, 2005). Such addicts bestow a smaller amount of priority to their favorite hobbies, academics/profession, spare-time activities, and games, and often pay no regard to their next of kin, family, and their friends/ acquaintances for their commotion on the social web (Dalvi-Esfahani et al., 2019; Griffiths, 2005).

ii. **Relapse**

This dimension can be conceptualized as the proclivity of an individual user to re-establish addictive virtual behavior after a period of self-discipline (Brown, 1993; Griffiths, 2005). When individual social network users make their own choice to use less of such networks than their preceding levels, they become unsuccessful in that particular route to use less of such socializing platforms (Andreassen et al., 2012; Dalvi-Esfahani et al., 2019; Griffiths, 2005).

iii. **Continuous use of SM**

It can be described as a type of a person's state of psyche in which individual users are quite cognisant of detrimental consequences of their social media activities, except they would still go on to use such platforms (Liu & Ma, 2018). These disadvantageous effects/outcomes are more likely to be psychosocial in disposition and not just physically affecting the users (Liu & Ma, 2018).

iv. **Preference for online social interaction**

Academicians/researchers have also postulated the abstract cognitive thought of an individual-discrepancy, which means an individual considers that she/he is more relaxed, capable, and positive in a virtual (online) interactivity in strong contrast to the usual person-to-person societal contact/relation (Caplan, 2003).

Discussions

Many measures concerning social media addiction have been postulated by researchers over the last decade now (Liu & Ma, 2018). Some of such measures have tried to assess the problematical usage of social media on just Facebook, referred to as 'Bergen Facebook Addiction Scale (BFAS) (Andreassen et al., 2012). Other authors have structured their work on the pro behavioral virtual gaming behavior, such as the 'social media disorder scale' (van den Eijnden et al., 2016). ve adopted the previously Intermany addiction measures to many social websites (Assunção & Matos, 2017; Marino et al., 2016). However, the wide-ranging view is that dependence on Facebook is not equivalent to social media addiction (Griffiths, 2013; Kuss & Griffiths, 2011). This has led to the opinion that calls for a universal platform and an instrument Psychometrically good to measure this evolving concept (many researchers have posted Kuss & Griffiths, 201concerningew dimensions concerning social media addiction in recent times in addition to the classic construct of the addiction module. For instance, Liu and Ma (201the 8) proposed a new version of the social media addiction scale by adding two new

dimensions (continuous use and preference for online interaction) to the already existing social media addiction instrument factors.

Nevertheless, the scale proposed by Liu and Ma (2018) had six factors. One of the factors, i.e., 'tolerance' adopted from previous scales on social media addiction, vanished in their study. The likely rationalization might be that the work of Liu and Ma (2018) evaluated subjects' broader aspects of the addictive behavior about many social media platforms and not just Facebook as in former studies. This indicates that the tolerance construct on social media may exist on one of the networks but not on other platforms. However, this deduction must be tested in future social media addiction studies (Liu & Ma, 2018).

Various studies have shown the evolution of measuring social media addiction from specific to more general platforms. Recently, new factors have been ascribed to the instruments of social media addiction. Moreover, the rising social media population and users in the world's developing regions also presents opportunities to scholars for developing an instrument of social media addiction. Recently, one such instrument was developed in the Chinese context. India is also a vast country with a huge population of social media users, making it imperative to develop such a scale in the Indian context. The rate at which social media users increase is higher in developing regions than in developed nations (Poushter et al., 2018).

The bulk of the worldwide population of younger adults lives in developing nations/regions of the planet (United Nations, 2011). Moreover, young individuals are more prone to use such networks to express their distinctiveness and bond with others (Mahmood et al., 2018). The main reason for such an increasing Internet use could be cheap Internet provisions and the accessibility of mobile phone internet (Alabi, 2013; Poushter, 2016). This also makes it crucial to conduct a study on developing an instrument of social media addiction in India. Moreover, newer studies also need to discover new factors that can describe social media addiction construct more effectively. Thus, this work endeavoured to explore the factors of social media addiction in order to develop the social media addiction scale in the Indian context.

Acknowledgment

The authors would like to thank ICSSR for their support and research funding for this study.

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ANTECEDENTS OF WORD OF MOUTH ADOPTION IN MOTION PICTURE INDUSTRY

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ABSTRACT

Word-of-mouth plays a crucial role in the success of theatrical motion pictures. Motion pictures', being artistic and experiential in nature, assessment ambiguity is the greatest challenge before the movie-goer. Before watching a new release, movie-goers' collect all the necessary information for arriving at a purchase decision. Movie-goers' prefer the opinion of others as they are considered to be more reliable than various industry initiated promotion activities. This study tries to identify the antecedents of word-of-mouth adoption in the motion picture industry. Source trustworthiness, credibility, expertise, homophily and tie strength were identified as the major antecedents of word-of-mouth adoption in the motion picture industry based on the findings of the earlier studies in this field. Also a theoretical model that can be empirically established is added to the existing literature.

Keywords: *Word-of-Mouth, Motion Picture Industry, Trustworthiness, Credibility, Expertise, Homophily, Tie Strength.*

Introduction

The evolution of word-of-mouth (WOM) can be traced back to the origin of mankind. Hence, WOM is considered to be the oldest and at the same time the most commonly used medium of communication among people (Ismagilova et al., 2017). However it was only in the late 1950's, the researchers started discussing its significance in the business performance. In the marketing context, WOM refers to consumer's opinion regarding the whereabouts of a product or a service (Westbrook, 1987). Relevance of WOM lies in the fact that it plays a crucial role in forming the consumer buying decisions. This is because consumers consider WOM as the most reliable source of information (Cheung & Thadani, 2012). As WOM emerges from a non commercial source, its acceptance is much more when compared to other business initiated promotion activities (Godes and Mayzlin 2004). Also, it can be observed that the reach and spread of WOM has increased manifolds due to the emergence of internet-mediated communication platforms such as online forums, social networking sites (SNSs), review sites, merchant websites, and online stores (Benerjee, 1992). According to Mahajan et al. (1984), WOM plays a significant role in the promotion of new products or services as potential consumers should be made aware regarding the whereabouts of these new products or services for taking a favorable purchase decision. In the case of an intangible or experiential product, the only option before the buyer to have a quality assessment prior to purchase is to engage in WOM (Zhang, 2016).

Movie selection by audience to a great extent depends on the words of other movie-goers' (Mishra et al., 2016). WOM is detrimental in the existence of MPI as it always deals with a new product (new releases) which is artistic and experiential in nature (Álvarez-Monzoncillo et al., 2018.) Hence, it would be worthwhile to evaluate the role of WOM in the performance of theatrical motion pictures (MPs). There are numerous reasons to conclude that WOM happens among movie-goers. First, movies being an interesting topic of conversation, active interpersonal communication happen between the movie-goers (Liu, 2006). Second, social acceptance will be greater when talking about a popular subject like movies than less popular ones (Brown & Reingen, 1987). Third, a movie being an artistic or cultural product consumed purely for entertainment purpose, the like and dislike of a movie varies from person to person (Yeap et al., 2014). So, movie-goers engage in WOM to conclude whether a particular movie meets their individual taste and preferences. Fourth, the quality of an experience product like MPs can be assessed prior to purchase by

engaging in WOM with other movie-lovers' (Liu, 2006). Fifth, there is greater possibility to talk about movies as memories of mesmerizing topics like cinema will last long in the memory of audiences (Brown & Reingen, 1987). Finally when simultaneous releases occur movie audiences discuss with others to arrive at a purchase decision (Bristor, 1990). From the above discussion it can be concluded that movie acceptance by the audience to a great extent depends on the WOM.

While going through the literature it can be noticed that consumers exhibit a greater acceptance or adoption of facts conveyed through conversation and information sharing by consumers than in the case of market-initiated sources of information such as print and visual adds, sales man…etc (Buttle 1998; Godes and Mayzlin 2004). However a study revealing all the factors that motivates movie-goers to adopt WOM (WOMA) in motion the picture industry (MPI) is vacant in the literature. This study is a novel attempt to identify the antecedents of WOMA is MPI. This study thus aims to fill the theoretical gap that exists in the present literature relating to the precursors of WOMA in MPI.

The remaining part of this paper is organized as follows. A careful review of the available literature has been conducted to identify the probable precursors of WOMA in MPI. The role of these antecedents in the acceptance of WOM in the cinema industry is established by joining together the findings of the prior studies conducted in this domain. Also an effort has been taken to put forward and establish a theoretical model depicting the relationship between the forerunners of WOMA and WOMA. This paper ends by suggesting the practical implications based on the findings of the study.

Review of Literature and Model Building

Antecedents of WOM Adoption (WOMA)

The term Word-of-Mouth-Adoption (WOMA) refers to the extent to which WOM is considered to be the most preferred and reliable source of information by the recipient in matters relating to their decision making (Martin & Lueg, 2013). Researchers are of the view that source characteristics such as non commercial, independent and social circle creates an impression among the listeners of WOM that the source is credible and trustworthy. Also people have a tendency to rely on the words of others as they believe that the provider possesses relevant expertise on the topic discussed. Providers' (source) similarity (homopily) and the closeness of the relationship between the recipient and source of information (tie strength) are the other reasons found in the literature for the acceptance of WOM. Hence, in this study, trustworthiness, credibility, expertise, homophily and social relationship (tie Strength) are taken as the antecedents for WOM adoption or WOM acceptance (Table 1).

Table 1: Antecedents of WOMA (Source Perspective)

Source	Trustworthiness	Credibility	Expertise	Homophily	Social Tie
Cheng and Zhou ,2010	✓	✓	✓	✓	-
Aghakhani and Karimi,, 2013	-	✓	-	✓	✓
Lis, 2013	✓	✓	✓	✓	-
Oroh, 2014	-	✓	-	✓	✓
Baber et al., 2016	✓	-	✓	-	
Mahapatra and Mishra,2017	-	✓	-	-	✓
Kim et al., 2018	-	✓		✓	✓

Source: Author

Trustworthiness and WOMA

Trustworthiness refers to the receiver's degree of faith over the message provider or source (Pan, 2014). It is the extent to which other's opinion is considered to be genuine by the receiver (Pornpitakpan, 2004). A source is perceived to be trustworthy by the receiver if it provides real and impartial opinion about the matter under discussion (Martin & Lueg, 2013). It is the element of trust that determines the acceptance or influence level of various

information channels. Murray (1991) is of the opinion that unlike other information sources such as advertising, WOM is mostly perceived to be more trustworthy by consumers. This is because WOM are considered by potential consumers as direction from people experiencing similar situations (Beck, 1992). Faber and O' Guinn (1984) also expressed a similar opinion in their study. They stated that as WOM in MPI comes from other movie-goers, it is perceived to be more trustworthy than advertising by the movie-goers. Nielsen (2012) in his study found out that 70 percent of the people trust the words of others in matters relating to purchase decisions. According to Charlton (2015), reviews provided by consumers are 12 times more trusted than the information supplied by the manufactures. Therefore, in this study perceived trustworthiness is taken as an antecedent that decides the acceptance of WOM.

H_1: Source Trustworthiness leads to WOMA

Credibility and WOMA

According to Cheng and Zhou (2010, p.2) credibility of WOM refers to "the extent to which an individual considers the recommendations from others as true or actual". Acceptance of WOM communication to a great extent depends on the credibility of the content delivered. Gruen et al. (2006) is of the view that when compared to various market-initiated sources of information, WOM is perceived by consumers to be more credible and useful. According to Lis (2013) there exists a visible and direct link between credibility of the source and WOM adoption. A great challenge according to O'Reilly and Marx (2011) before the recipient of WOM, especially in the case of e-WOM, is to reach a conclusion as to how to assess and evaluate the credibility of information received through WOM as in many cases exchange of information takes place between people who are completely anonymous and strangers. In spite of these challenges, studies reveal that consumers have a greater and notable preference for WOM as a credible information source over other business initiated promotion techniques. Moreover, they overcome such issues by resorting to the recommendations from strong ties as against the recommendations from weak ties. Also a rational consumer is capable enough to assess the credibility of the message conveyed through WOM (Huang et al. 2012). Consumers also assess the credibility of reviews by examining the extent to which such reviews provide evidence to solve their purchase related problems or apprehensions. Hence in this study perceived credibility is taken as a factor that decides the acceptance of WOM.

H_2: Source Credibility leads to WOMA

Expertise and WOMA

According to Ohanian (1990, p.44), the term expertise can be defined as "the extent to which a person is perceived to possess knowledge, skills or experience and thereby is considered to provide accurate information". Perceived expertise in the context of interpersonal communication refers to the recipient's perception of the speaker's proficiency in delivering real and true information (Baber et al., 2016). According to Bristor (1990), expertise is the ability of the source to provide correct information. It is the ability of the source to provide authentic and genuine information (McCracken, 1989). Individuals who have expertise in a particular field are also interested in sharing their knowledge with others (Berger, 2014). Source expertise is an important criterion that decides the acceptance of WOM. Yale and Gilly (1995) is of the opinion that people prefer to listen to the words of a person whom they believe to be knowledgeable and experienced. People prefer to have information received from a source with good expertise so as to reduce the risk involved in arriving at a purchasing decision. According to Sweeney et al., (2008), information sources having higher expertise exert larger influence upon audiences than those sources having lesser expertise. While purchasing unfamiliar products or new products, consumers prefer to have WOM references received from sources having higher expertise. So, in this study perceived expertise is taken as an antecedent that decides the acceptance of WOM.

H_3: Source Expertise leads to WOMA

Homophily and WOMA

Homophily refers to the extent of similarity between sender and receiver in matters relating to values, attitude, demography and social status (Thelwall, 2009). This similarity can be either demographic similarity (Engle and Lord, 1997) or cognitive similarity (Guzzo et al., 2014). Demographic similarity is a peripheral similarity based on the status of the participants while cognitive similarity is an in-depth one based on the similarity of taste and behavior of individuals. In this study the construct homophily includes both demographic and cognitive similarity. The concept of homophily is based on the 'like-me' principle which states that humans exhibit a natural tendency to interact with others who are similar to themselves (Steffes and Burgee, 2009). While receiving the opinion from others, the receivers' acceptance of WOM depends on the receivers' perceived similarity with the source (Foreman et al., 2008; Yaniv et al., 2011). Responses from similar persons are found to be more effective in the formation of favorable attitude among potential customers (Foreman et al., 2008).According to Chan (2017), similarity of individuals involved in the conversation plays a very important role in shaping consumers' perception and influencing buyer's decision making process. Hence, in this study perceived homopily is taken as an antecedent of WOMA

H_4: Source Homophily leads to WOMA

Social Relationship (Social Tie) and WOMA

Another important factor that determines the acceptance of WOM is the tie strength. There is an urge among humans to create a strong and stable interpersonal connection with others (Baumeister & Leary, 1995). These interpersonal relationships are developed and nurtured through social interaction and these interactions lead to the formation of social ties among the people involved in these communications. Tie strength is the measure of closeness of association between the social members. It is thus the degree of intimacy between the source of WOM and the recipient. If the source is known and the relationship with the source is close, it is considered to be Strong Tie and else it is considered to be Weak Tie Duhan et al. (1997). Studies by Brown and Reingen (1987) and Wirtz and Chew (2002) clearly indicate that Tie Strength has a significant role in the acceptance of WOM. Wirtz and Chew (2002) further stated that people accept communication from strong tie more than communication from weak tie. Also the chance of passing the WOM is more in the case of strong ties when compared to weak ties. According to Bansal and Voyer (2000) strong ties exert a significant influence in the acceptance of WOM by the receivers. However, weak tie cannot be avoided as they facilitate communication to pass from one community to another and thus accelerate the diffusion process (Brown and Reingen, 1987). With the emergence of internet mediated communication, weak ties become more common than strong ties as in majority cases e-WOM takes place between unfamiliar people (Chatterjee, 2001).Thus, in this study social ties are taken as an antecedent that influence the acceptance of WOM.

H_5: Source Social relationship leads to WOMA

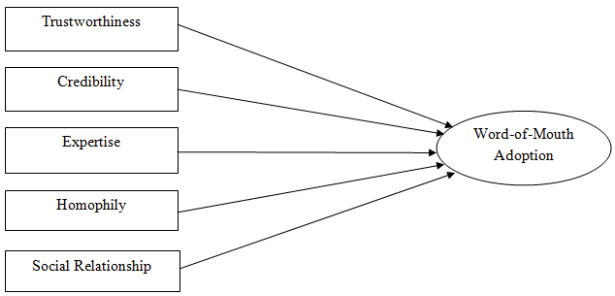

Figure 1: Antecedents of Word-of-Mouth Adoption by Movie-goers' (Source: Author)

Implications and Conclusions

Owing to the high economic importance, research on MPI is greatly valued and appreciated by the academicians and the industrialists all over the world. Being an artistic and experiential product, the destiny of a movie in theatre to a great extent is decided by the people's opinion be it online or offline. Based on the insights received from the previous studies in this domain this study put forward a conceptual model (Figure 1) which can be empirically verified. Thus, the contribution of this research work to the academic world is the proposition of a conceptual model covering the possible

antecedents of WOMA in MPI. This study proposes five possible antecedents of WOMA in MPI i.e., source trustworthiness, expertise, credibility, homophily and tie-strength. The empirical establishment of this proposed model would bring new insights in the field of WOM and MPI. These insights provide food for future researchers and as well foundation for movie promoters while designing their promotional activities. A good understating about the concept of WOM and its effective utilization will helps the movie houses to develop cost-effective and efficient promotion strategies.

Limitations and Scope for Future Research

It is not practically possible to review all the past studies relating to a broad topic of research such as WOM and word-of-mouth marketing. However, researcher has made a genuine effort to include all the relevant studies in the domain of WOM in MPI. Those studies which were found to be suitable and those studies which have been widely cited by the previous researchers in this domain were thoroughly reviewed by the researcher. This study being a conceptual one, an empirical establishment of the proposed propositions can be carried out in future. Also this study is source centric i.e., WOMR based on source characteristics. In future studies can be conducted from recipient perspective too

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LEAN THINKING – A NEW TRANSFORMATION SUCCESS FACTOR APPROACH BUILDING INNOVATIVE BUSINESS

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ABSTRACT

The objective of this paper to undertake how lean thinking implementation practices / initiatives could lead to sustainable business growth. As every firm keep improvising process excellence which continue across all departments where lean thinking and innovation bump with each other. Nowadays consumers across all portfolio expecting product producers to launch new products with high quality, low cost with shorter development time. A key to achieve this challenge resolved by deploying lean thinking methodological practices during product development process. Most companies have rearranging their process architecture designs according to changing market wherever they are surviving. The findings from this study provides theoretical implications by intersecting business sustainability and lean approaches and also provides a comprehensive framework for every business by supporting them with suitable business model innovation. The objective of this research was to undertake a systematic literature review of how the implementation of lean and green initiatives could lead to sustainable business practice.

Keywords: *Innovation, Transition, Workforce, Scheduling, Suppliers, Success Factors.*

1. Introduction

Lean thinking is a new buzz keyword across all firms and this transformational framework allows business organizations to examine and identify and think newer ways which helps firms to organize and deliver qualitative benefits to society and also adding value generation to individuals by eliminating unnecessary components and waste. This concept coined by James P. Womack and Daniel T. Jones in their in-depth study undertaken in Toyota Production System.

Every new business which established recently / their for more than decades making radical changes by incorporating new business models that go beyond firms economic intention by creating social and environmental value (Schaltegger et al. 2016; Ludeke-Freund and Dembek 2017). Transformation towards sustainable growth and radical change is a big challenge for all companies (Evan et al. 2017). Innovative business models which currently linking to existing business process provides a overall view of entire business which offers alternative approaches for radical innovations that improve affect all the functional areas of the organization (Osterwalder et al. 2005; Teece 2010).

Most of the firms looking upon of the grassroot success factors of Toyota but not fully adopting and following lean practices. Toyota success on lean application depend on high performance with all its production systems which established across multiple international sites (Wafa & Yasin, 1998). But success of lean depend on how current roadmaps and frameworks to be established by applying fullest lean thinking philosophy among every one with a view of fullest involvement across sectors. The are some complications / complexities may arise which are driven and resolved across all levels such as executives, cultural, implementation and technical barriers (Flinchbaugh, 1998).

Lean thinking is a not a new concept, a traditional customer-centric cost reduction program mainly focused on continuous incremental improvement and respect for people approach. This method allows positive way of thinking on a much constructive way to build organization towards success path.

Every business firm today want to be much innovative and creative and they want to create unique / differentiated products from their rivals. This innovative culture make firms to acquire graduating professionals with more competencies to resolve day – to – day complex problems creating value based approach in decision making process to address and resolve problems with more entrepreneurial mindset.

The major reasons for the success of lean thinking across vertical domains is because of digitalization. Over the past decades principles

of lean only adopted and implemented only in manufacturing organizations. Now every firm keep on improvising their product line and extending their product features towards global entity. Lean thinking improves every business entity in their operational performance to sustain in the market wherever they are operating with better customer satisfaction as their key mantra. [Herzog NV, Tonchia S]

Lean services during the current days keep extending their application limits not only to specific work profile / domain their extensive growth allow HR, Accounting, Retail, Health, Education, Product Development, Startup / Entrepreneurship work areas with better scope of action

1.1 Organization change and Lean Thinking

Many continuous improvement methodologies unfortunately fail to sustain over decades. When concepts of lean introduced and adopted across organizations acceptability ratio is poor during initial stages of implementation it requires widespread organization change. The various reasons most of the organizations fail to sustain necessary lean practices. Lean principles and thinking is overall organizational development. Organization change management practices need not be planned and discrete it can emerge continuously.

Lean thinking allows firms to re-think and re-design existing organizational cultures by eliminating unnecessary elements exists in structure, previous success, management tenure to overcome and to achieve emergent change across all organizational / management levels (Burnes, 2005; Sashkin & Burke, 1987; Tsoukas & Chia, 2002; K.E. Weick & Quinn, 1999)

2. Purpose of the Work

The basic purpose of undertaken this study was to explore and identify success factor of innovative firms by adopting lean thinking. This lean thinking exercise ensure greater potential to improve productivity and commercial success of selected firms after initiating lean thinking approaches and concepts. The scope of the work is definitely unlimited, this work definitely allows future researchers to extend the research contributions over the next decades.

3. Originality/Value

There is a lack of research on lean thinking how this concept materializes and tend to be a key success factor of any business organization. Every business organization look for success factors which need to be attained through some means. Every organization looking for change management methodology to develop innovative business models for sustainability. Success factor is key to making the changes which attained through continuous lean practices which drives tremendous growth prospects for an organization. The paper begins to fill this gap.

4. Literature Review

The most efficient way for searching the literature is from electronic databases. Multiple and alternative search databases are available. It is important to search appropriate and relevancy in searching and choosing database which serve the base of objective and topic of the paper (Green, Johnson and Adams, 2006). The database searched for this topic includes Inderscience, World Scientic, IOS Press, EBSCO Host Academic Search Primer, American Society for Engineering Management and book publications. The keywords used for filtering process include ‘lean thinking implementation’, ‘success factors for transition towards lean’, ‘building lean framework’, ‘roadmap to lean transition’. More than 150 publications contains relevant facts related to lean thinking and implementation.

According to Liker and Morgan (2006) lean principles not only depend on set of tools defined but it is people management effort to integrate the organization process to create a sustainable environment within the organization. There are numerous lean tool implementation frameworks available but few lean thinking implementation [Pettersen, 2009] and indeed very few researchers discussed how people participation and supporting role in implementing lean thinking make growth prospects for every organization. This there is lot of questions and elements how features and characteristics of lean thinking to be

implemented successfully and in what sequence quality improvement programs plays vital role across organization.

As discussed in the previous paragraph very few frameworks available for lean thinking implementation and that also contain low level comprehensiveness to the people. [Anand and Kodali 2010). There may be many more discussions in the lean forum still lean thinking framework does not provide complete list of lean tools and even that tools itself still not suitable and handled in lean environment.

According to Achanga et al. (2006) empirically investigate some of the main key factors which are beneficial and fundamental and also even critical for implementing lean which includes finance, skills and expertise, leadership and management and culture. They analyzed strong leadership ethos and commitment may be crucial success factor and also the cornerstone in implementing any idea during product development may be new / existing within an organization.

5. Lean Thinking Process Model

5.1 Methodology

Quantitative approach is basically adopted for this research paper. A well define structured questionnaire constructed and validated empirically for this study. The survey instrument questionnaire consists of different sections all related to lean thinking approaches and implementation procedures. All the items within the questionnaire based on 5-point likert scale. Questionnaire is distributed among authors friends who are research scholars and academics through e-mail to revising and modifications. The questionnaire is focused on leading manufacturing sectors of different products in India. The sectors selected based on experience in lean concepts, philosophy and implementation success factors. Stratified random sampling technique was adopted to select the respondents within the list of sectors which shown below in the table 1.0 and finally 202 sample size finally determined by the results derived from pilot study which happened through online survey.

Table 1: Measured Manufacturing Sectors

Sectors	No. of respondents
1. Manufacturer of leather product	127
2. Manufacturer of automobile product	97
3. Manufacturer of plastic product	54
4. Manufacturer of Electrical Machinery	29
5. Manufacturer of Food product and Beverages	36
Total	343

5.2 Lean Thinking Dimensions for Success Factors

From the various collection of literature data collection, the study identified eight main dimensions which considered across selected sectors listed above and treated as major success factors in deploying lean thinking methodologies / philosophies. The intention of the firms to implement successful lean concepts by identifying what is not favourable / not favourable for the firm by employing the following questions to the respondents.

- Which factors considered as critical / success factor for lean implementation?
- What initiatives / promotional efforts does the firm do to adopt lean philosophy?
- How much percentage of leanness ratio the firm found critical to them?
- What is not working well with the existing methodologies followed?

The proposed lean dimensions consists of different variety of tools and techniques. These dimensions are given below in the table 2. The dimensions considered to be reliable instruments and it is valid and acceptable through proper refinement by eminent academicians and industrialists across many countries. This study proposed seven different dimensions which is considered as a comprehensive lean philosophy approach across sectors.

Table 2: Lean Thinking Dimensions

Dimension	Definition	# of Items
Set-up time reduction [LT1]	Useful tool to eliminate waste and also production efficiency. Allow firm to tailor made products as per changing demands on-time individually.	6
Waste Elimination [LT2]	Make use of TIMWOODS considered to waste management components and tools	5
Workforce Management [LT3]	New lean-thinking concept allow people with much flexibility and also promote multi-skill capability to increase production volume and capacity	4
Kaizen and Kanban [LT4]	Both tools improvise production tasks and inventory levels through proper control mechanisms	3
Customer Relationship[LT5]	Dealing direct relationship with customers by providing satisfiable / customizable / predictable services and also real-time deliveries, providing unique / differentiable solutions to customers compared to rivals	4
Equipment and service process [LT6]	Maintain quality standards with an effort to reduce development time by improvising the continuous flow production to cellular manufacturing and breakdown maintenance	4
Planning and service scheduling [LT7]	Proper planning of production based on requirements of quantity in lot sizes allows the firms deliver on-time with quality and service	3
Contact with suppliers [LT8]	Relationship with multiple suppliers allows firms to manage reliable deliveries and on-time shipment to customers also make firms to predict demand as well as competitiveness to deal with customers	4

The above-mentioned key dimensions of lean thinking principles are continuously evaluated through expert committee members of the organizations through their tacit knowledge and then prioritize and access average value based on relative importance.

6. Results and Discussions

Results of this paper are analysed and interpreted through SPSS 18.0 and the data collection period for this study undertaken during post pandemic Covid'19 between January 2021 to Mid-May 2021 where 50% of participants is on-duty working on rotational basis / rest 50% participants contacted through virtual mode. Data collected electronically which makes author to take much time in data collection. The results are analysed using Exploratory Factor Analysis [EFA], reliability analysis etc.

6.1 Reliability Analysis

This is an important step considered most important during data collection phase [Shah et.al]. All the above-mentioned lean dimension data items considered for reliability using Cronbach alpha calculation through SPSS 18. According to [J.F. Hair et.al] threshold value of reliability latent construct should be greater than 0.7 and it is recommended.

Table 3: Reliability Analysis for Latent Construct

Construct	No. of Items	Cronbach Alpha	Result
Lean Thinking [LT]	33	0.876	Acceptable

From the above table 3 it is concluded that the model in the present paper is reliable since the results derived from Cronbach's alpha value [0.876] is greater than the threshold value 0.7. This shows a right signal for the author to move successfully for the next phase.

6.2 Exploratory Factor Analysis

According to Zainudin to run Exploratory Factor Analysis minimum [EFA] sample size required is 100. But the sample size derived for this study after completing pilot study is 202 which fulfils the minimum sample size. The adequacy of EFA is also estimated from this study through Kaiser-Meyer-Olkin measure where the value is below 0.5 and it should

dropped from factor analysis and Bartletts test of Sphericity check for p-value < 0.05 to correlate between variables and large enough for factor analysis. Both the estimations for lean thinking with several iterations for each case are shown below in the table 4.

Table 4: KMO and Barlett's Test for Lean Thinking

Kaiser-Mayer-Olkin Measure for Sampling Adequacy		0.814
Bartlett's Test of Sphericity	Approx. Chi-Square	1134.632
	df	96
	Sig.	.000

The above table shows KMO value for Lean Thinking practices = 0.814 which is higher than the minimum level which shows the value falls in the acceptable region. Further, Bartlett's test was significant since p-value < 0.05.

6.3 Principal Component Analysis [PCA]

The study makes use of orthogonal rotation. Varimax rotation method used in this paper to minimize variables which high loadings on each factor by making much smaller values on each loading on variables [Yong and Pearce]. PCA is calculated using SPSS for lean thinking [LT] which indicates six factors have eigen values more than 1 and it can be extracted. The final extracted PCA with 18 items, and the rest of the items are discarded because of low communalities, low factor loading and cross loading issues. The PCA for LT is summarized in the following table.

Table 5: Rotated Component Matrix for Lean Thinking Dimensions

	Component					
	1	2	3	4	5	6
LT2	.813 .784 .651 .587					
LT1		.854 .778 .729 .674				
LT8			.785 .724			
LT6				.762 .744 .684		
LT7					.745 .732 .685	
LT5						.654 .623
Cronbach Alpha	.812	.832	.713	.724	.745	.634
Cumulative TVE%	23.172	34.145	39.184	45.728	63.845	62.143

From the above table factor loadings for rotated components of lean thinking dimensions ranges between 0.587 and 0.854 which is considered to be an acceptable loading considering the threshold is 0.55 [J.F. Hair et.al]. In addition, estimation values of Cronbach alpha after conducting principal component analysis are still acceptable.

7. Conclusion and Future Research

Most of the selected firms in the study has only focused to satisfy product through mass production. Lean thinking which is originated from Japanese concept over a time period making firms to achieve continuous improvements in the operations. The success factors of lean thinking is very much limited to

respective firm core areas by the way of involvement in deploying lean principles continuously. It is must for every firm to build 'house of lean' with strong foundation by training entire workforce by standardized practices on their own interest not by forcing the methodologies which is must essential for every lean base firms. Clear communication among employees by knowing priorities of work flow is important by not blaming mistakes or defects on others. Organizational policies differ between firms especially on norms and habits of individuals which influence core work areas on knowledge sharing. This study focused only on five to six lean thinking dimensions which along not sufficient but role and improvising lean thinking methodologies requires more scope for future research still available for future researchers with different firms and product and services.

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VIDEO BASED ABNORMAL DRIVING BEHAVIOUR DETECTION VIA DEEP LEARNING FUSIONS

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ABSTRACT

During this period identification of unusual driving is more significant. It offers wellbeing to travellers and drivers in vehicles. In our proposed technique profound learning strategies utilized for strange driving conduct expectation. Profound learning characterization strategies are more appropriate in different fields. The applications are PC vision, discourse discovering, language preparing, sound distinguishing proof, clinical picture investigation, bioinformatics, and self-driving vehicles. In the improved-on technique. The proposed NN separates significant level highlights like a secret article in a picture awe present an improved YOLOv3- convolutional neural network to catch the facial areas under complex driving conditions, disposing of the mistake and warm gestures brought about by counterfeit component extraction. Second, we build a mathematical territory called Face Feature Triangle (FFT) in view of the utilization of the Dlib tool compartment just as the directions of the facial districts; at that point we make a Face Feature Vector (FFV), which contains all the data of the region and centroid of each FFT. We use FFV as a marker to decide if the driver is in weariness state. and needn't bother with hand-planned highlights. For this reason, we utilize one dataset that contains 22,424 shading outlines (pictures). In the current framework that utilizes novel profound learning combination techniques to recognize unusual driving conduct and the exactness of that is 82%. Our proposed technique uncovered an exactness of 97.44%. So new technique is superior to the current strategy.

Keywords: *Driver, Drowsy, Yolo, Sluggish, Electroencephalogram,Eye Flickering, Dliblibrary, Haar.*

1. Introduction

Driver's intellectual interruption is a significant reason for dangerous driving, which prompts serious fender benders consistently [1]. Activities that underlie thoughtless driving incorporate associating with travellers, utilizing a cell phone (e.g., for text informing, game playing, and web perusing), and devouring food or beverages [2]. Such practices contribute altogether to delays in driver's reaction to surprising occasions, consequently expanding the danger of impacts. Distinguishing driver practices is in this manner getting progressively significant for vehicle makers, who mean to work in-vehicle insight that can improve wellbeing by informing drivers continuously of potential dangers [3]. Further, albeit full vehicle mechanization is still a very long time ahead, inducing driver practices is fundamental for vehicles with fractional ("hands-off") and contingent ("eyes off") computerization, which will overwhelm the market at any rate until 2030 [4]. This is on the grounds that the driver should either be prepared to take control whenever or mediate in circumstances where the vehicle can't finish certain basic capacities [5]. Present day driver conduct arrangement frameworks as a rule depend on recordings gained from in-vehicle cameras, which record the developments and outward appearances of the driver [6]. The recordings caught are regularly divided into arrangements of picture outlines, which are then pre-handled for include determination [7]. Such highlights are taken care of to pre-prepared classifiers to play out the recognizable proof of various activities that the driver performs. Along these lines, the classifier may trigger an alert framework in manual driving vehicles or give contribution to a During this interaction, the exactness of the classifier is critical to the exhibition of the framework. What's more, the framework ought to perform such grouping progressively, in order to assist the driver with relieving risky conditions in a convenient way. Accomplishing high precision while keeping up runtime proficiency is anyway difficult. Striking proper compromises between these points is hence imperative for astute and independent vehicles. Supported by ongoing advances in equal registering, profound neural organizations [8] have accomplished surprising outcomes in different regions, including PC vision [9], control [10], and self-governing driving [11], [12], as they can consequently extricate highlights from crude information without

requiring costly hand-created include designing. Designs handling units (GPUs) permit to prepare profound neural organizations quickly and with extraordinary exactness, and perform derivations quick. Besides, System on Chip (SoC) plans enhanced for versatile man-made brainpower (AI) applications are turning out to be all the more impressive and computationally effective [13] and inserting profound learning in-vehicle frameworks progressively reasonable [14]. Subsequently, the likely exists to fabricate high exactness driver conduct order frameworks without bargaining runtime execution. In any case, late works that embrace profound figuring out how to tackle the driver action acknowledgment issue, experience the ill effects of at any rate one of the accompanying constraints: (I) they don't evaluate the deduction seasons of the arrangement proposed, which is basic to genuine vehicle frameworks, or show runtimes that are not moderate by and by; (ii) regularly battle to order singular activities with high precision; and (iii) depend on a solitary detecting methodology (video feed) for recognition, which can turn into a solitary mark of disappointment, subsequently testing the viable viability of the classifier. To handle these issues, in this paper we plan a driver conduct acknowledgment framework that exceptionally consolidates diverse convolutional-type neural models, through which we precisely play out this assignment continuously, depending on numerous data sources. Accordingly, we make the accompanying key commitments:

- We build up a phony environment to mirror self-driving vehicle conditions and instrument an ordered customer concentrate for data combination purposes. Specifically, we pass on side and forward-looking cameras to record the body advancements and outward appearances of 50-part drivers, as they play out an extent of tasks. This prompts an immense driver direct video dataset recorded from two focuses (front and side), which we use for model planning and evaluation. To the most amazing viewpoint data, this contains the fundamental twofold view dataset for driver direct gathering.
- We artist special Interwoven Convolutional Neural Networks (InterCNNs) to perform feature extraction and mixes across various levels, considering multistream video inputs and optical transfer information. Our epic arrangement licenses to isolate in equivalent and mix continuously hypothetical features, similarly as interfacing particular lightweight CNN plans, engaging to sort out which building squares can improve the computation capability of in-vehicle structures.
- We exhibit that our InterCNNs with MobileNet blocks and a worldly democratic plan, which improves precision by utilizing recorded inductions, can group practices with 97% exactness. Our engineering can make deductions inside , which fulfills the circumstance imperatives presented by genuine frameworks. Significantly, our design is exceptionally vigorous to lossy contribution, as it stays precise when two surges of the info are blocked.

2. Related Work

The strategies to identify languid driving incorporates vehicle-based, conduct based, and physiological-based procedures. In vehicle-based identification, a few measurements, for example, directing wheel development, quickening agent or brake design, vehicle speed, deviations from path position, and so on are checked consistently. Location of any unusual change in the estimations of the measurements is considered as driver laziness. In the conduct based strategy, the visual conduct of the driver, for example, eye flickering, eye shutting, and so forth is broke down to distinguish tiredness. Both vehicle-based and conduct based are non-meddling estimations as the previous doesn't need any sensors connected to the drivers and the last requires just a straightforward camera to recognize the highlights. In the physiological-based strategy, the physiological signs like ECG, EOG, EEG, heartbeat, beat rate, and so forth are checked and from these measurements, languor or weakness level is identified. The physiological based recognition is meddlesome estimation as the sensors are

appended to the driver which will occupy the driver [15]

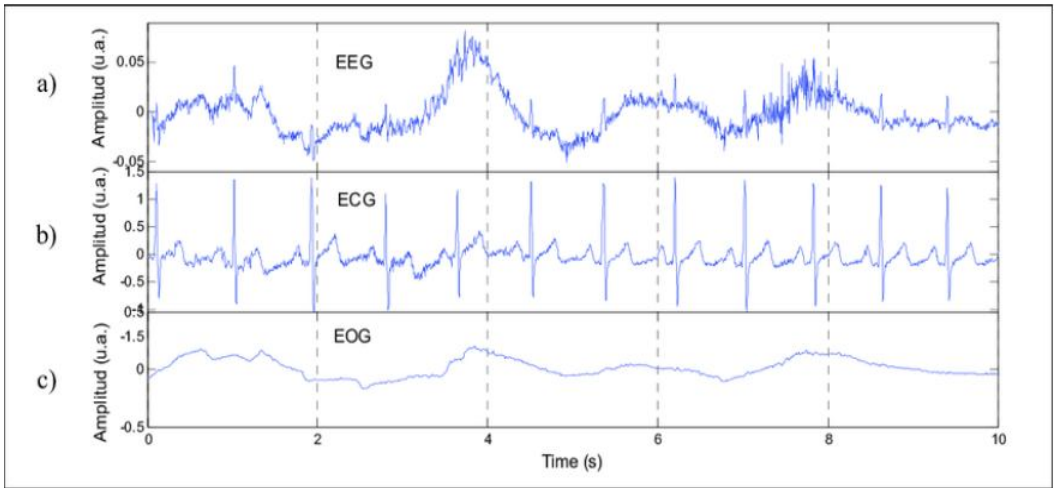

Figure 1

In picture preparing based strategies, driver's face pictures are utilized for handling with the goal that one can discover the states. Utilizing similar pictures, the tiredness of the driver can be found since, in such a case that the driver is dozing or snoozing then the eyes are shut in the picture. In the format coordinating procedure, on the off chance that the driver shuts the eye for some specific time, the framework will create the alert as the framework has both close and open eyes layout of the driver. In the eye squinting based method, eye flickering rate and eye conclusion term are estimated to identify driver's languor. At the point when the driver felt languid the eye squinting and look between eyelids are not quite the same as would be expected circumstances so sluggishness can be handily recognized. The situation of irises and eye states are observed through an ideal opportunity to appraise eye squinting recurrence and eye conclusion length [16].

The Electroencephalogram (EEG) sensor framework screens the human intellectual state and gives biofeedback to the driver while the driver is languid. The vacillations in drivers' presentation are distinguished concerning mind action and balance the EEG accounts [17]. In the fake neural organization (ANN) based method, neurons are utilized to recognize driver's tiredness. Individuals in weakness display certain visual practices that are effectively perceptible from changes in facial highlights like the eyes, head, and face. Visual practices that commonly mirror an individual's degree of weariness incorporate eyelid development, look, head development, and outward appearance [18].

3. Implementation

To develop a continuous languor order model, the driver's visual conduct must be checked. Dissimilar to conventional picture handling techniques for registering, eye squints, including a blend of eye limitation, thresholding to discover the whites of the eyes, and deciding whether the white district of the eyes vanishes for a period (demonstrating a flicker), Proposed NN is utilized to decide educational and conclusion. The eye location is performed with facial milestones The objective is to recognize significant facial constructions on the face utilizing shape forecast strategies. The dlib library is utilized for facial milestone identification, which utilizes Haar Cascade in the strategy. The library gives milestones to the whole face. The milestones are versatile to perceive the state of particular human countenances. You only look once (YOLO) is a cutting edge, ongoing object recognition framework. The YOLO (You Only Look Once) then again, manages object location in an alternate way. It takes the whole picture in a solitary occurrence and predicts the bounding box organizes and class probabilities for these containers. The greatest benefit of utilizing YOLO is its sublime speed –it's amazingly quick and can deal with 45 edges each second. YOLO additionally comprehends summed up object portrayal. The risk of sluggish driving is just mediocre compared to alcoholic driving; Thus, this calculation advances as indicated by

the YOLO v3. Through joining a consideration gadget, the organization can focus on the eyes of the individual suitably, and improve the organization arrangement to propel the testing speed. By means of estimating the pace of shut eyes, and the recognition of shut eyes different occasions in a unit time, the three standards used to find whether the driver has a languid driving condition.

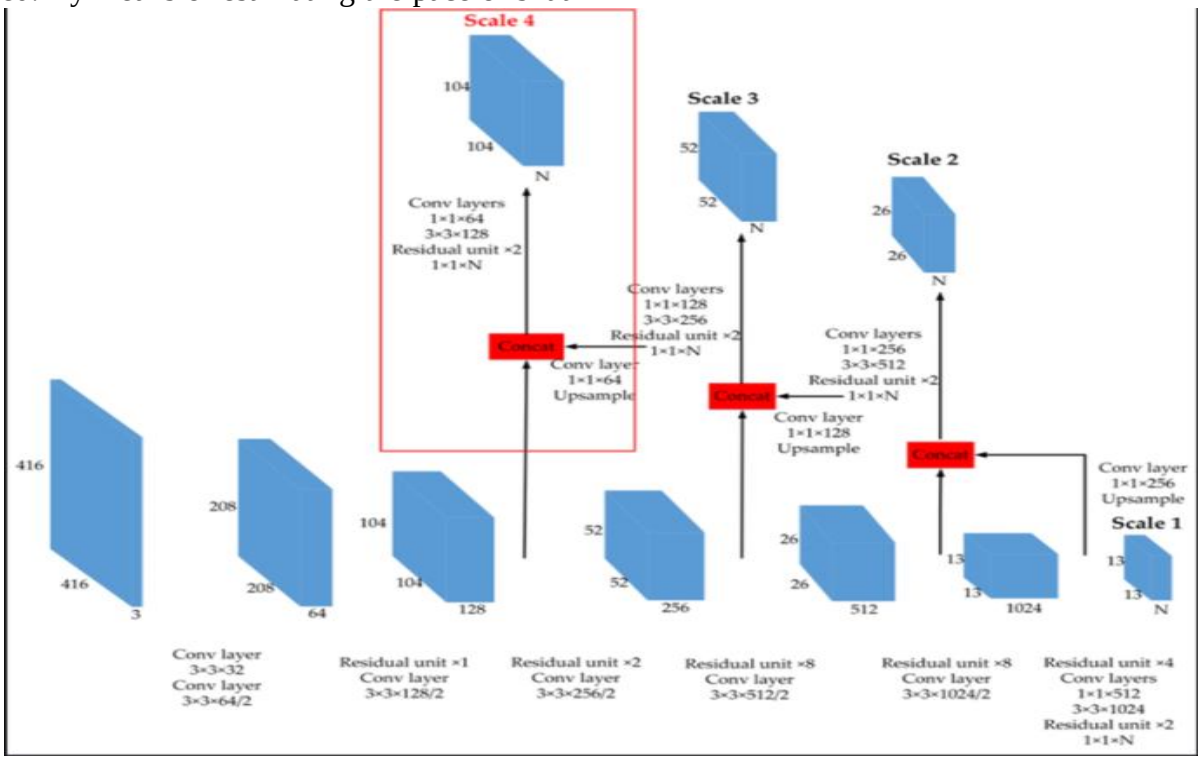

Figure 2

To examine the exhibition of eye closeness location in these conditions, we gathered a dataset for eye closeness identification in the Wild. Eye patches are gathered dependent on the coarse face area and eye position naturally and separately assessed by the face indicator and eye limitation. We initially resize the edited coarse countenances to the size 100×100 (pixels) and afterward extricate eye patches of 24×24 focused at the confined eye position

The model utilized is worked with Keras utilizing NN. The cross breed profound learning model endeavors three particular profound models comprising of two profound NNs specifically spatial convolutional neural organization and fleeting convolutional neural organization, and one profound combination network worked with a profound conviction organization (DBN). The profound learning models use various layers to extricate more significant level highlights from crude info. A profound CNN is involved at least one convolutional layers and pooling layers [1]. The NN is a unique sort of profound neural organization which performs incredibly well for picture arrangement purposes Image procurement fundamentally includes getting the picture of the vehicle driver. The video of the driver is caught utilizing a webcam. A video section with length 16 cm can create 15 casings as information, guaranteeing that the info edges of both spatial NN and transient NN are equivalent in a video portion. By using the highlights of OpenCV outlines are separated from the video. The RGB picture caught is changed over to grayscale picture. From the grayscale picture caught utilizing haar course highlights of OpenCV the face is distinguished. Dlib milestone indicator is used to give the facial tourist spots. After the utilization of facial milestone, highlight extraction is performed. Here the contribution for highlight extraction is the eyes. To extricate the critical highlights of NN for include extraction we adjusted a dataset CEW which incorporates both opened and shut eyes. NN calculation is utilized to prepare the dataset and a model is readied. Every component in the dataset is permitted to go through the numerous layers of the CNN. The fleeting convolutional neural

organization measures optical stream pictures which are the dislodging change of relating positions between sequential casings in a video arrangement. Both the worldly NN and spatial NN comprises of convolutional layers, pooling layers and completely associated layers. Subsequent to preparing with both spatial and transient NNs, the yields are linked and are taken care of as the contribution to the combination network worked with a profound conviction organization. The DBN is made out of multi layered neural organization structure having an obvious layer and a secret layer. The DBN catches the nonlinear connections among spatial and transient organizations. The current dataset is retrained when another picture comes utilizing tensor stream and the condition of the eye is anticipated. Various casings are noticed and a limit esteem is set for the eye shutting. When the limit esteem is arrived at the alert emerges showing that the driver is tired.

4. Results

The peril of drowsy driving is simply mediocre compared to alcoholic driving; Thus, this calculation improves as per the YOLO v3. Through joining an attention gadget and a webcam, the network can focus on the eyes of the individual, and if the individual shut eyes more than 15 time per minute, and the score reaches beyond 15 the attention gadget indicates the red alert which means the driver is in drowsiness state suitably, and improve the arrangement to propel the testing speed. Through estimating the pace of shut eyes, and the recognition of shut eyes different occasions in a unit time.

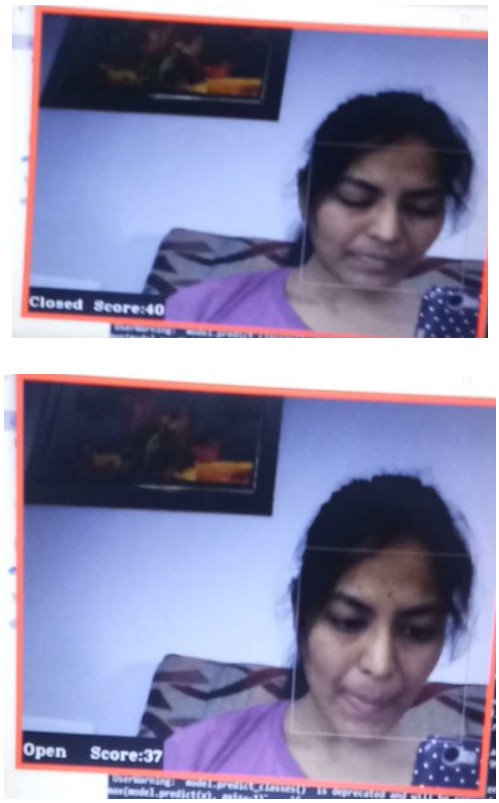

Figure 3

5. Conclusion

The improvement of advancements for distinguishing or forestalling sluggishness in the driver's seat is a significant test in the field of mishap evasion frameworks. Due to the peril that laziness presents out and about, techniques should be produced for checking the impacts. By checking the eyes, the side effects of driver weakness can be distinguished early enough to dodge a mishap. Location of tiredness includes an arrangement of pictures of a face, and the perception of eye developments and squint examples. The proposed half breed profound learning technique utilizes a convolutional neural organization and profound conviction network to identify languor. The pre-prepared transient and spatial neural organizations are taken care of into profound conviction networks which catch the relationship among the organizations. Sleepiness is identified dependent on the limit esteem set.

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A COMPARATIVE STUDY OF ARTIFICIAL INTELLIGENCE ON ECONOMIC CRISIS FOR HR MANAGERS DURING COVID-19

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ABSTRACT

This article provides an overview of dynamic ways by which Artificial intelligence (AI) has either been suggested or used as a tool to combat the economic crisis during Covid-19 pandemic. Almost each and every organization is suffering from economic downfall in terms of the Human Resource Management (HRM) that is directly related to the overall productivity of the business. Here, the study targets to focus on the economic crisis of organizations and how it is correlated with the HR managers. Major purpose of this article is to find the efficacy and efficiency of artificial intelligence as the determinant of economic loss or profitability during Covid-19 pandemic. The discussion and findings of this study has explored the evolving use of AI within the organizational structure. It is intended to induce awareness among those HR managers impacted by AI-application in this current Covid-19 pandemic situation. The key objective of this paper targets to inform those organizational policy makers, and depict the multidimensional ways how technologies can be deployed during this time of crisis. Along with the application of artificial intelligence and its implications in the organization, the study denotes the fair, transparent, just and accountable use of AI-based technologies in future.

Keywords: *Artificial intelligence, Benefits, challenges. Economical growth, future scope*

Introduction

The technological use within the organizational structure is transforming into new ways in every second say where the organizational world is striving to find the best potential benefit through new innovation. Artificial intelligence is considered as the blessing of the technology which is spreading through the industrial world. Covid-19 has turned the entire industrial world into a new form. Due to the entire closure and lockdown the businesses are confronting tremendous loss, and to mitigate the problem the industries are seeking the efficiency of AI in business procedure. Here, in this article the function of AI in HR is illustrated with its benefits and c challenges. The discussion depicts the use of pre pandemic use of AI and the estimation of the upcoming days.

Artificial intelligence in HRM

Artificial Intelligence (AI) depicts machine performance that is compared with the human-like cognitive skills such as understanding, learning, interacting, and reasoning. It can put on diverse forms including specific technical infrastructure that is the part of the production process or may be the end-user. Many scholars emphasize that artificial intelligence consists of significant economic impact [2]. From the recruitment to building chat bots, the organizational activities are maintained by the human professionals in conventional ways where the inclusion of artificial intelligence has been emphasizing new effort.

Artificial intelligence and Human resource management stand side by side in this contemporary business world. While multiple organizations have already begun to apply the technological inclusion integrating AI into the recruiting effort, on the other side many are striving to generate this new innovation into their organizational structure. It has become clear that the role of artificial intelligence will definitely continue to give proper shape to the organizational structure positioning the human

resource management in the upcoming days. The common concerns of the HR professional are to modify it to be safer and simpler to use.

Evolving uses of AI for HR managers during Covid-19 pandemic

As the globe grapples with Covid-19 pandemic, each ounce of technology genuinely harnesses to fit into the new changing environment. The evolving use of AI can be found in every sector such as retail, banking, finance, energy and many more sectors. Total lockdown and closure has affected the organizational procedure badly as each industry is concerned due to the social distancing. Almost two third of the total executives inquired by ***McKinsey*** in June have said that the company has accelerated robotic implementation, and another emerging new technologies in giving response to the Covid-19 pandemic [1]. It has been seen that the retail industry has gained a notable profit through the AI implementation during the Covid-19 pandemic. The profit of ***McKinsey*** is the greatest example of such technological implementation.

Despite the tremendous challenges in the pandemic period, the mitigation measures by ***McKinsey*** have found value by this new innovative approach. Most of the respondents expressed that their institution has increased the investment in artificial intelligence major business in response to covid, while less than 35% of other executives expresses the same thing, According to the industries; the respondents are also assembled in the healthcare sector by the use of AI to increase the value most likely [4]. Most of the high profile industries have increased their investment for the artificial intelligence application. It has been seen that 24% of the total respondents have increased the amount of investment during the pandemic period to maintain their production consistency.

Another company is ***RXR*** that has increased their investment to establish the digital lab. ***RXR*** currently has about 100 data scientists, engineers, and designers who are working with digital initiatives [3]. This investment may induce more capabilities to the business-through apps it enables scheduling, dog walking, and deliveries. The inclusion of artificial intelligence has become influential to take the sudden hit of Covid-19 pandemic in order to maintain the social distancing and the business cohesively. Currently, the use of Ai has reached a recognizable place and observing the increasing pattern it can be assumed easily that in the upcoming days the industrial pace is going to take a new turn depending on this current situation.

Proposed method

Major database in this study has been collected from multiple ***secondary*** sources including literature reviews, journals, and documents which were published previously by the peer researchers. Several databases (journal, literature) were collected from 'Google Scholar' that is given in the reference list. During this Covid-19 pandemic situation, it was not possible to collect any type of primary data, so the study is devoid of first-hand data. The secondary databases were important to express the best use within organization functions, especially in the HRM department. Collected secondary data were helpful to draw the comparative study about AI-based technology inclusion to mitigate the economical crisis in HRM. Best information regarding those comparisons also included conferences organized on technology and pandemic situations.

Discussion

Evaluation of benefits and challenges faced by HR managers

Benefits and challenges are the things the challenges of the AI application are not so less within the organizational framework. Approximately 31% of the employees from a manufacturing industry have given their accommodation that they would prefer to interact with a human being in the workplace than to interact with a machine [8]. The challenges and benefits of the AI application within the organizational framework are illustrated below-

Table 1: Key benefits and challenges of AI implementation in HR

Benefits	Challenges
1. Generating high-volume tasks	1. Lack of human experience
2. Chabot for communication	2. Concern about reliability
3.Improving hiring quality	3. Biased to build way for itself

(Source: Self-developed)

Globally over 36% of the hiring authority has suggested the AI application in HR to manage the economic growth within the organization. On the other hand, in a contrasting manner, 77% of candidates who are seeking a job have been given their preferences choosing the human interaction in the first position over the artificial intelligence appliances in the recruitment [9]. Measuring the challenges and benefits of the AI application, the future scope of these technological appliances has been estimated. It explores that it is increasing day by day where major economies of the world and also the developing economies are also finding ways to apply this new technologies into their organizational framework.

AI application within organizational structure (HRM)

Artificial intelligence can be applied within the organizational structure in multiple ways that are discussed in table 2.

Table 2: AI application in HRM

AI application in HR	Context of economic impact
1. On boarding and recruitment	Recruitment is one of the most essential procedures within the organization which need a concise view to manage the consistency in the productivity.
2. Employee retention	To boost employee retention the use of artificial intelligence is very important as the employees are the most essential asset of the business that needs to be managed properly. Here, AI finds a substitute effort to increase productivity.
3.Automation	Leveraging AI in various HRM as similar to the other disciplines within the organizational structure. Automation suitable value through the AI inducement, organizations can easily reach the economic goal.
4. Inducing stability in HRM and internal mobility	Additionally, the personalized feedback through surveys or recognition system HRM can gauge the internal mobility and stability. These are important and incredibly beneficial cohesively.

(Source: Self-developed)

Economic potential of AI-based technologies in developed economies before pandemic

The potential economic implication of AI technology is compared with the before pandemic situation, the use of AI in those developed economies is necessary. Multiple researches have been conducted through consultation companies including 12 major developed economies in the world [5]. These companies together generate approximately 0.6% of the total economic output of the world, forecasting by the year 2035.

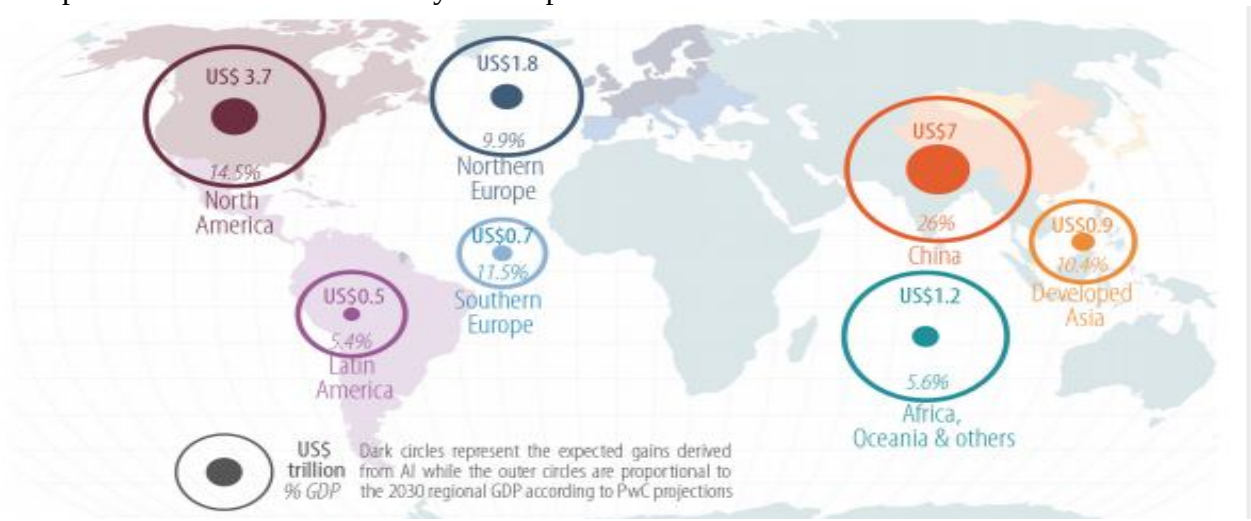

Figure 1: Potential impact of AI application on the economy in major economies of the world

(Source: Inspired by [10])

AI applications can double the economic growth rate globally within their organizational structure. They predicted that in three ways AI may work to drive the economic growth- it can lead to increase the strong labor productivity up to 50% within the targeted years [10]. Secondly, artificial intelligence can establish an innovative virtual workforce. It can be seen in this current Covid pandemic situation that many industries are using AI-based technologies to put the collective effort in order to increase the overall productivity of the business [10]. It can be seen from figure 2 that almost in every sector

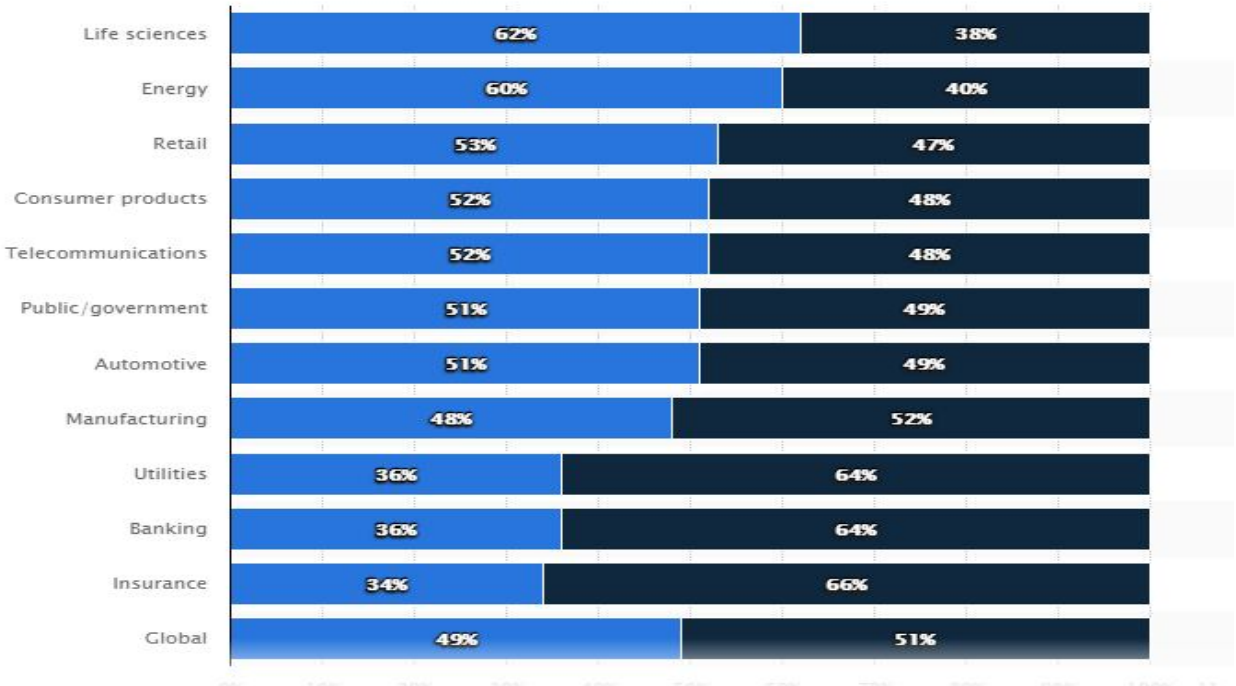

Figure 2: Global investment for AI application in different sectors

(Source: Inspired by [10])

The covid-19 has worsened the current issues impacting disenfranchised authority for years. Industrial pace is the broad place where the technological application has lacked or has paucity of technological access. Resource inequalities, quality management in HRM or disparities all these organizational activities can be managed by the proper access of artificial intelligence and machine learning. This assumption of the scholar has become clear and fruitful during this current covid-19 pandemic situation where almost every industry is discovering new ways of business procedures with the diverse approach of AI inclusion [7]. It is helping to integrate the business operations worldwide and also within the demographic wall of the country. Managing the human resources, the professionals have found the best use. For example, cleansing crews, restaurant service, delivery service or the trade workers, all are managed through the functional ways decreasing the difficulties to tackle the workforce.

In comparison with the pre-pandemic use of AI within the organizational structure, the growth rate of AI use increasing economic growth has gotten a sudden jump. Percentage of AI investment in different sectors is illustrated in figure 2. It can be seen that in the energy field it is 62% while the investment in the retail sector is 53% [10]. Other sectors such as telecommunication, automotive industry, banking and insurance are going in a linear way. Compared with the past situation, and during the pandemic it can be said that the future scope of the AI application consists of high potential. This pandemic time is portrayed as the turning point towards the future transformation in the HRM within the organizational framework.

Conclusion

Change is the only inevitable thing in the world, and the organization structure is no exception here. All the activities within the organization are changing every day in finding the best potential economic benefit to their business. Technology is the tool that cte4sate new workforce reducing the time and the cost of the business procedure. Hence, the efficacy of artificial intelligence is undoubtedly implicative. Comparing the opportunities and adverse situation created by the AI application, it can be said during the crucial periods of Covid-19 pandemic, it has shown a new way to the organization. Previously the AI use was increasing and this pandemic has acted like a fume to increase the force. Observing the current situation it can be easily predicted that the organizational world is going to be transformed totally through the AI application in linear way.

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ANALYSING THE IMPACT OF MACHINE LEARNING ON EMPLOYEE PERFORMANCE IMPROVEMENT DURING COVID-19

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ABSTRACT

The study is described that machine learning can improve employee performance and increase the brand value of the business in the marketplace during covid-19. Covid-19 has a great impact on the businesses and also on employees' performances. This study gives the proper introduction of machine learning and employee performance in the research article. Machine learning is the study of computer algorithms and the branch of AI information technology. Machine learning has many benefits in the business and it helps to improve employees' well-being. This study also gives a proper understanding of employee performance. This research article has also given the role of HRM in employee performance improvement. The study is given Maslow's Hierarchy Needs to analyse the role of HRM in employee performance improvement. HRM uses their skills and knowledge to improve employee well-being and employee performance. Through proper communication, training, reward, and motivation, the HRM increases the work performances of the company personnel.The research also gives a description of the impact of machine learning on employee performance. The business gets to profit in their work progression and increases brand value and awareness in the marketplace through using machine learning techniques in the business. The training of machine learning can help the employees to maintain the technology of the enterprise and it increases employee performance in the business. Increasing employee performance helps the business to improve its brand position in the industry to improve productivity, consistency, and insight. This research is used a secondary quantitative data collection method to collect data about this topic. The research also gives the information of machine learning importance in employee performance and discusses the benefits of it with the proper report. The study has the goal to improve the knowledge of people about machine learning and employee performance.

Keywords: *Machine Learning, Employee Performance, HRM, Employee well-being, Covid-19, Brand Value*

1. Introduction

In the situation of covid-19, the businesses faced many kinds of conflicts in their business performance. The businesses decreased their employees' performances and increased the issues in the business. In that case, machine learning can increase employee performance. The research described ***machine learning's*** impact on employee performance. The business ***HRM*** tries to improve employee performances and during ***covid-19*** the business ***HRM*** wants to improve the brand image and profitability properly. In that case, the proper learning skills of machines can improve brand productivity and also help in ***employee's well-being***. Appropriate learning of machines can improve employee performance in the business. ***Machine learning*** is the method and study of computer algorithms that can analyse the data that automates analytical model building. ***Employee performance*** is the most important in the businesses that can improve brand awareness and increase the turnover of the corporation. ***Machine learning*** can increase the experiences of employees and increase employee performance.

The aim of the research is to increase the knowledge of people about machine learning and employee performance. The main objective of this research is to find the relationship between employee performance and machine learning. The impact of machine learning on

employee performance is another objective of this research.

2. Literature Review

2.1. Role of HRM in Increasing Employee Performance

HRM or ***human resource management*** of the business has a great role in the business to increase employee performance. ***Employee performance*** is the result of a worker's workforce and capabilities [1]. It refers to how employees of the business perform in the business and fulfil their duties on time. Employee performance can be improved by motivating employees of the company. In that case, the HRM of the company focuses on the employees' motivation, performances, and so on. HRM of the company focuses on employee comfort and provides them the comfort in their work to improve their satisfaction. Through giving proper salary, increment, bonuses, holidays, and promotion, the HRM motivates their employees. The HRM gives proper security to their employees and focuses on their safety in the company. It can increase the interest of employees in the company and focus on employees' well-being [2]. Employees' well-being is related to employee performance. In that case, proper satisfaction of employees can increase the performance of employees in an enterprise.

As per the theory of Maslow's Hierarchy needs, the business HRM gives the proper environment and atmosphere to their employees to improve the interest of employees in the workplace. HRM of the company also communicates with their employees as friends to recognise their issues and prevent the issues of employees [3]. In addition, the HRM of the business organisation provides honest employee feedback for improving work performance. HRM of the enterprise also trains their employees to improve their work performances. HRM of the company, through using their leadership skills, can increase employee performances of the business organisation. Through monitoring their employee's work capabilities and giving advice, the HRM can manage employee performances. The HRM of the company, through improving company culture, can improve employee work performance. The HRM of the company can increase their learning skills and provide them a proper knowledge of the company's work [4]. The educational increment can improve the performance of employees of the business enterprise.

Figure 1: Factors Influence Employee Performance

(Sources: Inspired by 4)

2.2. Impact of Machine Learning in Employee Performance

Machine learning is a method of data analysis and it is the study of computer algorithms. It is the part of artificial intelligence and machine learning that can increase the experience of employees in the business enterprise. It is used in the internet search engine and this learning provides their employees to improve employee performance [5]. This learning helps the employees to focus on the programming of the business computers. It helps to manage the computer issues and also increases the speed of the work of the business. It helps to recognise the cyber-attacks in the business and also it can improve the knowledge of data of the computers and also the business.

Machine learning techniques help business employees to gain knowledge of company data security. Machine learning can be used in the web search of the company as well as in the finance of the business. Machine learning has a great effort in increasing employee performance. Through using this learning process, the business employees can operate the technologies of the company such as automation, artificial intelligence, big data, and so on [6]. These kinds of technology can increase brand productivity and employee performance. Employee performance of the business increases the brand value in the marketplace.

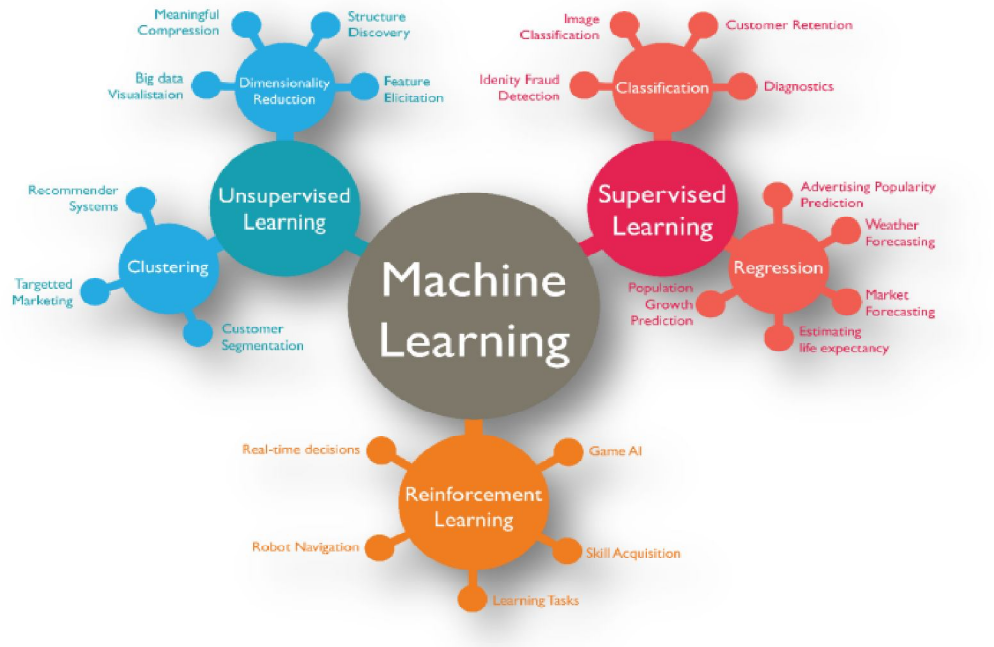

Figure 2: Machine Learning

(Source: Inspired by 6)

3. Methods and Techniques

This research work is done by using some methodologies and increases the quality of the research paper. It is quantitative research and this research is designed through descriptive research design. The research is focused on positivism and increases the quality of the research. In addition, the research of machine learning on employee performance during covid-19 needed to collect data, and data was collected from journals, books, and websites, and so on. There are two kinds of research and those are qualitative and quantitative research [7]. This research is quantitative research work and the data was collected through a secondary quantitative data collection method.

Secondary data is when the data was collected through some other website or journal. Primary data is called those data which are collected from the people of the phenomenon [8]. This research collected secondary data and used journals and reports of machine learning and employee performance during covid-19. The secondary quantitative data collection method is the easy method that can improve the

research quality and also help to analyse those data properly. The research "impact of machine learning on employee performance during covid-19" data was collected from some resource journals of other authors and also used in some books to increase the weight of the research.

4. Findings and Analysis

From this data collection method, the data is collected on machine learning, employee performance, covid-19, and also the impact of covid-19 on employee performances. This research also gives an understanding of machine learning on employee performances. As per the result of the collected data, the HRM of the company focuses on employee performances and gives training about machines to improve the performance of employees in the business. Through motivating their employees, the HRM increases the employee's interest in the company and increases employee performance [9]. Employee performance can increase the brand value in the industry and also it helps to improve the company turnover and productivity. On the other hand, machine learning helps the business to secure their data. Employees of the company can protect their computers from cyber-attacks when they have knowledge of machine learning [10]. Machine learning also helps employees of the company to manage the technologies of the enterprise.

During Covid-19, the performances of company personnel decrease and increase the issues in the businesses. In the following table, the duration and the employee performance rate are given to analyse the proper information of employee performance during covid-19.

Impact of Covid-19 on employees	Percentage of employees' response
Afraid of the spread of Covid-19	53%
Afraid to go work for risk of exposure	29%
Believe work life will be disrupted by Covid-19	45%
Stay informed/regularly read of the situation	67%

Table 1: Covid-19 Impact
(Source: 12)

As per the result of the research and the table, the impact of covid-19 decreased employee performance. In this table, the percentage of employees' responses and the issues of employees' are given. As per this information which is given in the table, 53% of employees were afraid of the spread of covid-19. On the other hand, 29% of the personnel of the company are afraid to go to work because of the risk of exposure. The table also portrays that, 45% of employees also believe that work-life can be disrupted by covid-19. Conversely, 67% of the employees of the organisation stay informed about the situation. Major employees have an impact on their performance for low confidence and fear of the virus. On the other hand, some employees want to go to the workplace for work improvement. Low confidence of employees decreased the performances of employees of an enterprise.

In the following table, the impact of machine learning on employee performances is given.

Impact of Machine learning on employee Performances	Percentage of improvement
Improve consistency and quality	58%
Improve productivity	26%
Improve insights	16%

Table 2: Impact of Machine Learning
(Source: 13)

As per the result of the table, machine learning can increase employee performance. Machine learning helps to improve the consistency and quality of the company work [11]. It helps to improve the product and service quality as well as it helps to improve the productivity of the business. Improved employee performance can increase the productivity of the company. Machine learning can improve the insights of the company.

5. Conclusion

From this above study, the understanding of machine learning and employee performance is increased. Employee performance can be increased through machine learning because it can manage the technologies of the company. Through using appropriate technologies, the business can improve its brand value and increase business turnover. Those technologies need to be maintained and machine learning helps to improve the knowledge of employees to maintain information technologies of the business. Machine learning is the branch of artificial intelligence and also gives the proper knowledge of networks, computer algorithms, and so on. Employee performance can increase for the role of HRM in the business.

In this research, the report is given of the employee performance during covid-19. The performances of employees are decreased because of the fear of the covid-19 situation. Employees have decreased their confidence in the situation of pandemics. Covid-19 decreased the reward of the employees and it decreases the interest and motivation of the personnel to the company. In that case, the company employees decrease their work performances in the business enterprise. Machine learning helps to improve employee performances of employees of the business enterprise. Machine learning can improve employee performance that helps to improve insights, productivity, consistency, and quality of work of the business.

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ASSESSMENT OF RESILIENCE AND ANXIETY USING PERSON IN THE RAIN TECHNIQUE; COVID 19PERSPECTIVE

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ABSTRACT

The study was centered during Covid-19 breakout. It aimed at understanding whether Art therapy would help the young minds deal with the current situation with optimism or not. Art therapy including the Person in the Rain Technique was used to understand the level of stress and resilience the young adults were going through. For the pre test and post test CYRM-R (The child and youth resilience measure) , SCARED (Screen for Child Anxiety Related disorders) tests were used. Sample undertaken was 25 males and 25 females were included. It was found that before therapy the anxiety level was high among adolescents. With the help of theperson in the rain technique a similar pattern was observed in most of the images that is self-exploration. Participants were trying to understand themselves as well as their situation or surroundings. Lack of self understanding was observed. After sessions there was a considerable shift among the participants. Furtherresearch could consider, on a larger scale , the effect of art therapy in school set up among young adults inIndia .

Keywords: *Art therapy, young adults, anxiety, resilience.*

Introduction

Children are the most important assets of any country for overall development. Schools are one of the settings outside the home where children can acquire new knowledge and skills to grow into productive and capable citizens, who can involve, support and help their communities to grow and prosper. A Health Promoting School is a setting where education and health programmes for "health promoting", environment which in turn "promotes learning".

Schools can help promote the health of the staff, families and community members as well as the health of the **Art Therapy- A brief know how**

Art therapy involves image making as a means of expression of emotions and a mode of communicating one's feelings.

Art therapy supports the belief that all individuals have the capacity to express themselves creatively . The use of vibrant art materials stir emotions of an individual who then expresses them through drawings / craft / clay in a creative manner and does not expect tobe judges or commented upon.

American Art Therapy Association (AATA) describes art therapy in short as well as broader perspective as: "It is an integrative mental health and human services profession that enrivhes the lives of the individuals, families and communities through active art-making, creative process, applied psychological theory and human experience within a psychotherapeutic relationship".

Adolescence Stage

WHO defines adolescence both in termof age (between 10 and 19 years) and in terms of phases of life marked by There students. Much is known today about the relationship between education and health. People everywhere can use this knowledge to help create Health-Promoting Schools. In almost every community school is a setting where people learn and work, care for andrespect each other. It is a setting where students and staff spend a great deal of their greatest impact because they influence students at such important stages in their lives- childhood and adolescence, by creating schools that are health promoting, school leaders all over the world can foster health actively as they promote learning. are approximately 1.5 billion young people between the age of 10 and 24 years worldwide. Globally, life skills based school heath interventions have found impact and success in positive and adaptive behaviour of adolescents, equipping them with strategies to handle and resist high risk behaviours (World Health Organization - Life Skills Education in Schools Framework – 2001) .

Adolescence : The Challenges

Adolescence as a stage of development is of special interest to the area of health promotion. The physical challenges during the period are the most visible and striking markers of this stage. However, these physical challenges represent just a fraction of the developmental processes that adolescents experience. Their developing brains bring new cognitive abilities that enhance their ability to reason and think abstractly. They develop emotionally, establishing a new sense of who they are and who they want to become. Their social development involves relating in new ways both to peers and adults. They begin to experiment with new behaviours as they transition from childhood to adulthood. In understanding adolescents , it is important to view their development in reference to physical, cognitive, emotional, social and behavioural dimensions. Of course, no adolescent can truly be understood in separate parts- an adolescent is a "package deal".Change in one area of development typically leads to, or occurs in**Systematic Review-**

For this research literature from the past 15 years has been reviewed. People experience various changes throughout their lives and the year 2020 has certainly proven it. During this time period everyone had to undergo a lot of changes in respect to their job or environment. The lives of children have changed in respect of their school which involves online studies or lack of social contact with friends.

Studies have used projective techniques like art therapy in order to understand and analyse the relationship of children with their respective environments. Art therapy is derived from a Latin word "arte" meaning craft and a Greek word "therapeuein" meaning treatment . It can also be called as treatment through art. It provides a great way to promote development in children . Hence it is believed that it should be widely used in education and with people or patients of different age groups (Hoffman 2016).

There were many studies conducted on effectiveness of art therapy as an intervention for children and adults. One such qualitative study was conducted with a sample of 5 children in a long - term art therapy intervention comprising of 50 sessions. The therapist took interviews and analysed their art work after every session. During the study both the therapist and children were able to feel positive conjunction with, change in other areas. Furthermore, no adolescent can be fully understood outside the context of his or her family, neighbourhood, school, workplace, or community or without considering such factors as gender, race, sexual orientation, disability or chronic illness, and religious beliefs. Art therapy serves as a medium for the youth to heal from the challenges posed by the stage of adolescence. changes like contentment and thereby reported the positive changes (Ball 2002) . Gersch, Goncalves S.J conducted a study with a sample of 5 ten year old children having issues related to their families , sadness and various other type of stress inducing variables. The art -based intervention was practiced in a school setting for a year. Focus-group interview was conducted with all the students. They reported that the sessions helped them to feel good and cope with their problems . Another study was done with 84 undergraduate students who were exposed to an anxiety provoking situation. They were then asked to colour a mandala , or a complex pattern/ they freely coloured. The activity was completed in 20 minutes . once the activity was done they were asked to complete the State Anxiety Inventory. It was concluded that colouring mandalas and complex patterns helped in reducing the level of anxiousness to a great extent. Whereas free colouring did not show the same results (Curry , Kasser 2005).

A school based study was conducted so as to understand if art plays an important role in the counselling process and if it helps in enhancing the cognitive process (Allen , Lavin 1977).A study concluded that art therapy helped in building up the self- esteem among adolescents . Though the mentioned studies stated and proved that art intervention does help in making positive changes among children the researchers were not able to give the elaborate description of the same. Studies have argued that such an intervention can help adolescents in search of their self and like to express themselves through it because it is less confrontational. Children like to use symbols as it is less exposing than talking to someone

about their problems. Doing art work or using graphics helps them to secretly express themselves and makes them feel safe. (Fang 2019, Shirley). Children are very curious and creative which can be perfect for doing art therapy . It is believed that the art made by children is completely natural like a reflex action and during the therapy they are able to understand and accept their own feelings and that of others (Szuman). Halprin pointed out that by using art interventions one can also divert their focus from their health conditions . An eight week intervention was conductedwith grade five students for enhancing their socio-emotional development . They were given lessons on skills like awareness of emotions , talking skills etc. By the time the intervention was completed it was concluded that children's confidence increased while expressing themselves and felt contented with the class environment (Lenka 2012).

There were some studies specificallyconducted on to understand how specific art techniques help in enhancing an individual's resilience and adjustment level . One of such studies aimed at testing how well person in the rain technique as a tool can help in assessing one's ability to adjust with stress. Tools used for the study included the technique , Adjustment scale and Resilience scale on a sample of 285 people. Results showed that there was a difference in scores among upper and lower groups in terms of army life adjustment. It also found that the group with high level of resilience had higher scores in the technique than the lower resilience group. The study contributed by exploring the applicability of the technique through a 2-way examination (Jue .J 2019). Verinis et.al used the technique for understanding as well as concluding onthe best treatment for people who suffered from mental illnesses like anxiety issues . They also tried to associate the aspects of the art work to the amount of stress the person experiences and the defenses used by him/her. It was argued that projective tests are very useful in moving beyond the barriers laid out by the person and can give the therapist an inside view ofthe client's situation (Ross 1997.

Another study aimed at understanding the relationship between Person in the rain and Resource Inventory for Stress and Perceived Stress scale and the sample size was 40 patients who were diagnosed with substance use. The drawings were scored and analysed by 3 raters to check for stress and protective indicators. The scores on the assessment positively correlated with the scores on the self-directedness and confidence scale (Willis L.R et.al 2010). The same technique was used with a sample of 58 students with an age range of 8-10 year olds from three different areas of US that were the great plain , rocky mountain and pacific northwest. A projective technique was used to gather information about a client that might otherwise be repressed.

The analysis involved looking for signs that showed how many defenses the person was using and the level of stress he/she is undergoing. It was a pilot study done to validate the 45technique as a tool . The aim was to understand whether the location of residence had a influence on the person or not . It was concluded that some responses to it are influenced by the location of residence. It was suggested that further studies should be done at the same time the tool can be used as an assessment (Graves A, Jones L et.al 2013). Hence the study's aim is to explore how well the youth have or haven't adjusted with the sudden changes in their lives by using the technique .

Methodology

Research design:

Variables:
Independent variables: Art Therapy
Dependent variable : Resilience and Anxiety
Sample and participants: 50
Locale: The tools were administered with women of Delhi NCR, Noida .

S.no participants	Male	students	Female	students	Total	number	of
1	25	25		50			

Research questions -Does person in the rain technique help in expressing the

Tools

For resilience- cyrm-r (the child and youth

resilience measure).(10-23years)

Procedure

Adolescents were selected from Delhi , Noida (India) as the sample for the study and the google form containing the informed consent and thequestionnaires on resilience and anxiety were sent to them . After the consent was taken four sessions were conducted emotions of adolescents during covid- 19 ?

For anxiety – scared (Screen for Child Anxiety Related disorders. (14-20 years) with the students wherein art therapy was conducted after a rapport was formed with them online .

Session 1 included a basic rapport formation and the participants were introduced to Art therapy and its importance . It also included the administration of psychometric tests .

Session 2 involved administration of"Person in the rain technique " on the participants followed by a discussion onthe images made .

Results

Following are images drawn by some of the participants during the session .

Session 3 involved administration of psychometric tests again .

Session 4 involved closure and discussion over the previous sessions.

Pre test scores

Table 1 – Mean Scores of Males and Females Before Therapy

Variables	N	Gender	Mean
Anxiety	25	Female	68.27
25		Male	51.62
Resilience	25	Female	42
25		Male	57

Post Test Scores

Table 2 – Mean Scores of Males and Females after Therapy

Variables	N	Gender	Mean
Anxiety	25	Female	40.2
25		Male	48
Resilience	25	Female	47
25		Male	55

Discussion

People experience various changes throughout their lives and the year 2020 has certainly proven it. During this timeperiod everyone had to undergo a lot ofchanges in respect to their job or environment. The lives of children have changed in respect of their school which involves online studies or lack of socialcontact with friends.

Studies have used projective techniqueslike art therapy in order to understand and analyse the relationship of children with their respective environments. Art therapy is derived from a Latin word “arte” meaning craft and a Greek word “therapeuein” meaning treatment . It can also be called as treatment through art. It provides a great way to promote development in children . Hence it is believed that it should be widely used ineducation and with people or patients of different age groups (Hoffman 2016).

The study’s aim was to understand that does Draw-a-person-in-the-rain (DAPR) help in expressing the emotions of adolescents during covid- 19 . Art therapy was used as a projective technique to gather information about people that might otherwise be repressed. It was observed that before therapy the anxiety level was high among adolescents . With the help of the tchnique a similar pattern was observed in most of the images that is self-exploration . Participants were trying to understand themselves as well as their situation or surroundings. Lack of self understanding was observed .

After Art therapy there was a considerable shift among the participants . One of the participants quoted “ I felt the initial session was very helpful as I am someone who gets very anxious amongst new people or in an unfamiliar setting . ” It was observed that many defences were common among the participants . For example shielding self or not facing the situation

Art therapy helped in expressing their emotions on paper which is not only cathartic but stimulating to them as well.

It was concluded that some responses to it are influenced by the location of residence. It was suggested that further

Implications for Research

- The work described here is limited to my experience of running an art therapy group in a specific context and therefore any hypotheses offered are only in relation to a lesser sample size. The group was also time limited as it ran for only 4 weeks . Further research can be conducted with a larger sample size involving a school set up. studies should be done at the same time the tool can be used as an assessment (Graves A, Jones L et.al 2013). Especially in India more work can be done with the youth so that they can benefit more from a creative approach.
- Future studies can be done including the second and third wave of Covid-19’s impact on the youth of India .
- This research was limited to few sessions so a thorough art therapy programme can be used for future researches .
- Sample size can be increased to have a better understanding of how Art therapy works .

Acknowledgements

I would like to thank the young students of India studying in higher grade institutions from Noida and Delhi who allowed me to be in their presence and use their material here . I would like to thank my guide , Dr Mamata Mahapatra for her guidance and support throughout the study .

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CHALLENGES FACED BY FACULTY MEMBERS IN ONLINE DISTANCE EDUCATION

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ABSTRACT

Rapid advances in digital information and communications technology have led to significant changes in distance education practice worldwide. E-learning changes all the educational components. Many empirical studies were conducted to examine the problems of delivery of courses online; however, few had previous studies summarized and developed a framework of challenges in courses online. In this paper we will examine some of the previous studies that address the challenges facing professors in distance education.

Keywords: *Challenges, faculty members, online learning, e-learning, distance education*

1. Introduction

The definition of distance learning is already modified and reframed throughout the long term. This can be seen in the development of Moore's (1973) definitions of distance learning. Moore (1990 p.15) viewed distance learning as "all the educational arrangements for those involved in planned study in a place or period other than the teacher, in print or electronic communication media." Moore & Kearsley (2011 p. 2) further refine the definition of 'organisational and administrative arrangements' to indicate that the learning process is being planned. In most definitions, asynchronous training is a distance education – the faculty and students are distant from one another by space and time – through several technical media to support learning and teaching (Eastmond, 1998). Distance learning pertains just to this offbeat e- learning arrangement for this review. Distance studies offer faculty members, learners and school administrators a range of advantages. The interaction between faculty and students is increased in an online setting and the ability to reach more students leading to more globalization and diversification (NEA, 2000). Additional advantages incorporate gathering the necessities of non-customary understudies with tasks like families and jobs that effectively take classic daytime university courses and traditional students who prefer to learn online. Furthermore, given the decrease in support to public colleges and universities, distance education provides new audiences and revenue without the need for further on-camper facilities, such as residential and classroom facilities. Even with the increase in offerings and enrolments for distance education. Many professors are averse to teaching online. In reality, a national education organization poll(2000)discovered that 50 percent of teachers had negative or ambiguous sentiments about distant education. The majority of distance learning literature focuses on technology, courses, and student demands. During the research on teaching and distant learning managers' perceptions is growing, professional attitudes and unique elements that motivate and restrict community participation must also be considered., web-based education (Howell et al., 2007).

HEI teaching in institutions of higher education (HEI) is increasingly pressurized by online teaching (Allen and Seaman, 2017). (Hunt et al., 2014). This is despite the fact that most of the HEI faculty have hardly any experience as online learners. or as teachers of online courses.

The faculty has a key role to play in the development, the creation and distribution ofe-courses. Anecdotalproof suggests, however, e-courses are often required in HEIs, without giving faculty successful online teaching skills. Weaver et al. (2008) pointed out that the faculty often has to use pedagogical and technological skills that they may not have with a growing online training. As per Berge (1995) online teachers perform pedagogical, social, management and technical roles, so that

students can actively learn environments through higher learning. Liu et al. (2005) spoke about other key roles of the faculty in e-course creation and distribution. If the skills and knowledge to play such roles are lacking, the quality of the on-line course could be challenging, as many faculties can "teach in traditional classrooms with the hundred strategies of teachers dominated by lecture and discussion" (Taylor and Mc Quiggan, 2008, p. 30). (Twigg, 2001). 2001. Moreover, since the nature of online courses is different from traditional courses (Jung, 2010) teachers offering online lessons can face challenges stemming from the virtual nature of their educational environments, which are unique to their teaching experience on campus courses. It is therefore more and more important for faculty to offer the necessary support for quality online courses and programmes (Baran & Correia, 2014). Often professional support is a key measure of the quality of courses in the standards and framework for the assessment of online course. Shelton (2011) found the recurrent topic of faculty support for quality indicators in a review of 13 paradigms for online assessment. On-line quality learning standards were reviewed by Daniel and Uvalic-Trumbic (2013) and the support from the faculty has been critical to successful online learning. In its assessment of the twelve standards for online learning in the various countries, Martin et al.(2017) also noted as a crucial indication of virtual learning quality in the most of of their standards. Current reviews (Baran and Correia, 2014) show that support for faculty plays a key role in ensuring a high level of online education and training. Other studies have shown that HEI managers recognise that professors offering online coursework need to be supported (Garza, 2009).

While HEIs providing online education could have a support mechanism for faculties, there is little information about how these systems adapt to the basic problems of faculties in designing and delivering online courses. Since online courses have vibrant nature of online courses (Shelton 2011), professors are also developing and delivering online courses. For instance, new and improved technologies can be used to involve students in authentic online learning activities (Ko & Rossen, 2010). The current concept including the use of learning analyses was proposed to improve the design and distribution of education so that it becomes more significant (Martin & Ndoye, 2016). Studies by Clark et al.(2016) and Merchant et al. (2014) prove that new techniques like simulation and the virtual world can be used to inspire and motivate students efficiently. However, the Faculty should be given the technological and educational support it needs in order to draw its attention to such new technologies and make use of them meaningfully in delivering quality online teaching. Support for professors with little or no online teaching experience is particularly critical (Hunt et al., 2014). Previous studies have shown that the challenges facing faculty in using fast-moving learning technologies are often a major impediment to quality e-learning (Hunt et al., 2014).

Friendman et al. (2017) pointed out that further changes are likely to occur in future online training. This can affect how online courses are taught and probably requires improved professional support. Friendman et al. (2017) identified the trends that the on-line education stakeholders are expected to follow: 1) increasing utilisation of big data in measuring student performance; (2) increase artificial intelligence inclusion in classrooms; (3) growth in non-commercial online programmes; and (4) online graduation programmes in astonishing and expert fields. Online learning trends Smith (2014) has identified: 1) major information; 2) gamification; 3) personalization; 4) mobile learning; 5) investment returns; 6) automation; 7) enhanced learning; 8) corporate MOOCs; and 9) the development of cloud management systems (LMS). The study by Kibaru (2018) concluded that in this study three broad category faced major challenges for the faculty in the creation and distribution of virtual courses. These relate to: 1) student proximity; 2) teaching loads; and 3) faculty support. The dynamism of online education indicates that the existence of the difficulties posed by faculty in creating and providing online courses is changing over time.

In order to achieve and maintain quality online courses, the faculty must stay current with the

dynamic nature of online learning and new learning technologies, while promptly meeting its challenges.

It is not clear whether HEIs involve professors continuously in identifying their issues with the creation and distribution of online courses. One may argue that it is vital to proactively identify and provide the support or remediation necessary for professors in this regard not just to maintain the authenticity of professional support systems but also to improve the quality of online courses. Barely any investigations have thought about the staff's difficulties to plan an online course to stay up with the changing idea of online schooling. The reason for this investigation is to find out the principal problems facing the faculty in its efforts to produce and offer quality online courses..

Who might doubt that distance learning is the heat, sex, and controversial issue in American higher education in the many forms it takes today? No issue has been published in a journal or higher education newsletter which does not include at least one article on distance education or technology. We are consecutively surrounded with message on campuses about the technological revolution. As a faculty, we are warned that our institutions are harmed by the failure to "get to programme" and that our jobs are lost to more technologically-oriented, fundamental organisations like the University of Phoenix.

University administrators urge the faculty to take part in virtual education and other technological efforts. However, most faculty did not react as fast and passionately as the managers wanted. In an article published by J. D. McKinnon of the Wall Street Journal, the faculty has legit issues and concerns about the benefits of distance learning, even at the Florida Gulf Coast University, "built as an internet test base" (1998, p.14c). A national faculty study conducted between 1998 and 1999 at the UCLA Higher Education Research Institute (HERI) revealed that two-thirds of faculty found that information technology is kept informed about stressful information technology issues above research/publication, a burden on education and tenure/promotion as an important stressor as well (HERI, 1999).

The faculty opposes endeavours to compel them into virtual courses for numerouscauses. They resist separately or in its entirety and often seek guidance from representatives of the Union. While individual faculty members may resist taking part in the currenttrend of e-learning for individual reasons, there are many factors why faculty are resisting distance learning. The Faculty expressed particular concerns about the sufficiency of institutional assistance, changes in personal relationships and performance.

2. Institutional Assistance

Everyone works and is encouraged by a positive strengthening. There are no exceptions to the Faculty. How are the professors of higher education rewarded? Wage, promotion/tenure or adjusted workload. What is the faculty offering distance learning in these areas?

Salary: Does the faculty get any financial incentives for distance learning? According to a recent National Education Association (NEA) national survey, 63 percent of teachers receive a normal compensation for distance education (NEA, 2000). Alough an educator requires a significant investment in energy and time to create a distance learning course, when moving from class to electronic medium, many faculty are regarded as part of the standard workload.

Advancement & tenure: In majority of theacademiccentres , tenure is granted through the institutional Educating, studies and facility balance. The distance learning time is not invested on other task that may be necessary to succeed. For academic institutions with high research and publication expectations, this issue is particularly important. In "Digital Diploma Mills: Automation of higher education," as described by David Noble (1998)," the most vulnerable faculty, unrepresentated faculty or faculty are often pressured to favour administrators to achieve their employment objectives.

Workload: The adaptation of the workload is an incentive for academic organizations to urge the workforce to take an interest in institutional drives. The NEA study (2000) however showed that the wide majority of the faculty were not provided with a reduction in their national study. Probably this is due to increasing productivity is one of the factors for

extending virtual classes and the application of educational technologies. If institutions give free time to teachers to prepare distance learning classes, they may need other methods like an increased student-faculty relation in online classes to demonstrate greater productivity.

Training: A 1997 NCES report showed that approximately 60 percent of HEIsoffer training opportunities for e- learning teachers. That means that 40 per cent of distance learning institutions asked the faculty without special preparation to take these courses. Of the 60 percent who offered particular training, about one quarter needed distance learning technology training, 13 percent needed curriculum development training and 17 percent needed distance learning training. The NCES poll did not address the depth or extent of the training provided, an important factor in the preparation of the instructor (NCES, 1998). The faculty is used as experts. Fear of being incompetent can lead the faculty to refrain from any activity, including camera or computer drive, for which training is not held. The faculty may not have adequate training or experience in the competent management of distance education courses.

3. Changes in Interpersonal Relations

Faculty members could have almost no knowledge of or contact with the audience during preparation and delivery of educational lessons in a distance learning environment. A telecommunication instructor sitting alone outside a camera in a studio may have an overview of the target audience for the course, but he does not know what the ultimate purpose is to use a lecture once it has been "in the can." Teleclass teachers who teach their classes live, with or without a study class, interact limited in studio / classroom with students and are limited by camera demands. Similarly, online teachers have limited interaction with students, whether they teach the class in synchronic or asynchronous manner.

Most of the faculty has a "hand-to-hand" training. They expect and are used to direct engagement with the students. The 2000 US Faculty poll confirmed that a pleasure in working with students is a key factor for the faculty in choosing an academic career (Sanderson, Phua, & Herda, 2000). A qualified teacher uses his understanding of the audience in the traditional classroom, followed by the participation reactions by observing the language of the body, verbal response, facial expressions, etc. The lack of direct interpersonal contact with students is a problem for some distance learning faculty. The Faculty does not have any contact or feedback to help them to measure their clarity of communication while preparing "canned" telecourses or internet courses. Distance feedback from students is frequently postponed and indirect. The significant share of faculty interactions with students are based individually on telephone, fax and computer technologies. Even teachers in distance educational settings have restricted communication and have to adapt how they evaluate the responses and understanding of the students. "Hand-to-hand" classroom environment at distant sites are seldom possible.

Personal interaction with students is one of the most satisfying aspects of teaching. To see a student struggling to build trust, the spark of understanding shines in the eyes of a student, which are the "big advantages" of teaching for many lecturers. The interface to distance learning technology often denies them this opportunity.

4. Quality Question

The quality concern makes it appear in distance learning literature. Informative developments consistently face the test of illustrating that they will have no adverse impact on the quality of education. It is expected that innovations will improve quality. At least the experience of a distance learner in traditional classrooms ought to be as rich, both mentally and emotionally. Given the additional resources for remote learning, the expertise will be improved and the traditional school will not become a weakened substitute.

In advanced education, nature of training is estimated from various perspectives. Quality should incorporate admittance to assets like the library, labs and workforce. Quality ought to likewise incorporate encounters of life aimed at socialising and developing affectivity

through interactions between students. These two qualitative questions are vulnerable to criticism in distance learning.

The NCES Distance Education Study (1998) discussed this problem in its investigation and concluded that "In general, students have some form of access to teachers." Teachers visited remote sites occasionally in 42 percent of institutions. Duty-free, e-mail and other online access methods were also used for instructor access. Access to academic libraries varied by type of resource. 56% of institutions had access to the institution's library via electronic links. Cooperative agreements with 62% of institutions were reached for students to use other agencies' libraries. Library staffs have been specifically appointed to provide support for distance-learning students at 45% of universities, while special library collections at remote sites have been made available for students at 39% of institutions; (NCES, 1998). But at least 35-45% of distance learning students had no necessary institutional resources available for campus students.

Students learn from other people. As we move from educating to learning the focus on interaction between students and students through group and cooperative work has increased.

A variety of techniques are being used to spirit of cooperation for distance learners. Few of them are so essential to organise and share student contact information; others use modern techniques to develop chat rooms for e-courses. Is quality identical? Data are still being collected on this subject. But to build an identical involvement with the e-learning environment, the instructor needs more planning and effort. The community problem remains a faculties concern when it examines the most effective method to give great learning experience within an e-learning environment.

In short, remote education technology creates a major change in the way learning takes place. Both the teacher and the student need new skills. The education experience is transferred from a learner-centric experience to a learner-centric experience. Educators become more facilitators, student intermediaries and resources for independent studies. These changes call the faculty a challenge and could lead to insecurity.

Technology can discuss many of the higher education challenges. Administrators need to move forward "Form it and They Will Come," recognise a faculty perspective, and develop strategies to encourage faculty participation in distance education in order to acquire acknowledgment and make quality learning experience in Distance Education innovation. Almost 60 per cent of the current faculty of higher education is older than 45. Most have taught in traditional classrooms for a number of years. To encourage faculty support and participation, distance education administrators must become competent change agents, encourage faculties to engage in e-learning by giving suitable motivations to enhance faculty participation and educational support so that faculty becomes as agreeable as conceivable in their change to another instructive medium.

The Institute of Higher Education Policy (IHEP) has set 24 quality criteria for the success of the Internet distance education efforts in its publication "Quality on the line" (IHEP, 2000). The four principal benchmarks for faculty problems relate to all distance education systems. The benchmarks promote the availability and promotion of technical support in the development of courses, help with the change to another distance and ceaseless help and preparing through the movement of the course. These problems were considered important to quality distance learning.

There are a number of strategies for addressing these problemsand encourage the participation of faculty in distance learning efforts. Open communication is an important key. Distance education during the planning and execution stages should be represented. Participatory management practises will generate professorship input and keep faculty informed as it develops on campus. Some campuses have established technology committees within faculties that regulate and additionally instruct on the arranging with respect to instructive innovation drives, including distance learning. Others remember conversations for set up personnel driven educational plan advisory groups. When the faculty makes a decision on

distance learning, it can reduce its concerns regarding the quality of e-learning.

Institutional support for the participation of faculty in distance education is crucial and should take a variety of styles to recognise the different motives and requirements of faculty. The literature shows clearly that distance education lessons take longer to teach than conventional ones. This should be recognised by institutions and competitive pay for distance learning efforts should be included. Various institutions have discovered that special upgrades are well received by distance education teachers in office computer equipment, as adjusted pay and training load. Recent research has shown that cheap rewards like public recognition, ratings or special parking advantages are also effective proof of aid.

An educational establishment that seeks to conduct distance learning initiatives will also need adequate and effective training. Development sessions for the faculty to incorporate remote education technology, as well as changes in the pedagogical approach necessary for the effectiveness of distance learning are necessary. Through these types of workshops, teachers can learn strategy to enhance the individual characteristics of distance learning, which is of interest to many educators, among other things. Although a several institutions can provide professorship training in remote teaching methods, at least one university in the South East has compensation and training combined. This institution provides the faculty with scholarships to participate in a 6-week summer workshop, without requiring a devotion to educate an online course. This enables interested professors to discover the digital environment by deciding whether the courses they teach are suitable. The institution offers more faculties to participate in summer workshops.

The Faculty is not recalcitrant to Luddite. Many have been simply misled by past advances portrayed as developments that would change the way of instruction. Staff is sound doubtful when they oppose the call to bounce on the most recent instructive vehicle prior to evaluating the way students learn about this new technology.

5. Distance Education and the Pandemic

The emergence of the COVID-19 outbreak has changed the landscape of our education, forcing schools to move quickly online rather than face-to-face. The Covid 19 crisis has affected around 27 million students in the Philippines, 1 million teachers, non-teachers, as well as student families (Obana, 2020). With the world fighting the implications of this contagious and deadly virus – destabilising the economy and trying to claim many lives – it is the most suitable option ever (Alipio, 2020).

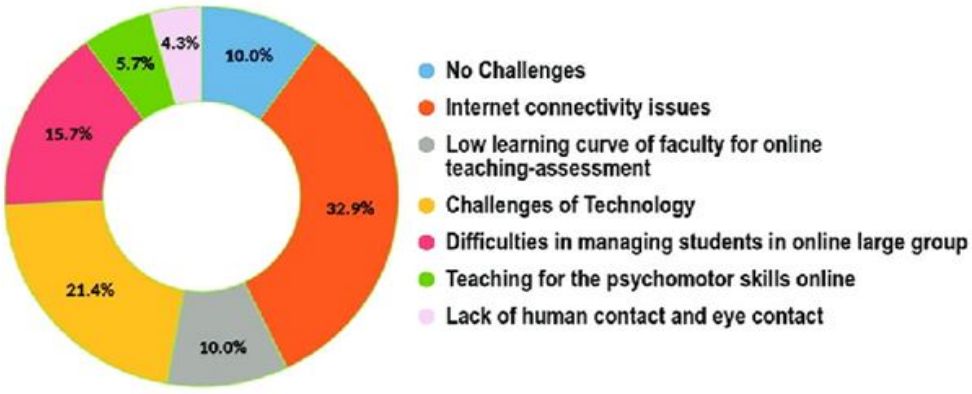

Figure 1.Challenges of faculty during online classes (source: Kapoor et al., 2020).

The present crisis introduces serious hurdles not only for Philippine educational institutions but worldwide. The above figure is the result that was obtained in Kapoor et al. (2020) work, in which they conducted an online survey to find out the teaching experiences of faculty members of a medical college in central India during this pandemic. Barriers and community quarantine in several areas, especially in the country, have prevented students from attending online classes. The Department of Education (DepEd) and other institutions have

implemented online classes so that students can continue their education. Online Distance Learning offers the instructor the active participation of students through various technologies accessed through the Internet and locally remote from one another (Llego, 2020). Before its implementation, DepEd was flooded with critiques while some reject the question of whether the situation has been prepared by DepEd and other academic institutions. These institutions are confident that, despite all criticisms, online learning from afar works in thePhilippines. As per to an educational official, some 93% of national public schools have online teaching equipment for the 2020-20121 school year. (Hernando-Malipot,2020). Private schools can begin classes before public school classes open on 5 October 2020, subject to the use of distance learning methods only. However, literature shows that e-learning offers students as well as teachers many challenges (Eyles et al., 2020). During Covid-19, Gurung (2021) conducted a study on the challenges of distance education educators whose results are mentioned below: -

Reach: 75.4% of faculty members found it hard to teach students in remote areas. The main difficulties facing teachers to reach students in remote areas online are poor connection, no strong internet access, no electricity and no computer. 17% of those surveyed were neutral. 7.6% of respondents found that reaching students in remote areas was not difficult. They believed that students can also learn in remote areas effectively during online classes(Gurung (2021).

Motivation: 61,5% of respondents believe that students in online teaching classes are hard to motivate because there is a minimal possibility to interact with students face to face, difficult to understand their personal behaviour and problems. 15.7% of those surveyed were neutral. According to 22,8 percent of respondents in online classes, motivating students was not difficult. In order to make a pleasurable environment, talking honestly with students while teaching an Internet class and building mutual relationships with students not only increases their motivation, but also their confidence in the situation. Gurung Gurung (2021).

Tracking: 27.1% of respondents amongst the 430 respondents strongly agreed, 34.7% of respondents agreed, 18.2% did not agree or disagree with each other, while 10% disagreed, and 10% of respondents were strongly opposed to the challenges posed by keeping student progress in online teaching classes track (2021).

Lack of knowledge and technology: 61.3% of respondents faced electricity and Internet connectivity in online classrooms. Sudden decreases in electricity, no clarity in voice in online courses not only affects learning but also its interest. 25.5% of respondents were not confronted with any problems caused by electricity or the Internet. 13.2% of those interviewed were neutral. Regular electricity and internet access increase the interest of students to study. In addition, 63.94% of respondents agreed that lack of software and technology knowledge is one of the major challenges in conducting online classes. If teachers and students have not adequate technical knowledge, adapting new teaching and learning methodologies becomes difficult for them. 18.75% of respondents were neutral, but only 17.31% disagreed that the lack of technical and software knowledge caused problems in online teaching. They felt that the professional service provider was appointed to resolve the problem Gurung Gurung (2021).

Time consumption: According to 62,7 percent of those surveyed in online teaching methodology, the preparation of the course contents required more time because they had to prepare the entire subject in electronic form. In PPT's, Docs and Excel, they prepare their contents, record their videos and many more. It seems obvious from the above data that development of an on-line course requires more time than teaching, but in the future, the content of an on-line course will also be used and it will not take time to prepare content like in the past. 24.7% of respondents have been neutral. 12.5% of the respondents said that they did not require more time in online teaching to prepare the content as timeframes when using the content of the other person developed or the contents available in open resources. Gurung Gurung (2021).

6. Dealing with the Challenges

- **Interactive learning experiences:** Faculty education opportunities must focus on delivering student learning experiences supporting an interactive learning environment.
- **Design and enhancement of educational material:**education opportunities are necessary to develop teaching materials that mix technologies and use mediated training and guidance.
- **Marketing courses:** Marketing strategies must be developed by others who promote remote delivery so that the faculty can focus its efforts on the education process.
- **Assistance:** strategies to support assistants or facilitators should be developed and funds to provide graduate assistants should be identified.
- **Evaluation:** Process strategies and evaluation of results must be integrated into education packages.
- **Technical processes:** Faculty should be provided with education on specific technical processes (for example, integration in multimedia applications, e-mail use, development of videotapes, audio conferencing and TV provision). For remote students, better connectivity and appropriate e-learning training should also be provided.
- **Peer support:** Faculty teaching opportunities must be available remotely to get peer feedback and work with a mentoring partner if they wish to do that.
- **Workload support:** The adjustment of duties to accommodate courses needs to be taken into account instead of providing only additional financial support.
- **Student services:** Other university service must continue to tackle student service logistics (e.g. library services, transfers, registration issues, rights of copyright, tuition costs), but the faculty should have a working knowledge of how distance learning is affected.
- **Overall policies:** Administrators must remain focused on overall policies (for example registration policies, tuition requirements and fees, issues of certification to teachers and the Post-Secondary Education Coordinating Commission) that affect distance delivery and keep the faculty informed.

Table 1. Summary of challenges faced by faculty and possible solutions

Challenges	Solutions
Salary	Better salary and remuneration should be providedalong with perks.
Work load	Workload support by hiring more staffs and reducing work hours.
No proper knowledge and Technical access	Proper assistance and regular training along with necessary devices and internet connection.
Intrapersonal relationships	Interactive learning experiences and better Student services

7. Conclusion

Three major types of the significant issues facing faculty in online courses creation and distribution have emerged in this study. These concerns: 1) student proximity; 2) teaching burden; and 3) support to the faculty. One general conclusion is that these problems can naturally be linked to perceived quality as explained below. Problems in getting students properly to understand the virtual environment affect the perception of teachers of their ability to organise quality courses, quality teaching and learning processes. For example, a lack of sufficient understanding of students' needs could lead to a course design which does not adequately meet the learners' needs, whereas difficulties in evaluating the practical use of knowledge could influence faculty to evaluate objectives of course achievement. As internet based industry is growing rapidly and technology is improving to improve innovative interaction strategies, HEIs are pressured to offer or to continue providing online courses that effectively and efficiently fulfil the quality requirements of stakeholders. As faculty teaches more and more over distances, their needs for education, assistance and support must be monitored. Institutional support can be adapted as technology changes and faculty shares their experience across departments. The most helpful aspects can then be performed to evaluate distance learning objectives. The important function of adequate faculty support in ensuring the quality of

courses is important for online course providers. HEI's need to continuously evaluate and prioritising the difficulties faced by the faculty in the creation and distribution of courses through VLEs to build and implement efficient faculty support strategies and systems.

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CONGESTION DETECTION MODEL TO PREDICT TRAFFIC CONGESTION USING MACHINE AND DEEP LEARNING

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ABSTRACT

"Traffic congestion is a formidable problem that is affecting the routine lives of people worldwide. A number of traffic control schemes have been introduced but still the problem is same. In this paper, we perform experiments with various Machine Learning Techniques (Nearest Centroid Classifier, Stochastic Gradient Descent (SGD) Classifier, Logistic Regression, Gaussian, Multilayer Perceptron (MLP) Classifier, Random Forest Classifier, Extra Trees Classifierand Neighborhood Component Analysis) and Deep Learning techniques Long Short Term Memory and Bidirectional Long Short Term Memory Model (LiSTM and Bi-LiSTM) to predict the traffic congestion. Deep Learning based integrated method stacked autoencoder + RNN is proposed to detect traffic congestion. The proposed method directly extracts fine grained set of features and eliminates the need of performing manual process of handcrafted features. Furthermore,in order to reduce the problem of over fitting during training of the model and to improve theperformance on validation set, dropout technique, batch normalization and Rectified Linear Units (ReLU) activationfunction are being used. The result indicates that the proposed method can not only achievegreat improvement but also is superior to many models (ML and DL). Finally It is found that proposed model (Stack Encoder + Bi-LiSTM) detects traffic congestion with accuracy of 99.9%."

Keywords: *Synthetic Minority Oversampling, Machine Learning, Deep Learning, Neighborhood Component Analysis, Rectified Linear Units, Stochastic Gradient Descent.*

Introduction

The traffic management system has obstacles like shortage of budget, un-planned cities, non-discipline, and out-of-date management techniques. Road traffic congestion is increasing in the world, and its impact is visible in the form of fuel and time wastage. The poorly planned networkis the most common issue behind traffic congestion. Traffic congestion problem happens due to several factors like slow drive due to traffic delay (Timalsena, Marsani, and Tiwari, 2017),crowd at the tourist places (Iyer, Boxer and Subramanian, 2018), Natural disasters (Hara and Kuwahara, 2015) , Improper Planning (Lal et al., 2016), Construction work on road (Hyari, El-Mashaleh and Rababeh, 2015) and unplanned events (Humphreys and Pyun, 2018). Some of thephenomenon related to traffic congestion are stress (Vencataya et al., 2018), speeding (Chang etal., 2019), death (Organization, 2015), frustration (Hickman et al., 2018), time wastage (Raheemetal.,2015),pollution(LiandHuang,2019) and low public satisfaction (Nguyen,2019).Travel behavior has become a significant research area due to its specific features for road safety support, human life safety support, and pillar for reducing traffic congestion environment. Hence, many methods and applications have been deployed to preserve and encourage Travel Behavior Modeling (TBM).The motivation behind this paper about a high level of traffic congestion which makes many other issues like high fuel consumption, wasted money and time delay, resulted in significant economic and productivity losses. TBM is one of the significant solutions for modeling travel behavior. Addressing monitoring travel behavior is a challenging and time-demanding task that requires data sources for processing and analysis of travel behavior. Recently, several solutions were identified to address the challenges and issues of modeling travel behavior.

Data Pre-processing

The Dataset is real time and we have collected data via google form. In these dataset, we have 13 attributes like distance, speed, time etc and done data analysis with Python, primarily because of the fantastic ecosystem of data-centric Python packages. Pandas is one of

those packages, and makes importing and analyzing data much easier.

Pandas DataFrame.fillna() is used to replace Null values in dataframe Our dataset csv file has null values, which are displayed as NaN in Data Frame. Just like pandas dropna() method manage and remove Null values from a data frame, fillna() manages and let the user replace NaN values with some value of their own. The dataset have many inf values as well. The simplest way to handle infinity values would be to first replace them (infs) to NaN: df.replace([np.inf, -np.inf], np.nan) and then use the first method to replace NaN values.

Transforming the prediction target variable (y): These are transformers that are not intended to be used on features, only on supervised learning targets (class Labels). In other words This transformer should be used to encode target values, i.e. y, and not the input X. We Encode target labels with value between 0 and n_classes-1 using below API

class sklearn.preprocessing.LabelEncoder

Need fit this transformation: In many Machine-learning or Data Science activities, the data set might contain text or categorical values (basically non-numerical values). For example, color feature having values like red, orange, blue, white etc. Meal plan having values like breakfast, lunch, snacks, dinner, tea etc.

Few algorithms such as CATBOAST, decision-trees can handle categorical values very well but most of the algorithms expect numerical values to achieve state-of-the-art results. Most of the algorithms work better with numerical inputs. Therefore, the main challenge faced by an analyst is to convert text/ categorical data into numerical data and still make an algorithm/model to make sense out of it. Neural networks, which is a base of deep-learning, expects input values to be numerical. This approach is very simple and it involves converting each value in a column to a number. Consider a dataset of bridges having a column names bridge-types having below values. Though there will be many more columns inthe dataset, to understand label-encoding, we will focus on one categorical column only.

Standardization, or mean removal and variance scaling

Standardization of datasets is a common requirement for many machine learning. Models might behave badly if the individual features do not more or less look like standard normally distributed data: Gaussian with zero mean and unit variance. In practice we often ignore the shape of the distribution and just transform the data to center it by removing the mean value of each feature, then scale it by dividing non-constant features by their standard deviation.

The sklearn.preprocessing package provides several common utility functions and transformer classes to change raw feature vectors into a representation that is more suitable for the downstream estimators/ algorithms. In general, learning algorithms benefit from standardization of the data set. If some outliers are present in the set, robust scalers or transformers are more appropriate.

Data Standardization: Standardizing a dataset involves rescaling the distribution of values so that the mean of observed values is 0 and the standard deviation is 1. This can be thought of as subtracting the mean value or centering the data. Like normalization, standardization can be useful, and even required in some machine learning algorithms when your data has input values with differing scales. Standardization requires thatyou know or are able to accurately estimate the mean and standard deviation of observable values. Youmay be able to estimate these values from your training data, not the entire dataset.

A value is standardized as follows:

y = (x – mean) / standard_deviation where the mean is calculated as: mean = sum(x) / count(x) and the standard_deviation is calculated as: standard_deviation = sqrt(sum((x – mean)^2) / count(x))

We can guesstimate a mean of 10.0 and a standard deviation of about 5.0. Using these values, we can standardize the first value of 20.7 as follows: y = (x – mean) / standard_deviation

y = (20.7 – 10) / 5

y = (10.7) / 5

y = 2.14

Data Analysis

When we analyze the data the following problem found with our dataset

1.The dataset is highly imbalanced in its nature.

Quick introduction - An imbalanced classification problem is an example of a classification problem where the distribution of examples across the known classes is biased or skewed. The distribution can vary from a slight bias to a severe imbalance where there is one example in the minority class for hundreds, thousands, or millions of examples in the majority class or classes. Imbalanced classifications pose a challenge for predictive modeling as most of the machine learning algorithms used for classification were designed around the assumption of an equal number of examples for each class. This results in models that have poor predictive performance, specifically for the minority class.

This is a problem because typically, the minority class is more important and therefore the problem is more sensitive to classification errors for the minority class than the majority class.

Challenge of Imbalanced Classification

The imbalance of the class distribution will vary across problems. A classification problem may be a little skewed, such as if there is a slight imbalance. Alternately, the classification problem may have a severe imbalance where there might be hundreds or thousands of examples in one class and tens of examples in another class for a given training dataset.• Slight Imbalance. An imbalanced classification problem where the distribution of examples is uneven by a small amount in the training dataset (e.g. 4:6).

- Severe Imbalance. An imbalanced classification problem where the distribution of examples is uneven by a large amount in the training dataset (e.g. 1:100 or more) as in our dataset A slight imbalance is often not a concern, and the problem can often be treated like a normal classification predictive modeling problem. A severe imbalance of the classes can be challenging to model and may require the use of specialized techniques. The class or classes with abundant examples are called the major or majority classes, whereas the class with few examples (and there is typically just one) is called the minor or minority class.
- Majority Class: The class (or classes) in an imbalanced classification predictive modelling problem that has many examples.
- Minority Class: The class in an imbalanced classification predictive modeling problem that has few examples.

The minority class is harder to predict because there are few examples of this class, by definition.

This means it is more challenging for a model to learn the characteristics of examples from this class, and to differentiate examples from this class from the majority class (or classes).

2. Data is very small having just 200 data samples.

To solve the above two problems, Synthetic Minority Oversampling Technique is used which help in two things

1. To solve class imbalance problems
2. To generate more data (synthesized data)

Below was the approach

SMOTE algorithm was performed multiple times based on the dataset split ratio as explained below

1. First data was splitted into 90:10 ratio with shuffling, so the training and validation data have different data instances with varied class imbalance ratio.
2. Data was splitted into 80:20 ratio with shuffling, followed by SMOTE algorithm.
3. Data got splitted into 70: 30 ratio with shuffling, followed by SMOTE algorithm.

With the above approach, we generate 10 time more data as compared to the original data. (200 vs 2000)

SMOTE for Imbalanced Classification with Python

As we have already discussed Imbalanced classification involves developing predictive models on classification datasets that have a severe class imbalance.

One approach to addressing imbalanced datasets is to oversample the minority class. The simplest approach involves duplicating

examples in the minority class, although these examples don't add any new information to the model. Instead, new examples can be synthesized from the existing examples.

This is a type of data augmentation for the minority class and is referred to as the Synthetic Minority Oversampling Technique, or SMOTE for short. Synthetic Minority Oversampling Technique Perhaps the most widely used approach to synthesizing new examples is called the Synthetic Minority Oversampling Technique, or SMOTE for short. This technique was described by Nitesh Chawla, et al. in their 2002 paper named for the technique titled "SMOTE: Synthetic Minority Over-sampling Technique."

SMOTE works by selecting examples that are close in the feature space, drawing a line between the examples in the feature space and drawing a new sample at a point along that line.Specifically, random example from the minority class is first chosen. Then k of the nearest neighbors for that example are found (typically k=5). A randomly selected neighbor is chosen and a synthetic example is created at a randomly selected point between the two examples in feature space.

SMOTE first selects a minority class instance a at random and finds its k nearest minority class neighbors. The synthetic instance is then created by choosing one of the k nearest neighbors b at random and connecting a and b to form a line segment in the feature space. The synthetic instances are generated as a convex combination of the two chosen instances a and b. This procedure can be used to create as many synthetic examples for the minority class as are required.

As described in the paper, it suggests first using random undersampling to trim the number of examples in the majority class, then use SMOTE to oversample the minority class to balance the class distribution. The combination of SMOTE and under-sampling performs better than plain undersampling.

The approach is effective because new synthetic examples from the minority class are created that are plausible, that is, are relatively close in feature space to existing examples from the minority class.

Our method of synthetic over-sampling works to cause the classifier to build larger decision regions that contain nearby minority class points. A general downside of the approach is that synthetic examples are created without considering the majority class, possibly resulting in ambiguous examples if there is a strong overlap for the classes.

Methodology

We have implemented number of Machine Learning and Deep Learning Techniques. The brief details of these techniques are as follows:

Logistic Regression

In this model, a logistic function is uses to describe the possible outcomes of a single trial as probability. Our implementation fit binary classification with ℓ2. Advantage of Regularization the improved numerical stability.

As an optimization problem, binary class ℓ2 penalized logistic regression minimizes the following loss function: **Minw,c12wTw+C∑i=1nlog(exp(−yi(XiTw+c))+1).**

Support Vector Machine

SVM provides the advantage of being effective in high dimensional spaces apart from being memory efficient. Different Kernel functions are being experimented and RBF kernel provides the optimalresults as compared to the other kernels.

Grid Search was performed to find the suitable/best kernel. SVMs does not directly provide probability estimates, rather they are calculated using an expensive k fold cross-validation.

Multi Layer Perceptron

MLP is a supervised machine learning algorithm that learns a mapping function Rm→Ro by training on a dataset, where m represent number of dimensions for input and o is the number of dimensions for output. MLP can learn a non-linear function approximator for both classification and regression.

It is different from logistic regression, in the way that between the input and the output layer, there can be multiple non-linear layers, which are called hidden layers.

The biggest Capability of MLP is to learn non-linear models. The model uses 5 layers with 5 neurons each with solver 'lbfgs'.

Stohcastic Gradient Descent

SGD is merely an optimization technique and do not correspond to a specific family of machine learning models. It is only a way to train a model. For example, use of SGD Classifier with loss='log' leads to logistic regression, i.e. a model which is equivalent to Logistic Regression but fitted via SGD rather being fitted by one of the other solvers in Logistic Regression.

There are three nearest neighbors algorithms: BallTree, KDTree, and a brute-force. The choice of neighbors search algorithm is controlled through the keyword 'algorithm', which must be one of ['auto', 'ball_tree', 'kd_tree', 'brute']. We choose the default value 'auto' so the algorithm attempts to determine the best approach from the training data.

Nearest Centroid Classifier

The Nearest Centroid classifier is a simple algorithm that represents each class by the centroid of its members. In effect, this makes it similar to the label updating phase of the K-Means algorithm. It also has no parameters to choose, making it a good baseline classifier. It does, however, suffer on non-convex classes, as well as when classes have drastically different variances, as equal variance in all dimensions is assumed.

Neighborhood Component Analysis

Neighborhood Components Analysis (NCA) is a distance metric learning algorithm which aims to improve the accuracy of nearest neighbors classification compared to the standard Euclidean distance. The algorithm directly maximizes a stochastic variant of the leave-one-out k-nearest neighbors (KNN) score on the training set. It can also learn a low-dimensional linear projection of data that can be used for data visualization and fast classification.

Naive Bayes

Naive Bayes methods are a set of supervised learning algorithms based on applying Bayes' theorem with the "naive" assumption of conditional independence between every pair of features given the value of the class variable. In spite of their apparently over-simplified assumptions, naive Bayes classifiers have worked quite well in many real-world situations, famously document classification and spam filtering.They require a small amount of training data to estimate the necessary parameters.

Naive Bayes learners and classifiers can be extremely fast compared to more sophisticated methods. The decoupling of the class conditional feature distributions means that each distribution can be independently estimated as a one dimensional distribution. This in turn helps to alleviate problems stemming from the curse of dimensionality.

Decision Trees

Decision Trees are non parametric supervised learning method used for classification and regression. The goal is to create a model that predicts the value of a target variable by learning simple decision rules inferred from the data features. A tree can be seen as a piecewise constant approximation.

Ensemble Methods

The goal of Ensemble method is to combine the prediction of several base estimators built with a given learning algorithm in order to improve generalizability / robustness over a single estimator.

Two families of ensemble methods are usually distinguished:

In averaging Methods, the driving principle is to several estimator independently and then to average their predictions. On average, the combined estimator is usually better than any of thesingle base estimator because its variance is reduced.

Examples: Bagging methods, Forests of randomized trees

In contrast, in boosting methods, base estimators are built sequentially and one tries to reduce the bias of the combined estimator. The motivation is to combine several weak models to produce a powerful ensemble.

Examples: Adaboost, Gradient Tree Boosting

Random Forests

In random forests, each tree in the ensemble is built from a sample drawn with replacement (i.e., a bootstrap sample) from the training set. Furthermore, when splitting each node during the construction of a tree, the best split is foundeither from all input features or a random subset of size max_features. The purpose of these two sources of randomness is to decrease the variance of the forest estimator. Indeed, individual decision trees typically exhibit high variance and tend to overfit. The injected randomness in forests yield decision trees with somewhat decoupled prediction errors. By taking an average of those predictions, some errors can cancel out. Random forests achieve a reduced variance by combining diverse trees, sometimes at the cost of a slight increase in bias. In practice the variance reduction is often significant hence yielding an overall better model.

Extremely Randomized Trees

In extremely randomized trees, randomness goes one step further in the way splits are computed. As in random forests, a random subset of candidate features is used, but instead of looking for the most discriminative thresholds, thresholds are drawn at random for each candidate feature and the best of these randomly-generated thresholds is picked as the splittingrule. This usually allows to reduce the variance of the model a bit more, at the expense of a slightly greater increase in bias.

LSTM Model

Long Short-Term Memory (LSTM) networks is a kind of RNN model that deals with the vanishing gradient problem. It learns to keep the relevant content of the sentence and forget the non relevant ones based on training. This model preserves gradients over time using dynamic gates that are called memory cells. At each input state, a gate can erase, write and read information from the memory cell. Gate values are computed based on linear combinations of the current input and the previous state.

The hidden state acts as the neural networks memory. It holds information on previous data the network has seen before.

The operations on the information is controlled by three corresponding gates:

Forget Gate: Controls which content to keep and which should be forgotten from prior steps.

Input Gate: Controls which information from the current step is relevant to add to the next steps.

Output Gate: Controls what should be the next hidden state, i.e. the output of the current step.

BiLSTM Model

Bidirectional LSTM (BiLSTM) model maintains two separate states for forward and backward inputs that are generated by two different LSTMs. The first LSTM is a regular sequence that starts from the beginning of the sentence, while in the second LSTM, the input sequence are fed in the opposite order. The idea behind bi-directional network is to capture information of surrounding inputs. It usually learns faster than one-directional approach although it dependson the task.

The input of the LSTM Layer:

Input: In our case it's a packed input but it can also be the original sequence while each Xi represents aword in the sentence (with padding elements).

h_0: The initial hidden state that we feed with the model.

c_0: The initial cell state that we feed with the model.The output of the LSTM Layer:

Output: The first value returned by LSTM contains all the hidden states throughout the sequence.

h_n: The second output are the last hidden states of each of the LSTM layers.

c_n: The third output is the last cell state for each of the LSTM layers.

To get the hidden state of the last time step we used output_unpacked[:, -1, :] command and we use it to feed the next fully-connected layer.

Stacked Autoencoders

Autoencoder is a kind of unsupervised learning structure that owns three layers: input layer, hidden layer, and output layer as shown in Figure. The process of an autoencoder training consists of two parts: encoder and decoder. Encoder is used for mapping the input data into hidden representation, and decoder is referred to reconstructing input data from the hidden

representation. Given the unlabeled input dataset, where , represents the hidden encoder vector calculated from , and is the decoder vector of the output layer.

Train the first autoencoder by input data and obtain the learned feature vector; The feature vector of the former layer is used as the input for the next layer, and this procedure is repeated until the training completes. After all the hidden layers are trained, backpropagation algorithm (BP) is used to minimize the cost function and update the weights with labeled training set to achieve fine-tuning.

Model Implementation

The combination of Stacked auto encoder and RNN models requires a particular design, since each model has a specific architecture and its own strengths:

Stacked auto encoder is known for its ability to extract as many features as possible from thedata as explained above.

LSTM/BiLSTM keeps the chronological order.

The purpose of combining these two models is to create a model that takes advantage of the strengths of Stacked auto encoder and BiLSTM, so that it captures the features extracted using Stacked auto encoder, and uses them as an LSTM input. Therefore, we develop a modelthat meets this objective.

Then, the results of Stacked auto encoder are feed to build the BiLSTM input, which apply a BiLSTM layer to filter the information, using its three gates. The output of this step is the input of the fully connected layer, which links each piece of input information with a piece of output information. Finally, we apply the sigmoid function as an activation function to assign classes

Results and Conclusion: In this paper, we implemented SMOTE technique for our generated data set, then we implement different machine learning algorithms but found 97% accuracy to predict the result then we apply Deep Learning Techniques LiSTM and BiLSTM and found 75% accuracy. The Confusion Matrix after implementation of LiSTM.

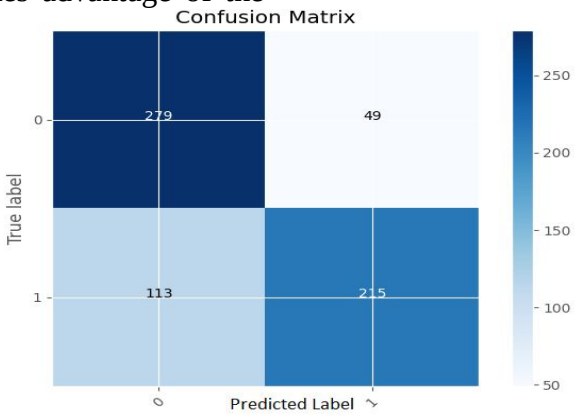

Figure 1: Confusion Matrix of LiSTM Implementation

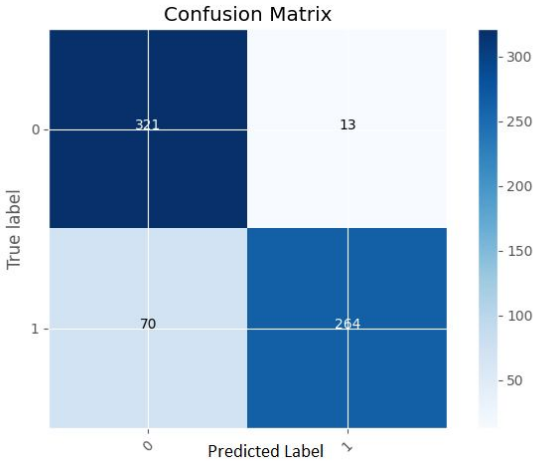

Figure 2: Confusion Matrix of Bi-LiSTM

When we implement Stack Auto Encoder with LiSTM then We got 99.9% accuracy to predict the traffic congestion. As in the Figure 3, It is very much clear with all the parameters values after implementation of different algorithms.

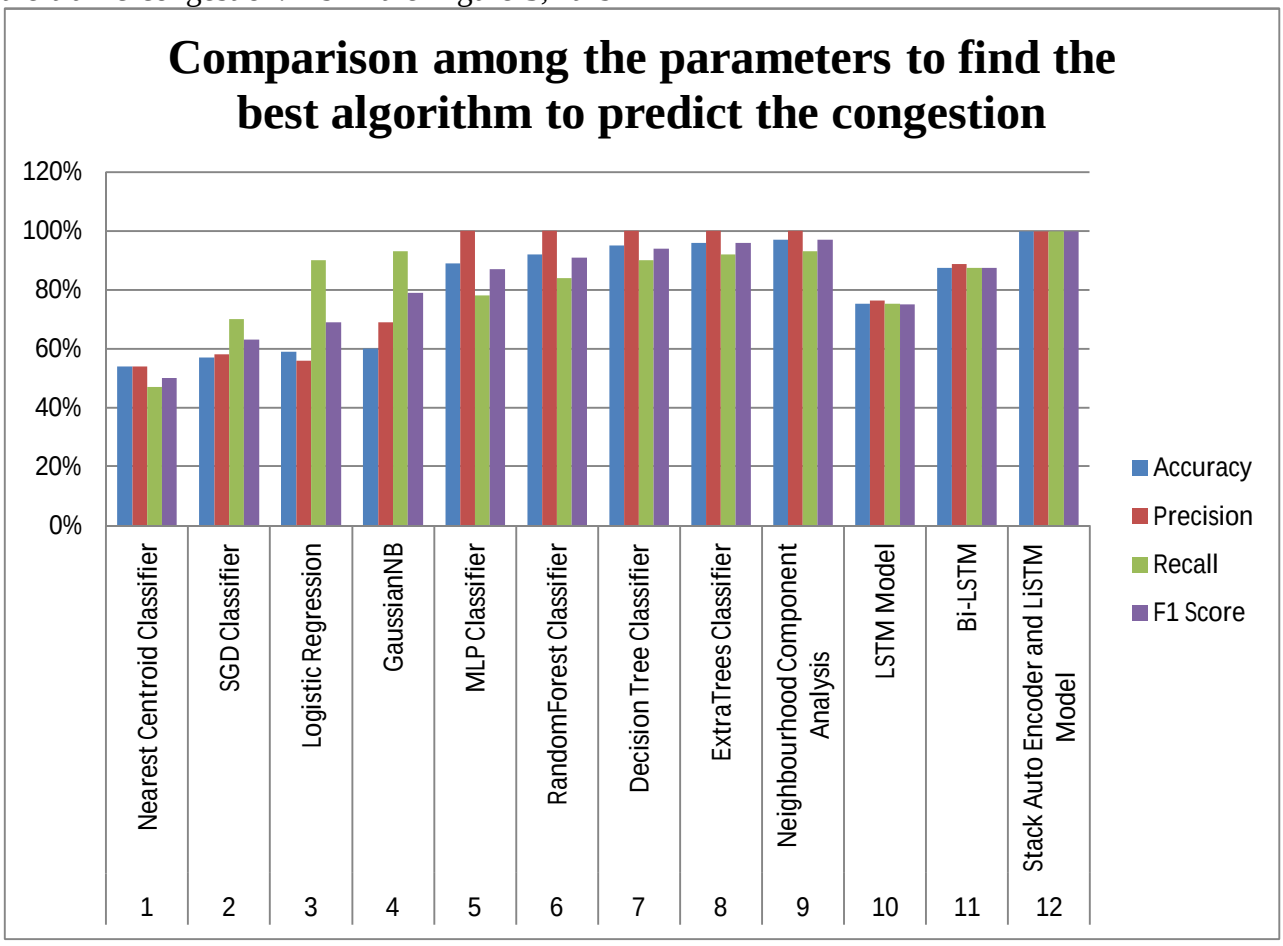

Figure 3: Comparison among the parameters to find the best algorithm to predict the congestion

Hence We can conclude that

Stack Auto Encoder + LiSTM Model proved to be the best Candidate Model.

Neighbourhood Component Analysis is the second best model followed by Extra Tree Classifier as the third best Model (99.9% vs 97% vs 96% accuracy and other parameters also).

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INVESTIGATING THE USE OF PERFORMANCE MANAGEMENT ON CUSTOMER SERVICE AND THEIR IMPACT ON E-COMMERCE TO GAIN COMPETITIVE ADVANTAGE

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ABSTRACT

The purpose of this study is to focus on the performance management system, to understand perfectly the crucial measurements of e-commerce quality in order to gain a competitive advantage. The quality of e-commerce has an influence over customer trust, behavior, and satisfaction. As customer behavior and satisfaction are related to repurchase intention, it indicates the positive impact of the customer over the product or service that helps an individual business process to lead towards success. The study describes the importance of adopting e-commerce in a business procedure along with an investigation of several barriers to make it understood better. Depending on the various business industrial reports it has been identified that the growth of e-commerce is rising rapidly which is capable of reaching more customers. The positive experience of customers has become an origin of competitive business superiority. In the business process, better e-commerce activities can balance the business process perfectly in order to draw the attention of the consumers with this advanced technology system. Here in order to lead this study, a proper survey has been conducted to get better and reliable responses from 51 participants. Here, in this research, the descriptive method was applied to analyze the primary and secondary data. Thematic analysis of the data has become profitable in getting a better understanding of the topic. In this study, data collection is a systematic procedure that deals with the gathering of information of interest and measuring those. The qualitative research method primary and secondary data collection is appropriate in order to get information about various aspects of e-commerce to balance the performance of the management team of customer services. Moreover, this study will be helpful for business leaders to understand both the positive and negative approaches of the e-commerce process to influence customers to develop business size in the competitive business market.

Keywords: *E-commerce, business process, management system, competitive advantage, customer satisfaction, business development.*

1. Introduction

Due to the over passing decade the utilization of technology has become a more developing and common factor rather than other innovation. In this scenario, within the increase of e-commerce, online businesses are capable of offering satisfaction to the customers. The quality of e-commerce is capable of enhancing the trust factor of the customers. Accompanied with the help of modern electronic devices, the interaction with people and services become easier rather than previous method. Beside this, observing the rapid improvement of information technology, the online business can lead a perfect cultural transformation by satisfying customers with their products or services. In both physical business as well as online business, performance management is considered as crucial to influence customers and this factor can motivate the activities of e-commerce in order to achieve competitive advantage. Maintaining customers' requirements and satisfaction is recognized as a serious element that an organization needs to focus on.

Accompanied with the recent update, the ratio of internet users has become 104.96 million, and due to the end of 2021 the number has reached 133.39 million [1]. This constant improvement shows the rapid increase in engagement in the online platform. Due to development in the e-commerce segment the annual revenue has reached US$ 2.3 trillion at the global platform [2]. Based on the survey it

can be stated that nearly 80% of the internet users currently prefer to shop online and it has become the best option for them. In order to develop the business process more successfully in the competitive business market, the majority of the business organizations are focusing on the performance management approach to achieve more success and customer base. The study will concern the use of performance management on customer service and their impact on e-commerce to gain competitive advantage has been discussed to understand the actual fact.

2. Literature Review

2.1 The impact of organization performance on e-commerce

In recent decades, digital transformation or technical revolution has become a trend and key element for enhancing a particular organizational growth. Due to the progress of the mind of the customers towards the purchase intention and increase the selling rate, the business organizations need to recognize the effective organizational performance tools. The impact of company performance is able to lead the growth of the organization to bring a tremendous approach [3]. Accompanied with good performance of the employees the quality of products or services can be maintained and the e-commerce business can sustain for a long term issue. The entire business transaction procedure depends on several combinations such as customer to business, customer to customer or business to customer. As in any business process, customers are the main concerning part; the business performance needs to be modified according to the needs of customers. Accompanied with better performance the organization is able to provide better products and can retain the customers for a long term.

2.2 Market strategies for increasing sales revenue

In order to increase sales revenue it is highly significant to adopt effective business strategies. Among the several business strategies, performance management is considered as one of the most vital key elements. Due to appropriate strategies an individual business organization can retain their customers for a long time and increase their total revenue. Revenue is identified as a key tool to lead any business smoothly [4]. In order to gain competitive advantage among the other business competitors, adopting new technologies along with innovation recognized as motivation power. Therefore, selling more to existing customers the organizational performance is highly significant. In addition, having effective employees and developing new products or services is also a required tool to increase selling rate. Creating a proper plan before engaging in the work process and bumping both short and long-term sales perspectives, monitoring employee performance is considered as a vital responsibility of leadership.

2.3 Innovative technology in internet marketing process

Technological innovation is another important key factor that helps in leading an e-commerce business towards success. Accompanied with innovative technology the purchase and selling process can be more secure and safe for both the customers and the business organization. It helps to make the company more reliable for their customers. Innovation technology can provide a new way to ensure customers regarding facilities to access online transaction procedures [5]. In this modern society the internet plays a vital role as it has almost all the people accessing the internet across the world. In this scenario, if the organization can adopt innovative technologies in the work process, the marketing procedure can be modified and attract the customers. Along with the innovative technology, the online transaction process can be more secure and active and can build the logical chain. New forms of marketing are capable of shaping the improvement of innovative market approaches.

2.4 Conceptual framework

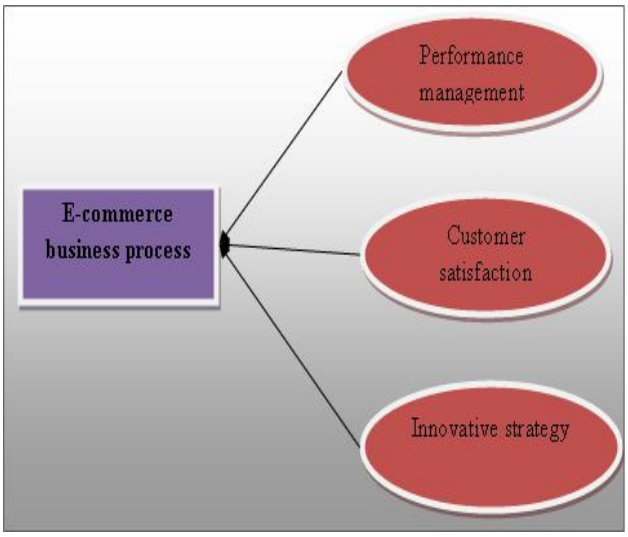

Figure 1: Conceptual Framework
(Source: Self-created)

3. Methodology

In order to lead the research procedure, the ***positivism research philosophy*** has been selected. This process is helpful in collecting the relevant data and securing them for further research. Based on this philosophy, the researcher can get the help of getting the data which are reliable, general and objective. As getting competitive advantage among the competitors the e-commerce business organization needs to adopt several approaches, this philosophy is considered as helpful in this context [6]. In addition, ***descriptive research design*** has been identified as the best approach to make the research study more authentic. Identifying the research barriers, the researcher will be able to collect the appropriate relevant data regarding e-commerce business procedure [7]. The research objectives and outcomes can be reliable and authentic within this selected research design.

The research has adopted a ***qualitative research strategy*** to make it proper in understanding the e-commerce business process. The qualitative data is generally nominal and descriptive in nature and always remains non-numeral. The methods of collective data in majority cases remain unstructured and are capable of capturing the real feelings of the participants [8]. In the research proposal, monitoring the positive effectiveness of the performance management process, an appropriate survey has been done by the researcher. This strategy is helpful in collecting the relevant data by answering the given question sets. In this scenario, observing and examining the real e-commerce business industry, the researcher has successfully analyzed the relevant data with the help of a modern and advanced technology system.

Figure 2: Research Strategy
(Source: Self-created)

Therefore, collecting the right information and data, it is highly significant to select a proper data collection method. In this scenario, to find better outcomes for performance management in leading e-commerce businesses, a ***mixed data collection method*** has been adopted. It can make the research process more authentic and reliable. In order to lead and establish a correct research outcome, it is highly important to select an effective data collection method [9]. In the primary data collection method 51 respondents will participate to provide their valuable experience with organizational performance. In the interview a set of questionnaires will provide to the individual participants. On the other hand, due to collecting secondary data, the researcher will take the help of various journals, books, newspapers and articles of other writers. As the research is explained in a systematic method to gather information and knowledge, the research will be capable of mitigating existing issues to make the research more reliable.

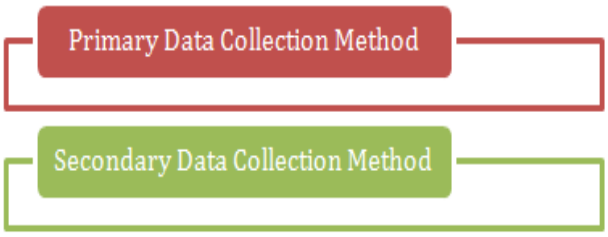

Figure 3: Mixed Data Collection Method
(Source: Self-created)

4. Thematic Analysis

- **Social Media as a Tool in Business**

In this recent developing world, social media has become an effective communicative tool that helps to interact with people across the world. The context of social media marketing allows the e-commerce business leaders to increase collaboration with customers and business plans to develop the advertising approach. In order to create something innovative and creative from the traditional business process, internet access and social media involvance is identified as the best option [10]. Online communication helps the organizational leaders by providing effective technological structure along with an active platform to promote their product or service. It can become easier to reach more people at a moment and draw their attention to increase the purchase intention. In this recent decade, the majority of business promoting companies is aware of their brand image and focus towards enhancing their customer connections. Researchers have found that internet accessing platforms are able to create successful advanced marketing strategies to sustain their competitive advantage.

Year	Percentage
2018	37.4%
2019	32.6%
2020	38.5%
2021	19.8%
2022	14.6%
2023	10.7%
2024	7.7%
2025	5.6%

Table 1: eCommerce revenue growth in India from 2018 to 2025
(Source: Statista.com, 2021)

- **The impact of performance management**

Due to organizational development and increased productivity, having an effective performance management program is considered as vital. It can ensure an organizational goal achievement process along with fulfilling objectives. The accurate performance measurement system can help in increasing employee efficiency and productivity to create innovative products or services to draw the attention of the customers [11]. Good performance practice can motivate the employees to think innovative ideas and implement those in the organizational work process that helps the company to sustain their business for a long term issue and be able to compete with the exciting business competitors. Therefore, by monitoring and observing the performance growth, the e-commerce organization can manage employee and organizational performance.

Market Fields	Market share
Home wear and furniture	9%
Food and drink	9%
Electrical goods	11%
Clothing and footwear	13%
Airlines and hotels	16%

Table 2: eCommerce Market Shares
(Source: Statista.com, 2021)

5. Recommendations and Conclusion

➢ **Recommendations**

In order to enhance the competitive advancement in an e-commerce business process, the organization needs to adopt effective business strategies to lead the business plan perfectly. Along with this, implementing a performance management team they can provide a training session to the employees that they can produce innovative ideas and techniques to support the e-commerce business procedure [12]. As the majority businesses have social media pages and involvance of several social platforms, the e-commerce business also needs to adopt a suitable and active social media platform to reach more customers.

➢ **Conclusion**

Based on the entire study it can be stated that to enhance the business competitiveness, performance management systems require an essential key tool. While doing an ecommerce business advance technology implementation method is also required as an important element. Use of an online marketing approach can help the organization to increase their customer satisfaction by providing them with innovative products and services. Though, the process of data collection method and analysis helped the researchers to bring the effective and authentic research outcome to make the research more reliable and authentic.

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MEDIATIZATION OF POLITICS AND CRISIS OF THE PRESS CREDIBILITY: AN INDIAN PERSPECTIVE

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ABSTRACT

The media is the Fourth Pillar of a democratic society. It works as a watchdog over the legislative, executive, and judicial systems of the government. The media's fair and unbiased reporting is essential for the smooth and better functioning of a democratic setup. According to recent observations, Indian media incorporates several harmful practices to generate revenue, which has impacted its credibility. Today, most of the press is not able to maintain the core objectives of journalism; by presenting fake news and delivering half-truths or fabricated. It is essential to study the role of Indian media in disseminating fake news and the perception of youth towards the declining credibility of the press today. Hence, this study looked into the participation of Indian mainstream media in spreading fake news as well as the approach of the Indian youth towards the declining credibility of the Indian media and how they are contending with credibility issues? The study also explored the evolution of Indian Nationalism, the challenges to Indian nationalism as a nation-state, and the role of media in setting a political discourse, with relation to Indian nationalism.

Key Issues: Democracy, Fake News, *Mediatization of Politics, Media Credibility, Nationalism, Political Discourse.*

Introduction

Mediatization of Politics

Media populism means appealing to people directly through media. A politician who can master the media can shape political affairs outside of parliament and even eliminate the mediation of parliament."

Umberto Eco

Despite several challenges to the idea (Ampuja et al., 2014; Deacon &Stanyer, 2014), mediatization has proven itself a productive and useful concept to explain the social change in terms of the growing significance of mediated communication in modern societies. In general terms, mediatization refers to a process in which media have acquired (and continue to acquire) increasing importance in social domains and for cultural practices (Lunt & Livingstone, 2016).

Mediatization is a word that has its origin in German, *mediatisierung*(Livingstone, 2009). The term "mediatization" firstly emerged among the German-speaking countries. This term was considered to be an awkward term among the native English speaker. However, the "Mediatization" term was first used by a Swedish media researcher Kent Asp who took mediatization of politics as a "process whereby a political system to a high degree is influenced by and adjusted to the demands of the mass media in their coverage of politics" (Asp, 1986, p.359) (Hjarvard, 2008). Couldry and Hepp (2013) however argue that a term is needed for non-native English speakers to encompass the broad consequences of media in our lives, hence mediatization is coined. Mediatization comes to theorize broad media-related or mediatic transformations, instead of particular media-caused, that is, transformations in the age where the "media no longer form a distinct sector but are fully integrated into human life‟ (Fornäs, 2014, p. 39), the age of "deeper social penetration of modes of 'media awareness‟ and „media relatedness‟, following recognition that we now „live in‟ the media rather than „live with‟ them" (Corner, 2018).

Mediatization is a theory that contends that media shapes the public opinion and agenda of the political discourse among the general public and society in which it exists. Media has a role in setting the dialogue of political communication. Mediatize means how communications transform society, media's impact on political systems, assessing how the processes and systems of communication transform society, media's impact on political communications as the media has emerged as the key institutions. Political communication is a subfield of political science and communication, where factors like- how

information spreads and influences the public, polity, and policymakers, citizens, and the news media; determine the decision making. According to this, the news media has high power over the shaping of the institutions and societies, as they are dependent on the mass media.

In recent times, especially during election campaigns, we have seen the impact of media on politics, that is, how media has influenced decision making. In present times, the media plays an essential role in politics compared to earlier times. In previous times too, media had a role in political communication in societies. Still, due to societal development in modern times, the present time to be specific, the media has become an indispensable part of politics, that the discourse has been shifted from 'mediated politics' to 'mediatized politics.' Mediatization of politics, therefore, is a long process in which the media has a significant impact on political communication, policymakers, institutions, and citizens.

In India, due to mediatization, politics has lost its autonomy, is increasingly dependent on media coverage to influence the people, and media coverage shapes political opinion. In the field of journalism, one of its subfields mass media is a communication tool for political institutions as well as society. The role of mass media is under continuous investigation, with its relation to social changes. It suggests that media as a platform has become a political territory. If we see the media coverage of the 2 Lok Sabha elections from 2014 and 2019, it is evident how the Indian mainstream media and press set an agenda, presented a fabricated reality before the public and used 'nationalism' as a sentiment to influence the political opinion of the people.

Crisis of the Press Credibility

The concept of source credibility was developed by Aristotle 2300 years ago. In his Rhetoric, Aristotle explained the importance of credibility in persuasion. He believed that a credible speaker, who is seen as competent, informed, and trustworthy, is more likely to convince than a speaker who lacks these traits.

Credibility is a multidimensional concept. For Aristotle, reliability was made up of three dimensions: wisdom, character, and goodwill. Modern-day scholars have also envisioned credibility. Multifunctional construction. For example, in 1948, Hyman, in his classic study of the effect of credibility. Persuasion conceived the credibility of the source as being composed of dimensions of prestige and competence. Yale University psychologists Hovland and her colleagues Janice and Kelly (1953) in their investigation into World War II communication suggested three components of credibility: expertise, credibility, and intention are important and must be considered.

As Gaziano (1988) points out, "The credibility of the media is studied as an important issue because the public's reluctance to trust the news media can seriously undermine a country's ability to inform the public and monitor leaders." This will interrupt". Bracken (2006) points out, "Source reliability is the amount of reliability attributed by the receiver to a source of information". Source credibility refers to the "judgment made by the audience about a communicator's expertise and credibility" (O'Keefe, 1990; Kissis, 2001; Self, 1996), while Moderate credibility refers to, "relative credibility of the media channels that sources use to send messages" (Metzer, Flanagin, Eyal, Lemus, & 5 McCann, 2003; Westley & Severin, 1964); Whereas the credibility of a media, a channel refers to the "credibility of a specific media outlet" (Bookie, 2003).

In recent times, we've witnessed a massive growth in the media industry, but the media coverage has drifted far away from the objectives of Indian journalism. Today, the majority of the Indian media and press doesn't concern themselves with society and the general public, that is to say, the Indian press has disconnected itself from the lives of Indian people and the issues they face. This drift of Indian media from objective journalism is due to the cross-media ownerships and media conglomerates.

According to the data of the 2019 World Press Index, India currently ranks at 140 out of 180 countries. The surprising fact is, India dropped down two ranks from the previous year. In recent years, India has also witnessed tremendous attacks on freedom of the press, in an attempt to suppress the critical reporting of the media. The attacks on the Indian media

have been in the form of media censorship that we have seen the Indian government implement on media houses and journalists. The attacks have also been in the form of physical violence against the Indian journalists, some of which have even led to deaths.

Table :1 India's World Press Freedom Index ranking since 2013

Sr. No	Year	Rank
1	2013	140/180
2	2014	140/180
3	2015	136/180
4	2016	133/180
5	2017	136/180
6	2018	138/180
7	2019	140/180
8	2020	142/180
9	2021	142/180

Source: India | RSF

Fig :1 India's World Press Freedom Index ranking since 2013

Reasons for the Crisis in Press Credibility

- Indian government's attempt to stifle dissent and free-thinking. Since the rise of the Modi government in 2014, India has observed deliberate attempts by the ruling government to suppress the press and journalists that are critical of the government.
- The majority of the Indian mainstream media houses have become a puppet of the Indian government, presenting biased news in favour of the latter. Propaganda and fake news have now become the tools of Indian media. Objective journalism and truthful reporting are on the verge of extinction.
- Paid news is also a big problem in terms of the credibility of the press. As it's been diagnosed as cancer in the field of media forthe last couple of years. Somewhere it leads to the commercialization of media especially mainstream media and also filth the media ethics. In pats we have seen incidents like Gujarat Assembly elections, Jindal Steel owned Zee News Dispute or disqualification of sitting UP MLA by the election commission of India in October 2011 are some incidents of paid news in India.
- The inclination of the Indian public towards propaganda and controversial news. The audience isn't interested in the critical issues of society but favours the sensational story presented by mainstream media, which lacks objective journalism.
- In India there are almost 400 news channels that are currently working at the National or regional level and more than 150 news channels are in awaiting clearance. Along with this in India, we have more than ten thousand newspapers and magazines also published here. But the major problem is the quality of journalism in India which is poor as mentioned by Reporters without Borders an NGO, who ranked India 142 among 180 countries in the Global Freedom Index.

Literature Review

Audience confidence in the selection of news themes, journalists' selection of facts, illustration accuracy, and journalistic assessment and interpretation of facts are all factors that contribute to public trust in the media (Kohring and Maths, 2007). Thus, the hope that journalists would cover the news professionally might be defined as trust in the media (Tsfati, 2003a).

The media's perceived credibility is influenced by a number of variables. In their study, Rimmer and Weaver (1987) found that the more people utilize a specific medium, the more likely they are to believe it is trustworthy. In other words, those who use a specific media more regularly have a more favourable opinion of its legitimacy than those who use it less frequently. While, Severin and Tankard, (2001) argued that, "reliability often

depends on the user's choice and the kind of medium used". Kiouis, (2001) and Johnson & Kaye, (2002) also found a strong correlation between the daily use of a medium and its credibility.

"People who watched a television station more often tended to assess it more favourably than those who were not aware of it," according to Bookie (2003). Few other studies examining the influence of the media in the formation of political attitudes can be trusted since they are linked to other factors, such as television viewing habits (eg, Lu and Andrews, 2006).A general trend is that media audiences rate their primary source of news as a reliable source. When information is abundant, such as during election seasons, media trustworthiness becomes a critical criterion for content (Schweiger, 2000). In most cases, television is seen to be more trustworthy than other forms of communication (Geary,2005).

Berlow, Lemert, & Mertz (1969), Chaffee (1982) have argued that reliability is excessive. As it's always audience-centered view, it is situational and susceptible to change. Changes in the media landscape, changes in media practices, and big events of enormous social significance, such as elections and disasters, have all been known to affect public opinions of media trustworthiness.

Sharma (2017) states that 'fairness' 'correctness,' 'fairness,' completeness, comprehensive, purity' is some of these Factors adopted in the news credibility Factor. The study of Stockwell (2008) states that the relationship between newspaper credibility and Attitude is not linear though, and it is necessary What other factors are influencing to consider Causes of attitude change in message recipients In addition to the reliability of the source

(Newsclick & Production, 2018) PamellaPhilipose, in her interview with News Click, says that earlier, the role of media was a mere communication channel. But it has now appeared as an independent organization with its own symbolic and economic logic. The press is capable of setting political agendas, with advertising the message at the source, so that the audience is highly influenced by it. The author emphasizes the early days of Narendra Modi, explaining how he used media as a weapon to take down his political rival Keshubhai Patel, then chief minister of Gujarat. Result? Modi won the subsequent election and later admitted the exploitation of media for party publicity.

(Chaudhary, 2019) The writer, by taking the reference of the book 'Media's Shifting Terrain: Five Years that Transformed the Way India Communicates,' explains how there has been a change in the media convergence recently, from 2011-2015. The book starts with how the majority of Indian media, due to economic liberalization, has shifted to a business model, changing its target audience from readers/viewers to advertisers. The author of the book titles the years from 2011-2015 as mediatized, calling them mediatized 'half-decade.' These five years witnessed a surge in the rise of the internet and social media, along with technology like smartphones.

(RSF, 2020) Reporter without Borders, an international press freedom organization, in its 2020 World Press Freedom Index, marks India at 142 out of 180 countries. India has dropped from 2 rankings (140) in the year 2019. India witnessed no journalist murders or killings in 2019, compared to 6 in 2018. It might suggest that India's state has recovered, but there had been regular press freedom violations. These were police brutality against reporters, political ambushes, and retaliation incited by unlawful groups and officials. According to RSF, since the victory of BJP's Narendra Modi in the 2019 General Elections, the pressure on the press to align with Hindu nationalist sentiments have increased.

(Mishra, 2019) According to the National Herald, Indian society is in desperate need of freedom from biased media. It is because of the ignorance of the public to identify propaganda and biased news from the press. The reason is that Indian society has been fed misinformation repeatedly, repetitively, making it a pattern. Consequently, the public has systematically adapted to it over time, and now all the public opinion is shaped. According to the article, the media has set a narrative, branding JNU as a place for anti-national activities, and the public has accepted it as a reality. These media houses have no sources to verify their claims, except for a single political party that is praised nationwide.

The media is said to filter out the news that shows dissent and is critical of the government.

(Visvanathan, 2016) Rabindranath Tagore once said, "patriotism is the last refuge of scoundrels," and he couldn't be more right. The nation-states today have become authoritarian that focus on censorship of dissenting thoughts and preserving the so-called "national pride." In India, majoritarianism and jingoism have united to carry out policing tasks. Self-made vigilante groups like the Bajrang Dal protect India from obscenity by censoring movies and art that has or portrays sexuality. According to the author, majoritarian nationalism is a threat to India as it lashes out on the dissenting voices, the minorities, and the critics.

Objectives of the Study

The primary objective is to analyze the impact of the mediatization of politics on the credibility of the press. In the current scenario, the way media is presenting information is very dubious and it also appears in the presentation on news channels. Through this study, the researcher will try to analyze the content as well as the credibility of news channels.

Research Methodology

This is purely exploratory research. The analysis is done based on secondary data accessible on the internet, websites, research papers, newspapers etc. In the dichotomy of qualitative and quantitative research, this study is primarily qualitative. The case study is a research methodology that helps in the exploration of a phenomenon within some particular context through various data sources, and it undertakes the exploration through a variety of lenses to reveal multiple facets of the phenomenon (Baxter & Jack, 2008).

Analysis

Media today has drifted away from the issues concerning society, especially poor people. If we observe the coverage of Indian mainstream media in recent years, we will find that most of the information or reporting by the media is propaganda based and agenda-based. To divert the public from crucial issues like health, education, employment, the government, and the help of mainstream media, it has created an environment of sentiments and pseudo-nationalism among ordinary people. The media is biased towards the ruling government BJP, reporting the issues or news that directly or indirectly benefits the government.

The mainstream media is already in the hands of a few prominent private individuals due to the cross-media ownership and media conglomerates. Due to this, most of the media houses are no longer dependent, and therefore, the reporting they do is nothing but propaganda for their masters. Except for a few media houses like NDTV, most of the media is already an advertising propaganda machine. Since the rise of the Modi government in 2014, we have seen that if anyone dares to question and criticize the government, asking what it has done for the common public, he/she is branded as anti-national. And the media plays a vital role in building this 'anti-national' propaganda among the people.

It is sad to see how gaily the government and the media have shifted focus from public policies under the umbrella of 'nationalism' or 'Hindu Rashtra.' The BJP fought the 2019 Lok Sabha Election using the "Pulwama terrorist attack" as a propaganda tool. The building of 'Ram Mandir' was another tool to influence the voters. Using communal politics as its propaganda, the government, with the help of mainstream media, created a scenario of "us vs. them." According to this, if you question the government or criticize it, you are an anti-national, urban-Naxal, Maoist, or worse Pakistani. The media played an important role here by regularly reporting propaganda news in India. The media should be blamed for creating an anti-muslim hate sentiment among the nation, just so its masters could win the election.

If we observe the 2019 Lok Sabha media coverage, none of the media except NDTV reported issues like poverty, employment, health care that concerns the poor society. However, few independent news portals like News-Laundry, Scoop-Whoop, The Wire, The Quint, Scroll, The Print; did an excellent job in reporting societal issues.

Hence here are a few case studies to analyse thecredibility of the press in India or we can

say how Indian media works in a biased way in terms of presenting the information.

- AAP's 2020 victory in Delhi assembly elections: It was a good thing to see that AAP fought the election on issues like free water, free electricity, government schools, Mohalla clinic, etc., staying away from propaganda. BJP, on the other hand, with the help of media, fought the elections using 'islamophobia' and constant Muslim baiting. "Shaheen Bagh" was all over prime time and social media, to spread anti-muslim hate among the public. The public, however, wisely chose AAP as its leader because it knew the work Arvind Kejriwal had benefited society and poor people the most. Soon after AAP's victory, Sudhir Chaudhary from Zee News was rambling on prime time, saying Delhi citizens didn't care about their nation. It shows how low the Indian media has stooped, losing their ethical values.
- The farmer suicides in Maharashtra and across India: In the year 2018-19, the farmer suicide rates were at an all-time high. Because the farming sector hit rock bottom, the poverty-stricken Indian farmers were distressed. The farmers from Maharashtra and other Indian states launched a rally in protest. Sadly, except few mainstream TV channels, this news was completely ignored by the media. Neither the government nor the media concerned itself with the poor farmers.
- DuringCOVID-19 pandemic in 2020, the entire nation is under lockdown. The lockdown has affected migrant labourers and daily wage workers the most; they have nothing to eat and nowhere to go. But the media is covering this issue, by doing trash journalism on TV, singing praises of PM Modi, and reporting the "Chinese virus." To make the situation worse, this, too, is blamed on Muslims. Islamophobia is at an all-time high in India.
- During Mumbai Attacks, NDTV's prominent anchor BarkhaDutt was criticized for the way she covered the news. she reported from the Taj Mahal Hotel and the Oberoi Trident. She was criticized for covering the news in a of sensationalize manner, which put lives of various people at the risk, along with causing death by identifying on live television where hotel guests may be located. Reporting a siege situation, providing terrorists with information, and indirectly assisting them. According to Lydia Polgreen of the New York Times, critics regarded Dutt and other journalists' coverage of the assaults as "dramatic and dramatic." Fairness, preserving fairness, credibility, and ethical principles in reporting are critical in today's world, which is rife with corruption.
- Famous controversy of students which includes Kanhaiya Kumar and Umar Khalid as the main culprit behind the raising of anti-India slogans happened inside in the campus of Jawaharlal Nehru University (JNU) has gone viral on social media and has been widely reported in the mainstream media. Theway media has covered the 'action' of JNU are what make this whole event interesting. Delhi Police have issued a lookout notice against Kanhaiya Kumar, In what now looks to be false film, police detained Kanhaiya Kumar, a student leader, as 'proof' shown by certain media outlets that did not bother to examine the validity of the video, or worse, ignored the altered facts in their line of duty. This caused a lot of friction among different student groups because the media had no proof of legitimate evidence but continued to talk and make views without it. The story of Gudiya, aired by Zee News, whose first husband, whom she presumes dead and remarried, returns after being released as a prisoner of war. The village panchayat of Muslim clerics ruled that Gudiya, 8 months pregnant, would have to go back to her first husband. The story was telecast live on the channel where Gudiya sat as an accused during the media trial and the panel discussed and discussed her future. This story was met with criticism from the public. The story was sensationalized with no concern for moral values or ethics.
- The killings of 14-year-old Aarushi Talwar and 45-year-old Hemraj Banjade, a domestic servant recruited by her family in

Noida, India, are known as the Noida double murder case. Both were assassinated at Aarushi's home. The case sparked widespread attention and garnered extensive coverage in the media. The dramatic media portrayal of the case, which featured severe charges against Aarushi and the defendants, was panned.Aarushi's parents, Dr. Rajesh Talwar and Nupur Talwar, were later named as major suspects by the police. Many unfounded discussions arose in response to this event, such as how safe is a daughter with her father? Every day, the media presents a new narrative about the murder case that has engulfed the country, but the media quickly goes on to a new topic with no media following or ability to disprove the myth with the reality. In this incident, the media seemed to be unreliable, inconsistent, unscientific reporting methods and not upholding ethical values.

Along with these stories, India's electronic media has been in the news this year, mostly for all the wrong reasons, be it the TRP scam, sensational stories related to the Sushant Singh Rajput case or the alleged defamation of the Muslim community over the Tablighi Jamaat congregation.

Conclusion

Mediatization of politics has given media tremendous power over shaping public opinion. The media has a massive role in shaping the political agenda, especially during the elections. The political institutions, politicians, authorities; everyone is dependent on the media. As we have discussed in the previous General Lok Sabha election whether it’s in 2014 or 2019 press played an indispensable role in shaping and molding the image of Narendra Modi. Since then, every political party is trying to use media to advertise its ideology and influence the public mind, but we have seen it only BJP who got success. We have seen in recent times the allegation that has been imposed by the Indian National Congress and other political parties where they claimed that media has become a tool for the ruling party, which reports every news in favour of the government and sets propaganda to shape public opinion. Along with this, there is another issue of the press credibility has gone worse in recent years. Most of the mainstream media has turned biased and is working towards profits, not for ethical journalism. Freedom of the press is at an all-time low in India, like what happened during the Indira Gandhi emergency era. We can consider a kind of silent emergency in the current time where anyone can be called anti-national or put behind the bar on raising questions to the establishment.The common citizensis unaware of the media's tricks or hidden agendas. The public consumes the information provided by the media, and many individuals are affected by it, shaping public opinion. The media serves as society's fourth estate and watchdog. The media should remember its social responsibilities and pursue the cause honestly in the fight for TRP. Despite the fact that most individuals think that trustworthiness is important,

Recommendation

The media in India should be administratively and financially autonomous to be the effective voice of the people in governance. What is expected of responsible media-reporting news in depth without opinion, providing only facts and facts to the people, data-driven journalism with the use of statistics and verifiable data, plurality and diversity of voices. The media is facing a credibility problem, and the only way to overcome it is to ensure that they are transparent. Nevertheless, there is a strong feeling everywhere that the media is not subject to public scrutiny; that they run stories without considering the sentiments of the public and publish what their editors want to read, rather than the public. Media organizations should have editorial independence and transparent ownership. These qualities are extremely important because media freedom is often compromised by owners who do not value independent ideas but focus only on commercial interests. The time has come for the media in India to reform itself to regain its lost sense of credibility.

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TECHNOLOGICAL INVESTIGATION AND DEVELOPMENTS OF VARIOUS ENGINEERING TECHNIQUES IN THE DEEP-SEA FISHING INDUSTRY

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ABSTRACT

New data and monitoring technologies have the potential to improve fishing industry while also contributing to the industry's greening. Governments have already been able to collect more data on fishery resources, better monitor, enforce, and research the environmental effects of fisheries actions, and increase the efficiency of laws to standard version fisheries thanks to the use of modern technologies. In recent years, there have been several technological advancements in this field. These technologies can be collaborative, such as those used by governments to monitor the fishing industry, or non-collaborative, such as those used by governments to monitor the fishing business. Illustrative steps are the increased computer capacity of mobile devices and the emergence of user-friendly GPS systems. Greater "big data" storage, distribution, and processing capabilities; greater drone diversity and durability; satellite technology accessibility and accuracy; continuous developments in on-board digital cameras and recorders; This article investigated some of the current and emerging technologies used in marine fisheries managed in order to understand how policies may affect their development and application, and inversely. It will help governments figure out how to improve and alter their policies, regulations, regulations, and compliance procedures.

***Keywords**: Electronic monitoring Systems, Sensors, Big data Analysis, Black chain, Drones*

1. Introduction

The fishery produces around 90 million tonnes of healthy seafood each year and employs tens of millions of people. Many fisheries were good and had reached or almost reached their capacity. On the other hand, despite climate change, thousands of other fisheries could produce significantly more food than profit if they maintained the catches established by scientists (Gaines et al., 2018). Fisheries monitoring is essential to address these challenges and enable fisheries to reach their full potential in terms of food, foreign exchange and employment, while protecting the ecosystems of the oceans. Monitoring systems provide the information necessary to ensure that fishing regulations are followed to achieve these objectives. Monitoring also generates data for scientific stock assessments that can be used to establish sustainable catch limits. In terms of food production, monetization, and environmental targets, fisheries that use surveillance data to compile stock assessments, set sustainable catch limits, and hold people accountable for legislation outperform fisheries that do not use surveillance or management. science-based (Costello et al., 2012). Surveillance can be beneficial for fishermen who need to demonstrate that they are fishing correctly in order to access certain markets or for other reasons. Despite its many advantages, fishing control is not used extensively. Lack of legal responsibilities for monitoring, lack of commitment to monitoring, perception that monitoring is too costly, concern for privacy, and resistance to change are contributing factors. Electronic surveillance (EM) programs that monitor catches and discards with cameras and other sensors and sophisticated computing are emerging as a viable option for fisheries with the necessary infrastructure, resources and for fisheries with the requisite infrastructure, resources, and capability to employ them.

2. Related Works

Various approaches and procedures are used to maintain an overview of the fishery (Lowman et al., 2013). In fisheries, self-assessment tools such as logbooks, hail and landing records are

widely used by fishers, as well as techniques that are not based on fishers self-assessment, such as observers, port samplers and ME. Surveillance systems are a collection of technologies that work together to produce a variety of surveillance data. A ship monitoring system & # 40; VMS & # 41; is an example of a surveillance system that uses a GPS receiver to record the vessel's position and a satellite transmitter to periodically send this information to fisheries managers.

Monitoring techniques define how data is collected, stored, transmitted, analyzed and used for management, as well as the monitoring obligations of each entity involved in the management of the fishery. As part of a monitoring system, fishermen can, for example, report the catch data themselves in the logbooks and transmit it to the administration at the end of each fishing trip. This book defines a fishery monitoring program as the collection of all the tools, methods and procedures used to monitor a fishery.

The ER tools, such as electronic registration books and satellite VMS systems, are often associated with EM systems.Human observer data can suffer from transmission biases and errors if the overall surveillance system is not well built, and the use of the human observer in a diverse fleet is generally hampered by shipping space, logistical issues, and significant financial expenses. When information obtained during a surveillance program conflicts with the personal interest of those involved in the fishery, limitations arise. For example, if a fisherman reports high catches of a protected species that is subject to a strict cap, his future fishing opportunities may be restricted.[2] Due to these limitations, many fisheries managers have been unable to establish surveillance systems that provide high-quality data to meet management objectives such as high and sustainable yields, good profits, and minimized impacts on marine animals and ecosystems. These surveillance restrictions do not normally lead to the introduction of fisheries surveillance programs.

3. Various Fish Monitoring Systems

A number of engineering approaches are used in deep sea fishing. Electronics monitoring systems, big data analytics-based fish monitoring systems, and black chain drones for fish monitoring are just a few examples. The approaches described above will be addressed in further detail later down.

4. R emote Electronic Monitoring System

EM programmes have emerged over the last 20 years to help overcome some of the limitations of monitoring programmes as well as other barriers to fisheries monitoring. By eliminating mistakes, electronic logbooks can help in the collection of self-reported catch and effort statistics. Cameras onboard vessels may now monitor capture, bycatch, and disposal rates instead of human observers' onboard vessels or catch enumerators in ports. Data from monitoring systems may now be digitally recorded and analyzed later, or even broadcast in real time.[4]

Most fisheries management video systems on commercial fishing vessels include more than just CCTV cameras. A GPS receiver, fluid pressure sensor, winch rotation sensor, user interface (for example, keyboard and display), and digitized CCTV cameras are all included in most solutions (Figure 1). They can be used by system to determine a boat's activity, where it occurred, procure thoughts and input from the skipper, and obtain video of the incident for overview and other purposes. If your system includes a satellite communication device, there's no purpose why sensor and GPS data can't be sent to the ground for near real-time monitoring. The gathered data is generally kept on a portable hard drive that is regularly exchanged rather than transmitted via satellite since the video files are too big to broadcast in real time. The picture may then be used to collect information on catch grip, discard strategies, and capture composition, but also empirical studies, identity data, and rule compliance.[5]

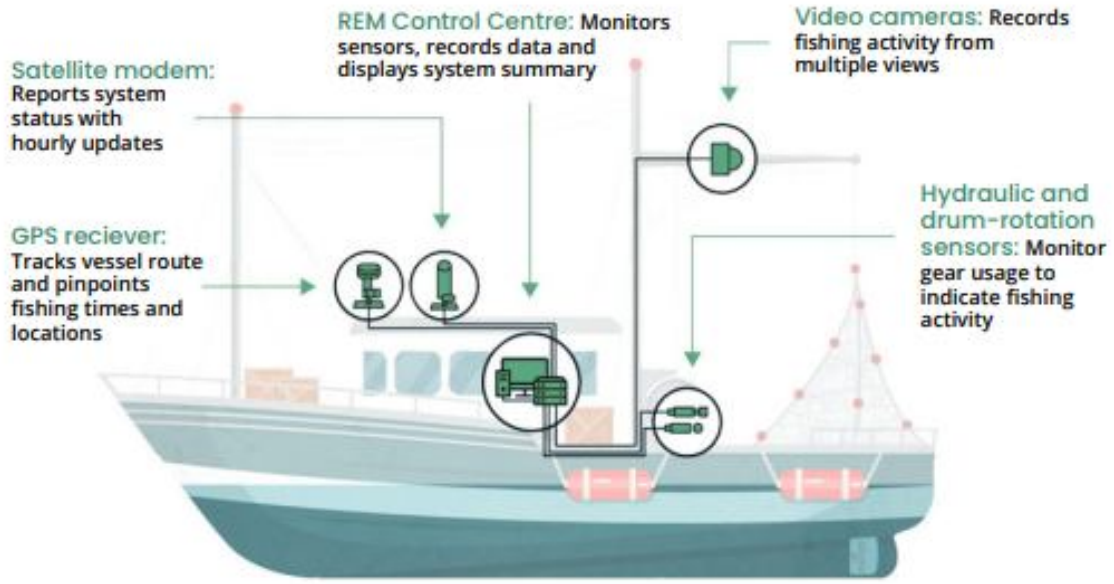

Figure 1. Remote Electronic Monitoring Systems [13]

EM Processes

In addition to the physical EM system, EM programmes include methods for ensuring that the system functions properly, as well as data management, analysis, and interpretation. These include rules for how data is passed to management, how often it happens, how much footage is examined, and who owns the data, among other factors. Field service personnel and data technicians must be kept to support these activities.[13]

The Future of EM

The current level and use of technology in most large, operational programmes is depicted in Figure 1, although EM technology is continuously advancing. The following are some anticipated EM technology advancements during the next three to five years:

- Higher load data storage at a lower cost to support future EM systems that generate that much data
- Higher-resolution digital cameras, although not always at a lower cost to accommodate future EM systems that generate more data
- Faster data converting with lower power consumption, which may or may not be less expensive to accommodate future EM systems that generate more data Sensors and cameras will have additional opportunities to interact wirelessly.
- Higher data transmission speeds across EM components, which may or may not be able to keep up with larger amounts of data created each day, in the range of two to three terabytes
- Improved power consumption (through satellite, WiFi, cell, and land-based portals) improves Health remote real-time control and analysis

5. Big Data Technologies for Monitoring of Fisheries

Big data can aid filter data from novel technology tools after the data cast-off to monitor, control and monitor fisheries has grown meaningfully. It is a good another to outdated databases and demand management software. Thanks to the cloud, data can now be bent, handled and accessible in near real time on mobile devices. Big data contains customer transaction data, automation, satellites, sensors, and IoT. 20 One of the major snags in transporting big data is the lack of a mutual language. For example, not all databases use "Big Data SQL", which makes system comparisons difficult.

Big data can help with information filtering, especially in heavy shipping situations. Pew partnered with Satellite Applications Catapult on The Eyes on the Seas project, which integrates surveillance and satellite imagery with fishing vessel records and oceanographic data to help authorities detect illegal fishing in

MPAs and around the world. Other national initiatives are also underway.

6. Blockchain Technologies

A blockchain is a rising collection of data called blocks that are connected and encrypted. Respectively block generally comprises a hash connection to a earlier block, a timestamp, and transaction data. Blockchains are inherently resistant to data manipulation. The first custom of blockchain technology in the fishing industry took place in 2017. The Earth Twine Stratis platform syndicates collaborative technologies (Earth Twine, SPARKL and Stratis) to progress the traceability of fishing items by recognizing IUU fishing items and removing them from the value chain of legal goods. However, since a contestant is unlikely to share business data, this option remains speculative. [12]

7. Drones

The increasing use of fully or partially autonomous vehicles or drones for sustainable fishing is one of the most popular application areas for new technologies. drones can be divided into three different types:

- Unmanned Underwater Vehicle
- Unmanned Aerial Vehicle
- Unmanned Surface Vehicle
- Autonomous Underwater Vehicle

Drones can be used to study fish populaces at a fraction of the cost of oceanographic vessels. Drones can be used to monitor and implement AMP, giving AMP authorities more flexibility and a inexpensive alternative. Drone surveillance can aid belief by only if a fisheries officer with sufficient evidence to conclude that an unlawful act has happened. To illustrate this, the EMSA, in partnership with the French trading company CLS, will undertake a multipurpose UAV mission to track illegal fishing vessels and smugglers.

Tuna vessels have used drones to illegally track accumulations of tuna in the Pacific Ocean, which is surprising. Drone development is hampered by the fact that autonomous vehicles / floating objects are not covered by international maritime standards and As a result, there are many different interpretations and uncertainties surrounding the topic.

8. Conclusion

Based on descriptions of new technological growths and their possible influence to better fisheries management, counting the organization of the food chain, this research analyzes new technologies as essential tools for green growth in the fisheries sector. However, there are several policy concerns that remain unresolved this article deals on blockchain, bigdata, electronic monitoring and drones used in fishery monitoring. Future studies could focus on technical, legal developments in deep see fishery monitoring systems.

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ON FINDING INTEGER SOLUTIONS TO THE HOMOGENEOUS CONE

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ABSTRACT

The ternary quadratic equation $x^2 = 25y^2 + 29z^2$ *representing a homogeneous cone is analysed for its non-zero distinct integral points. A few interesting properties among the solutions and polygonal numbers are presented.*

Keywords: *Homogeneous cone, ternary quadratic, integer points*

Notation

$$t_{m,n} = n\left[1+\frac{(n-1)(m-2)}{2}\right]$$

Introduction

Number Theory is the branch of mathematics concerned with studying the properties and relations of integers, irrational numbers, transcendental numbers, continued fractions and Diophantine equations. The ternary homogeneous quadratic Diophantine equation offers an unlimited field for research because of their variety [1-2]. For an extensive review of various problems one may refer [3-23]. This paper concerns with yet another interesting ternary quadratic equation $x^2 = 25y^2 + 29z^2$ representing homogeneous cone for determining its infinitely many non-zero integral solutions. A few interesting properties among the solutions and polygonal numbers are presented.

Method of Analysis

The quadratic Diophantine equation with three unknowns studied for its non-zero distinct integer solutions is given by

$$x^2 = 25y^2 + 29z^2 \quad (1)$$

We illustrate below different sets of integral solutions of (1).

Set I

It is observed that (1) is of the form

$$x^2 = y^2 + Dz^2 \quad (2)$$

where D=29. Employing the most cited solutions of (2), one may obtain

$$x = 29m^2 + n^2$$

$$y = \frac{1}{5}\left(29m^2 - n^2\right)$$

$$z = 2mn, m, n \in N.$$

Since our interest centers on finding integral solutions, it is possible to choose m,n such that x, y and z are integers. For the sake of clear understanding, the values of m, n with the corresponding solutions are presented in Table: 1 below:

Table: 1 Values of m, n with solutions

Choices	m	n	x, y, z
1	5M	5N	$725M^2 + 25N^2, 145M^2 - 5N^2, 50MN$
2	5k-4	5k-3	$750k^2 - 1190k + 473, 140k^2 - 226k + 91, 50k^2 - 70k + 24$
3	5k-4	5k-2	$750k^2 - 1180k + 468, 140k^2 - 228k + 92, 50k^2 - 60k + 16$
4	5k-3	5k-4	$750k^2 - 910k + 277, 140k^2 - 166k + 49, 50k^2 - 70k + 24$
5	5k-3	5k-1	$750k^2 - 880k + 262, 140k^2 - 172k + 52, 50k^2 - 40k + 6$

6	5k-2	5k-4	$750k^2-620k+132,140k^2-108k+20,50k^2-60k+16$
7	5k-2	5k-1	$750k^2-590k+117,140k^2-114k+23,50k^2-30k+4$
8	5k-1	5k-3	$750k^2-320k+38,140k^2-52k+4,50k^2-40k+6$
9	5k-1	5k-2	$750k^2-310k+33,140k^2-54k+5,50k^2-30k+4$

A few interesting properties among the solutions for each of the above choices in Table:1 are presented below:

Properties:

Choice 1

1. $y-t_{292,M}+t_{12,N}\equiv 0(\text{mod}4)$
2. $x-t_{1452,M}-t_{52,N}\equiv 0(\text{mod}4)$
3. $x-y-t_{1162,M}-t_{62,N}=579M+29N$

Choice 2

1. $x-y-t_{1222,k}\equiv 27(\text{mod}355)$
2. $z-t_{102,k}\equiv 3(\text{mod}21)$
3. $y-t_{282,k}\equiv 4(\text{mod}87)$

Choice 3

1. $x-t_{802,k}-t_{702,k}\equiv 36(\text{mod}432)$
2. $y-t_{202,k}-t_{82,k}\equiv 2(\text{mod}90)$
3. $z-2t_{52,k}\equiv 4(\text{mod}12)$

Choice 4

1. $x-z-t_{1402,k}\equiv 112(\text{mod}141)$
2. $y-2t_{142,k}\equiv 21(\text{mod}28)$
3. $y+z-t_{382,k}\equiv 26(\text{mod}47)$

Choice 5

1. $x-y-2t_{612,k}\equiv 10(\text{mod}100)$
2. $z-5t_{22,k}\equiv 1(\text{mod}5)$
3. $y-7t_{42,k}\equiv 13(\text{mod}39)$

Choice 6

1. $x-50t_{32,k}\equiv 52(\text{mod}80)$
2. $y-10t_{30,k}\equiv 20(\text{mod}22)$
3. $z-2t_{52,k}\equiv 4(\text{mod}12)$

Choice 7

1. $x-3t_{502,k}\equiv 117(\text{mod}157)$
2. $y-20t_{16,k}\equiv 5(\text{mod}6)$
3. $z-25t_{6,k}\equiv 4(\text{mod}5)$

Choice 8

1. $x-250t_{8,k}\equiv 38(\text{mod}180)$
2. $y-20t_{16,k}\equiv 4(\text{mod}68)$
3. $z-10t_{12,k}=6$

Choice 9

1. $x-10t_{152,k}\equiv 33(\text{mod}430)$
2. $y-7t_{42,k}\equiv 5(\text{mod}79)$
3. $z-t_{42,k}-t_{62,k}\equiv 4(\text{mod}18)$

Set II

Express (1) as the system of double equations as presented in Table: 2 below:

Table : 2 System of double equations

System	I	II	III
x+5y	z^2	$29z^2$	29z
x-5y	29	1	z

Solving each of the above system of double equations, one obtains the corresponding integer solutions to (1) as exhibited below:

Solutions to System I

$$x=50k^2+30k+19$$
$$y=10k^2+6k-2$$
$$z=10k+3$$

Properties

1. $x-t_{42,k}-t_{62,k}\equiv 19(\text{mod}78)$
2. $y+z-5t_{22,k}\equiv 1(\text{mod}25)$
3. $x+y-t_{122,k}\equiv 17(\text{mod}95)$

Solutions to System II

$$x = 1450k^2 + 870k + 131$$
$$y = 290k^2 + 174k + 26$$
$$z = 10k + 3$$

Properties

1. $x - 25t_{118,k} \equiv 131 (\text{mod } 2295)$
2. $y - 58t_{12,k} \equiv 26 (\text{mod } 406)$
3. $x + z - 29t_{102,k} \equiv 134 (\text{mod } 2301)$

Solutions to System III

$$x = 75\alpha, y = 14\alpha, z = 5\alpha$$

Properties

1. $x^2 - 75t_{152,\alpha} \equiv 0 (\text{mod } 5550)$
2. $y^2 - 14t_{30,\alpha} \equiv 0 (\text{mod } 182)$
3. $z^2 - t_{52,\alpha} \equiv 0 (\text{mod } 24)$

Set : III

Write (1) as $25y^2 + 29z^2 = x^2 * 1$ (3)

Let $x = 25a^2 + 29b^2$ (4)

Write 1 on the right hand side of (3) as

$$1 = \frac{\left(14 + i\sqrt{29}\right)\left(14 - i\sqrt{29}\right)}{15^2} \quad (5)$$

Substituting (4) and (5) in (3) and employing the factorization method, define

$$5y + i\sqrt{29}z = \frac{1}{15}\left(5a + i\sqrt{29}b\right)^2 (14 + i\sqrt{29})$$

Equating real and imaginary parts, we've

$$5y = \frac{1}{15}\left[350a^2 - 406b^2 - 290ab\right]$$
$$z = \frac{1}{5}\left[25a^2 - 29b^2 + 140ab\right] \quad (6)$$

As our interest is finding integer solutions, we choose a and b suitably so that x, y, z are integers, Replacing a by 15a and b by 15b in (4) and (6), the corresponding integer solutions to (1) are given by

$$x = x(a,b) = 5625a^2 + 6525b^2$$
$$y = y(a,b) = 1050a^2 - 1218b^2 - 870ab$$
$$z = z(a,b) = 375a^2 - 435b^2 + 2100ab$$

Properties

1. $z(a,1) - t_{402,a} - t_{352,a} \equiv 2038 (\text{mod } 2473)$
2. $x(a,1) - 625t_{20,a} \equiv 1525 (\text{mod } 5000)$
3. $y(a,1) - 50t_{44,a} \equiv 82 (\text{mod } 130)$

Conclusion

Since the ternary quadratic Diophantine equations are rich in variety, one may search for other choices of Diophantine equations to find their corresponding integer solutions.

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OBSERVATIONS ON CUBIC DIOPHANTINE EQUATION WITH FOUR UNKNOWNS $x^2 - xy + y^2 + 4w^2 = 8z^3$

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ABSTRACT

In this paper ,different sets of non-zero distinct integer solutions to the non-homogeneous cubic diophantine equation with four unknowns given by $x^2 - xy + y^2 + 4w^2 = 8z^3$ *are obtained through applying the linear transformtions . A few interesting relations among the solutions are presented.*

Keywords: *Cubic equation with four unknowns, Non-Homogeneous cubic, Integral solutions.*

2020 Mathematics Subject Classification: 11A67, 11D25.

Notations:

$$t_{m,n} = n(1+\frac{(n-1)(m-2)}{2})$$

$$P_n^3 = \frac{n(n+1)(n+2)}{6}$$

$$P_n^5 = \frac{n^2(n+1)}{2}$$

Introduction

The cubic diophantine equations are rich in variety and offer an unlimited field for research [1,2]. In particular refer [3-24] for a few problems on cubic equation with 3 and 4 unknowns. This paper concerns with yet another interesting non-homogeneous cubic diophantine equation with four unknowns given by $x^2 - xy + y^2 + 4w^2 = 8z^3$ for determining its infinitely many non-zero distinct integral solutions by employing the linear transformations. A few interesting relations among the solutions are presented.

Method of Analysis

The non-homogeneous cubic equation with four unknowns under consideration is

$$x^2 - xy + y^2 + 4w^2 = 8z^3 \quad (1)$$

The above equation is studied for its non-zero distinct integer solutions through employing the linear transformations as presented below:

Substitution of the linear transformations

$$x = 32(2u+v),\ y = 32(2u-v),\ w = 16v,\ z = 8a \quad (2)$$

in (1) leads to

$$u^2 + v^2 = a^3 \quad (3)$$

The process of obtaining diffrrent sets of non-zero distinct integer solutions to (1)

is illustrated as follows:

Illustration :1

Taking

$$u = m(m^2 + n^2),\ v = n(m^2 + n^2)$$

in (3),note that $a = m^2 + n^2$ (4)

In view of (2), it is seen that

$$x = x(m,n) = 32(2m+n)(m^2+n^2),$$
$$y = y(m,n) = 32(2m-n)(m^2+n^2), \quad (5)$$
$$w = w(m,n) = 16n(m^2+n^2),\ z = 8(m^2+n^2)$$

Thus, (5) represents the non-zero distinct integer solutions to (1).

Properties:

(i) $x^3 + y^3 = (16mz)^3 - 48m\,xyz$

(ii) $n^3x^3 + n^3y^3 = (8mw)^3 - 24mn\,xyw$

(iii) $x^2 - y^2 - 128mnz^2 = 0$

(iv) $n^3(x^3 - y^3) = 4w(3n^2xy + 16w^2)$

(v) When n=1,the following relations are observed:

$x + y = 256(P_m^5 - t_{3,m-1})$

$x + y = 768\,P_{m-1}^3 + 256\,m$

$x = 128\,P_m^5 - 32(m-1)^2 + 64$

(vi) From the numerical values of x,y,z,w one may generate second order Ramanujan numbers with base numbers as real integers.

Example: When $m = 2$ and $n = 1$, give

$z = 40 = 1 \times 40 = 2 \times 20 = 4 \times 10 = 5 \times 8$ (*)

Now,

$$1 \times 40 = 2 \times 20 \Rightarrow (40 + 1)^2 + (20 - 2)^2 = (40 - 1)^2 + (20 + 2)^2$$
$$\Rightarrow 41^2 + 18^2 = 39^2 + 22^2 = 2005.$$
$$1 \times 40 = 4 \times 10 \Rightarrow (40 + 1)^2 + (10 - 4)^2 = (40 - 1)^2 + (10 + 4)^2$$
$$\Rightarrow 41^2 + 6^2 = 39^2 + 14^2 = 1717$$
$$1 \times 40 = 5 \times 8 \Rightarrow (40 + 1)^2 + (8 - 5)^2 = (40 - 1)^2 + (8 + 5)^2$$
$$\Rightarrow 41^2 + 3^2 = 39^2 + 13^2 = 1690$$
$$2 \times 20 = 4 \times 10 \Rightarrow 11^2 - 9^2 = 7^2 - 3^2$$
$$\Rightarrow 11^2 + 3^2 = 9^2 + 7^2 = 130$$
$$2 \times 20 = 4 \times 10 \Rightarrow (20 + 2)^2 + (10 - 4)^2 = (20 - 2)^2 + (10 + 4)^2$$
$$\Rightarrow 22^2 + 6^2 = 18^2 + 14^2 = 520$$
$$2 \times 20 = 5 \times 8 \Rightarrow (20 + 2)^2 + (8 - 5)^2 = (20 - 2)^2 + (8 + 5)^2$$
$$\Rightarrow 22^2 + 3^2 = 18^2 + 13^2 = 493$$
$$4 \times 10 = 5 \times 8 \Rightarrow (10 + 4)^2 + (8 - 5)^2 = (10 - 4)^2 + (8 + 5)^2$$
$$\Rightarrow 14^2 + 3^2 = 6^2 + 13^2 = 205$$

Thus, $2005, 1717, 1690, 130, 520, 493, 205$ are second order Ramanujan numbers with base integers as real integers. In a similar manner, from the other values of x, y, z and w, one may generate many second order Ramanujan numbers.

Note: Consider (*).

Write $1 \times 40 = 2 \times 20$.

$$(40 + i)^2 + (20 - 2i)^2 = (40 - i)^2 + (20 + 2i)^2 = 1995$$
$$(1 + 40i)^2 + (2 - 20i)^2 = (1 - 40i)^2 + (2 + 20i)^2 = -1995.$$

Thus, ± 1995 are second order Ramanujan numbers with base numbers as Gaussian integers. Following the above formulation, many second order Ramanujan numbers with base numbers as Gaussian integers are obtained.

Illustration :2

Taking

$u = m(m^2 - 3n^2)$, $v = n(3m^2 - n^2)$

in (3),note that

$a = m^2 + n^2$

In view of (2), it is seen that

$x = x(m,n) = 32(2m(m^2 - 3n^2) + n(3m^2 - n^2))$

$y = y(m,n) = 32(2m(m^2 - 3n^2) - n(3m^2 - n^2))$

$w = w(m,n) = 16n(3m^2 - n^2)$, $z = 8(m^2 + n^2)$

Properties

$x = y + 4w$

(i)

$$x^2 - y^2 = 4(x+y)w$$

(i) $$x^3 = y^3 + 64w^3 + 12xyw$$

Illustration :3

(3) is written as

$$u^2 + v^2 = a^3 * 1 \quad (6)$$

Assume

$$a = p^2 + q^2 \quad (7)$$

Write 1 on the R.H.S. of (6) as

$$1 = \frac{(r^2 - s^2 + i2rs)(r^2 - s^2 - i2rs)}{(r^2 + s^2)^2} \quad (8)$$

Using (7) and (8) in (6) and applying the method of factorization, consider

$$u + iv = (p + iq)^3 \frac{[r^2 - s^2 + i2rs]}{(r^2 + s^2)}$$

Equating real and imaginary parts, one obtains the values of u and v.

As our interest is on finding integer solutions, replacing p by $(r^2 + s^2)A$ and

q by $(r^2 + s^2)B$ in the values of u,v & (7) and using (2),the corresponding integer solutions to (1) are given by

$$x = 32(r^2 + s^2)^2((A^3 - 3AB^2)(2r^2 - 2s^2 + 2rs) + (3A^2B - B^3)(r^2 - s^2 - 4rs))$$

$$y = 32(r^2 + s^2)^2((A^3 - 3AB^2)(2r^2 - 2s^2 - 2rs) - (3A^2B - B^3)(r^2 - s^2 + 4rs))$$

$$z = 8(A^2 + B^2)(r^2 + s^2)^2$$

$$w = 16(r^2 + s^2)^2((A^3 - 3AB^2)2rs + (3A^2B - B^3)(r^2 - s^2))$$

Conclusion

In this paper, an attempt has been made to obtain many non-zero distinct integral solutions to the cubic equation with four unknowns given by $x^2 - xy + y^2 + 4w^2 = 8z^3$ through employing linear transformations.The researchers may search for other choices of linear transformations for finding integer solutions to the considered cubic equation. As cubic equations are rich in variety, the readers may search for obtaining integer solutions to other choices of cubic equations withmultivariables.

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CLASSIFICATION OF DATA MINING TECHNIQUES FOR PREDICTION OF STUDENTS EDUCATIONAL PERFORMANCE

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ABSTRACT

In education, the projection of student educational achievement has received a lot of attention. Yet, the learning results are considered to enhance learning and teaching, predicting the achievement of student outcomes continues underexplored. The amount of data stored in educational databases is rapidly increasing these days. These databases hold information that can help students improve their grades. For all students, India's higher education performance is a watershed moment in their academic careers. Because many factors influence academic performance, it is critical to develop a predictive data mining model for student performance to distinguish between fast learners and slow learners. This paper recommends the Comparison of Predictive Model for Student's Educational Performance Applying Data Mining techniques. Various methods are used in data mining methods i.e., Support Vector Machines (SVMs), Neural Network- Multilayer Perceptron (MLP), Linear Regression, Naïve Bayes Classifiers and Extreme Gradient Boosting. And five well-known data mining methods i.e., SVMs, Naïve Bayes (NB), Decision Tree (DT), Neural Network (NN), and k-Nearest Neighbour (KNN) are employed on two educational datasets. The result section described the usefulness of data mining learning methods when forecasting the accomplishments of students and in last review finding are described. According to the study's findings, the three most efficient classifier Naïve Bayes, KNN and decision tree classifier performance is carried out. Naïve Bayes performed better in the experiment without feature selection, with an accuracy of 81%. The KNN classifier is the second most accurate, with an accuracy of 80%. And, the decision tree classifier has the lowest precision of 72%.

Keywords- *Neural Network (NN), Linear Regression (LR), Multilayer Perceptron (MLP) and Support Vector Machine (SVM).*

1. Introduction

Data mining performs a crucial part in the corporate sphere, and it supports to the learning organization to forecast and do decisions associated to the students' academic level. Advanced learning institutions must be able to forecast student performance because the quality of the teaching process is determined by the ability to satisfy students' requirements. Higher education institution quality entails offering services that most likely suit the needs of students, academic staff, and other education system participants. Many scholars has influenced by the advancement of data mining tools to study more fundamental insights into the information diffusion process. Some of them have long used data mining techniques for this purpose. However, there are very few similar investigations at the time. The increased availability of digital data gathered by a variety of academic information management systems and educational software has accelerated this process of improving educational quality. The educational information is first subjected to feature selection methods. The next step is to utilise classification systems to create a decent paradigm that can correctly translate inputs to required outputs. The model estimation level feeds back to the feature selection and learning stages, allowing them to make changes to enhance categorization execution. After a model is created, it is utilised to forecast the label of new student data in the second step. Data mining in education is becoming more popular topic. Educational Data Mining is a new expanding topic concerned with evolving strategies for detecting knowledge through data starting by educational environments. Many approaches are used in educational data mining, including Neural Networks, Decision Trees, Nave Bayes, K-Nearest Neighbour (KNN), and others. Various kinds of information, like as union rules, categorizations, and clustering, could be detected applying these methods. The exposed knowledge could be applied to predict student enrolment in a specific sequence, alienation

from old-style classroom teaching models, recognition of unfair means applied in online examinations, detection of abnormal standards in students' result sheets, prediction of student performance etc. For modelling and prediction of educational performance of architecture students, two data mining approaches (logistic regression and SVM) are employed.

2. Related work

Data mining in education is the field that allocates us to make predictions about the future by examining the data obtained so far in the field of education by utilizing machine learning techniques. This section is categorized into three parts. First category demonstrates the prediction of school educational performance of students. Second category demonstrates the prediction of college educational performance of college students. Whereas Third category is about course wise prediction of students educational performance.

2.1. Prediction of School Students Educational Performance

In this section numerous authors explained school related data on the predictive model for students' educational performance using data mining techniques. Su, Yu-Sheng, et al., (2021) [1] told the students' viewing behaviours in accessing learning materials and their accomplishment in flipped classrooms are investigated using educational data mining. To participate in flipped classroom activities, the members are split into 2 groups: an experimental group and a control group. For flipped learning, the experimental group utilizes the social media network Facebook, while the control group employs a learning management system. The findings reveal a substantial variation in learning performance among the two groups, with the experimental group's average score being greater than the control groups. K. Kyungyeul, et al., (2021) [2] explained the long-term viability of data-mining methods for predicting learning outcomes by looking at students' learning patterns, data about their educational backgrounds and learning processes may be studied. Attainment-point are recognised, and teachers can give positive response to pupils in order to help them. Avoid failure and uses sustainability-in-data-mining methods, to analyse students' opinions of computer and internet usage and forecast their degrees of data and interaction skill literacy in progress. J48, OneR, multilayer perceptron, random forest (RF), bagging, and sequential minimal optimization (SMO) approach are used. When 47 attributes were included, the SMO algorithm produced the best initial prediction outcome of roughly 69% accuracy. F. Eduardo, et al., (2019) [3] described a forecasting study of pupils' academic performance in public schools in the Federal District of Brazil during the 2015 and 2016 school years. To get understanding from the data and first did a descriptive statistical analysis. Following that, two datasets were obtained. The first dataset includes factors acquired before the beginning of the school year, whereas the next includes academic factors taken 2 months after the semester started. To forecast educational results of student performing at the ending of the school year, classification models based on the Gradient Boosting Machine (GBM) were constructed for each dataset. Although the attributes "grades" and "absences" were found to be the most important in forecasting end-of-year academic results of student performance, the analysis of demographic attributes revealed that "neighbourhood," "school," and "age" are all possible pointers of a student's academic victory or failure. Finland is experiencing improved immigration and therefore increased cultural diversity in its schools. Von Suchodoletz, Antje, et al (2020) [4] described that the majority of the existing material on the quality of early childhood education (ECE) comes from the United States or other industrialised countries. However, thorough research on ECE quality in low- and middle-income countries (LMICs) is extremely sparse. The author investigates variation in structural and method indicators of ECE quality in two Eastern European LMICs, for the first time in these countries, utilizing the Classroom Assessment Scoring System Pre-K (CLASS) as a amount of process quality. Finland is also included as governments in Ukraine and Kosovo are interested in using the Finnish education model to influence policy improvements. Kindergarten instructors from

these three nations (n =177) were detected in their classes and asked to complete surveys. The data mining strategies utilised for analysing pupil performance are represented by Soni, Astha, et al (2018) [5]. Academic databases holding student information are abundant at educational institutions. These student databases, along with other factors such as family background, family income, and so on, are considered. It will aid us by recognising promising students and giving us the opportunity to pay attention to and refine those kids who are likely to receive bad grades. For the response, create a framework that will analyse the pupil's performance based on their previous performances utilising Data Mining ideas under Classification. Classification algorithms such as Decision Tree, Nave Bayes, and Support Vector Machine can aid in forecasting student success. This forecast assists teachers and parents and in keeping track of their students' execution and providing necessary counselling. These analyses also aid in the provision of scholarships and other necessary training to students. There are attempting to improve the student acquisition and success through the use of educational data mining tools. It has the potential to benefit and impact novices, teachers, and educational institutions. Due to the exploitation of family incomes and students' personal data component sets, experimental outcomes reveal that the stated technique greatly outperforms the prevailing procedure. The findings of this study can be used to enhance policies in higher education. Dervin, Fred, et al. (2015) [6] discuss multicultural education discourses and the concept of intercultural competencies in Finland, a European and Nordic country. The author focuses on their current applications and attitudes among decision-makers, researchers, and student instructors. Based on a brief case study from art teacher education in this setting, some predictions for the future are offered. The author demonstrates a method that replaces a knowledge-based concept of intercultural competences with a critical-thinking approach. Holm, Gunilla, et al., (2016) [7] investigate the multicultural education discourse in Finland with examining national and municipal comprehensive school curriculum, educational policy papers, and teacher education curricula. The emphasis is on how multicultural education is discussed and whether it is intended for all kids or only for immigrant children. According to the findings, the existing variety connected by bilingual pupils, dual national churches, and an indigenous population is not considered as part of multicultural education. Instead, immigrant language, ethnic and immigrant religious variety are viewed narrowly. As a result, multicultural education is only meant for immigrant students. Cortez, Paulo, et al., (2018) [8] used past school grades, demographic, socioeconomic, and other school-related variables to predict secondary student grades in two core classes. Three distinct DM goals (binary/5-level classification and regression) and four distinct DM approaches i.e., DT, NN, RF, and SVM were evaluated. In addition, several input options (e.g., with or without past grades) were investigated. The acquired findings show that if the first and/or second school period grades are known, it is possible to attain a high predictive accuracy. This supports the conclusion reached by prior performance has a significant impact on student achievement. Nonetheless, an analysis of the knowledge delivered by the best predictive models revealed that, in some cases, other relevant features exist i.e., school-related, demographic, and social.

2.2. Prediction of College Students Educational Performance

In this section numerous authors explained college related data on the Predictive Model for Students Educational Performance using Data Mining techniques. I. Mohammad Noor, et al., (2020) [9] suggested that many institutions are focusing on increasing performance and education quality, and one way to do so is to utilise data mining tools to assess and anticipate students' performance, as well as to identify potential issues that may affect their final grades. To solve this problem, researchers used a variety of graphical, statistical, and quantitative tools to comprehensively explore and analyse two independent datasets at two different levels of course delivery (20% and 50%, respectively). The feature analysis elucidates the nature of the many aspects under consideration and aids in the selection of

machine learning algorithms and parameters. Also, presents a systematic method for selecting an appropriate ensemble learner from a set of six possible machine learning algorithms based on the Gini index and the p-value. M. Francis, et al., (2020) [10] suggested the level of accuracy of the 6 algorithms, as well as the misclassification errors associated with them The ANN method outperformed Logic Regression, Extreme Boost, SVM, Naive Bayes (NB), and RF techniques. The pass rate is found to be positively correlated with bursaries and group assignments. Based on the findings, the following recommendations are made:

- Because group assignments have a direct influence and have a definite link with either a student would pass or fail. It is suggested that students be inspired to participate actively in group projects.
- Because scholarships have a favourable association with educational performing, it is advised that successful applicants get bursaries from the private institute.
- Booster or support classes for students who are expected to fail should be available. Information through various domains of the advanced education value chain, for example the cognitive, psychosocial, personality, demographic, and institutional domain, must be addressed as upcoming effort to have exact evaluation of a student's academic accomplishment.

Aderibigbe et al., (2019) [11] suggested that educational data mining is becoming more popular because of the advantages gained through ML techniques, which serve to enhance decision-making procedures in higher education. The study's programme, the year of entry, and the Grade Point Average (GPA) for the first 3 years of study are used as inputs into a Konstanz Information Miner (KNIME) centered data mining model to see how well the 5th year and final Cumulative Grade Point Average (CGPA) of engineering students in a Nigerian university could be predicted. Six data mining approaches were tested, with the highest accuracy rating of 89.15 %. The finding was confirmed by utilizing both linear and pure quadratic regression models, with R2 values of 0.955 plus 0.957 in both situations. This opens the possibility of identifying students who are likely to graduate with bad grades or who might not graduate at all, allowing for initial involvement. M. Maria et al., (2019) [12] suggested that a regression analytic model centered on the RF method was created to calculate the overall academic performance of polytechnic higher education institution undergraduates at an early stage. Rather than confining the forecast to a single specific degree course, the study focuses on the entire universe of a five-school institution. As a result, to give the institution with a single instrument that can account for the variability of the student universe including educational dynamics. A new strategy to feature selection is recommended, which allows the model to totally ignore groups of predictive variables, creating it beneficial in cases when not all the data types evaluated are obtained. The stated model could be applied at a high level by decision-makers who are tasked with devising strategies to prevent academic failure. S. Leo, et al., (2019) [13] suggested the study of data mining in the learning industry to estimate the performance of university students. Data mining algorithms were employed. To begin, multiple student clusters were chosen using a descriptive task based on the K-means algorithm. Second, a classification challenge supported decision tree and Nave Bayes classification techniques to predict dropout due to low performance in a student's first four semesters. The models were trained and tested using student academic data acquired throughout the admissions process, which was examined using a cross-validation. When the data from the previous academic enrolment is added to the data from the current academic enrolment, the forecast of dropout students improves, and student performance is monitored. Agaoglu, Mustafa, et al., (2016) [14] described that the Data mining technologies are becoming a more prevalent tool in higher education for analysing and solving educational and administrative challenges. In general, educational mining research focuses on modelling student performance rather than instructor performance. The course assessment questionnaire is a standard instrument for evaluating teachers' implementation based on students' perceptions. Following that, the

author outlined four different classification techniques that are utilised to develop classifier models: DT algorithms, SVM, artificial NN, and discriminant analysis. Their results are compared utilizing precision, recall, accuracy, and specificity performance metrics on a data set comprised of student replies to an actual course evaluation questionnaire. Although all of the classifier models perform fairly well in terms of classification performance, the C5.0 classifier outperforms the others in terms of accuracy, precision, and specificity. In addition, each classifier model's variable relevance is examined. As a result, many of the items in the course evaluation questionnaire appear to be irrelevant. Furthermore, the data reveals that the teachers' success, as perceived by the students, is primarily dependent on the students' interest in the course. The results of this research show the efficacy and fluency of data mining models in course evaluation and higher education. Furthermore, these insights could be utilized to enhance measurement devices.

2.3. Course wise Prediction of Students Educational Performance

In this section numerous authors explained course related data on the Predictive Model for Students Educational Performance using Data Mining techniques. R. Abubakar, et al., (2020) [15] suggested that in academic institutions, data mining is utilised to forecast student performance using classification techniques. These strategies are used to analyse the characteristics of students to uncover realistic patterns that may be utilised as a foundation for prediction. This entire procedure has become a reality due to the accessibility of students' information in digital form and the growth in processing capability of computer systems (CS). Numerous studies have been conducted in this area to minimise significant student failure. On the other hand, are mostly concerned with the prediction of students from other nations. Although a little local researcher has attempted to conduct study in this area and have not yet investigated the generally extensively applied characteristics. The major goal of this study is to create a classifier that uses close by produced student characteristics to accurately predict performing. The students' features, which were gathered from various sources, were pre-processed before being used in feature selection and, subsequently, for learning and testing. The most accurate classifier, the nave Bayes classifier, was chosen and applied in performance predictor tool. The tool was evaluated applying a different set of attributes, and the results demonstrate that the tool could forecast student performance in upcoming exams. R. Cristobal, et al., (2020) [17] suggested Educational Data Mining and Learning Analytics have been utilized across learning information in a comprehensible and extremely generic fashion. This study reviews the main publications, major milestones, the knowledge detection cycle, the key educational environments, specialised tools, freely accessible datasets, the maximum applied approaches, the primary aims, and upcoming developments area to offer the present state of the art. S. Phauk, et al., (2020) [18] told that educational data mining is a useful data mining discipline that focuses on information in the education area. The goal is to present educational data mining approaches and incorporate them into a web-based system for forecasting underperforming pupils. A comparison of prediction models is carried out. As a result, high-performing models were created to achieve better results. Hybrid RF, a hybrid RF, offers the best classification results. In the background of mediation and enhancing learning outcomes, an innovative feature selection technique based on ranking feature scores that combines chi-square algorithms and mutual information, is developed to pick a dominating set, and improve prediction model performance. An academic performance prediction system is then constructed for educational stockholders to acquire an initial projection of student learning results for timely intervention, using the presented approaches of educational data mining. The usefulness and utility of the created academic prediction structure are demonstrated by tentative outcomes and assessment studies. The system is used to assist educators in intervening and enhancing student performance. Du, Xu, et al., (2020) [19] suggested that instructors are able to gain a holistic view of student progress and trigger associated decision-making using educational

data mining (EDM) and learning analytics, which are closely related but have different definitions and focuses. EDM's automated component is also closer to the concept of artificial intelligence. The dramatists are interested in the state-of-the-art of relevant functions in Education due to the vast uses of artificial intelligence in several domains. Chien et al., (2020) [20] told engineering education faces a significant problem in the development of creativity. Creativity influences not just uniqueness and invention, but also the usability of products and concepts, resulting in a market economic improvement. Though research has shown that creativity may be measured in practical ways such as student improvement or reactions to innovation surveys, only some researches have looked at how innovation develops. The model's accuracy was found to be 93 % in the experiments, confirming the model's suitability for forecasting innovation. Moreover, the students' key terms were acquired through applying k-means clustering with the recommended model, thus generating valuable supplementary data for discovering the expansion of creative ideas. These findings demonstrated that data mining has a lot of potential in the field of creative education. As a result, based on discussion records, the suggested predictive model is appropriate for forecasting creativity in learning activities. It can help teachers analyse student accomplishment and provide timely coaching and feedback to encourage engineering students to think creatively and imaginatively. K. Preet et al., (2019) [21] suggested that educational data mining is a technique for converting haphazardly collected data in educational contexts into useful information. It aids in the development of insights for a variety of research topics that occur in educational contexts, such as academic performance prediction, course design, instructor feedback, teaching technique or mode, and so on. The work tries to address a major difficulty for researchers, namely, the large number of dropouts and reduce percentage of first-year students. It focuses on the elements that influence student achievement. Many studies in the field of education, such as statistics and psychology, have been undertaken. The goal is to demonstrate the effects of various variables on student academic performance. The study had a sample size of 480 BCA students. Demographic, Academic, Social, and Behavioural aspects are used to construct the questionnaire. The study's findings showed that family income, parent's qualification, and interactions by instructors, as well as earlier year percentage, current year attendance, and class behaviour, were all influential factors. Gulati, Hina, et al., (2015) [22] indicated that dropout rates for students enrolled in correspondence and open courses are rising. There is a need to investigate the variables that are causing the rise in dropout rates. The discovery of hidden knowledge from educational data systems through the active use of data mining technology to analyse factors influencing student drop out can lead to better academic planning and management to decrease student drop out from the course, as well as generate valuable data for stakeholder decision making to expand the superiority of advanced education system. The process of data mining can be utilized for prediction and analysis. The author stated that he used real data from an Indira Gandhi National Open University study centre and obtained data from multiple sources such as a university database, a survey form, and so on. Various mining steps are used to produce relevant results. The accuracy of several situations was calculated once that were compared. The work of data mining in forecasting student dropout is presented. This study examines a data set utilising data mining algorithms. Following analysis, the primary factors influencing student dropout from open courses will be identified (dropout rate). Some feature selection algorithms are employed before applying classification algorithms in order to provide more refined prediction results. Such analysis and forecast data will assist college administration and teachers in making the required modifications to provide a better education. Many more mining techniques, including as association and clustering, can be used to mine important knowledge. Lu, Ma, et al., (2017) [23] indicates that predicting college student's English subject performance through data mining techniques for the measurement of students educational

performance. Table 1 displays the comparison of predictive model for student's educational performance utilizing data mining technique.

Table 1: Comparison of Predictive Model for Student's Educational Performance Applying Data Mining

Sr. no.	Author	Objective	Result
1.	Su, Yu-Sheng, et al., (2021) [1]	Utilizing Educational Data Mining to Discover Viewing Behaviours and Presentation through Exploded Classrooms.	The outcomes demonstrate that structures could assist students have a solid memory of the observed components of the learning material and enhance their learning execution.
2.	K. Kyungyeul, et al., (2021) [2]	Forecast the academic performing of students applying education information acquired and analysed via data-mining systems.	Early detection of students who are at risk throughout the learning process, alongside the development of personalised learning and educational techniques for each of these kids.
3.	F. Eduado et al., (2019) [3]	Students' academic success may be predicted and analysed using data mining techniques based on their academic records and forum participation.	The results demonstrate that the Nave Bayes classifier surpasses the other two with attaining an overall prediction precision of 86%.
4.	Martins, Maria., et al., (2019) [12]	Create an academic success predictive model, which matches educational data mining field.	The results show that it is feasible to calculate with a high level of precision using the algorithms Nave Bayes and RF Trees.
5.	R. Abubakar AUWAL, et al., (2020) [15]	To use locally generated student data to train and test multiple classification strategies, to assess the implementation of the taught categorization approaches, and to incorporate the resultant classifier in a performing prediction tool.	The technology can anticipate pupils' success in future exams, according to the results.
6.	R. Cristobal, et al., (2020) [17]	Educators try to comprehend the learning process and approaches for improving their teaching techniques.	Recommender schemes are very effective for supplying descriptions and suggestions both to students and a nonexpert user in EDM/LA for example instructors.
7.	Kamal, Preet, et al., (2019) [21]	Create good initiatives that may be made to improve educational endeavours in the future.	The outcome allows for the efficient and accurate prediction of student performance, as well as the identification of students who are at danger of failing or dropping out.
8.	Gulati, et al., (2015) [22]	Assessment, monitoring, and customisation of TL instructional approaches are all being improved.	The data mining findings support management in the administrative process and direct students in the process of learning. It also command tutors and educators to enhance educational practises and lead tutors and educators for improving educational practises.

3. Review finding

Predicting students' performance is widely useful to help the educators and learner improveing their learning and teaching process. Predicting student's performance with various analytical methods. Predicting student cohort academic achievement to aid in the automation of course and program-level outcomes assessment. Previous researchers' works on accessing learning materials, classification models based grades and absences, quality of early childhood education, family background, family income, multicultural education, demographic, socio economic and majority focused on intellectual academic data and so

on. Researcher found that there is a very few works on non-intellectual data which have affecting predicting students' educational performance.

Conclusion

In academic institutions, data mining is utilised to forecast student performance by classification methods. These strategies are applied to students' characteristics to uncover realistic patterns that can be utilised as a foundation for forecast. This entire procedure has become a reality due to the accessibility of students' data in digital form and the growth in processing capability of CS. Numerous studies have been conducted in this area to minimise significant student failure. These studies, on the other hand, are mostly concerned with the prediction of students from other nations and used five recognised data mining methods (Naïve Bayes, Decision Tree, SVM, NN, and KNN). In datasets various methods of data mining are used i.e., SVMs, NN- Multilayer Perceptron (MLP), Linear Regression, Naïve Bayes Classifiers and Extreme Gradient Boosting. Six classification algorithms i.e., RF, Support Vector Machines (SVMs), Neural Network- Multilayer Perceptron (MLP), Linear Regression, Naïve Bayes Classifiers, and Extreme Gradient Boosting are used and R programming language to investigate data quality's effect, significance of data attribute, and class number on academic achievement prediction have been used. The study's result indicates that the nave bayes classifier has the uppermost performance in the experiment without feature selection, with an accurateness of 81 % and an error rate of 19 %. The KNN classifier is the second most accurate, with an accurateness of 80% and a 20% error rate. The decision tree classifier had the lowest precision of 72 % and a 28 % error rate.

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DIGITAL MARKETING: CONCEPTS, COMMERCIAL WORLD PLANNING AND CHALLENGES FOR BRANDS IN IMPLEMENTING STRATEGIES

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ABSTRACT

The rise of digitalization has brought a new perspective to implement in their all walks of life to ease-up their day to day life with same expected efficiency.With the evolution of internet and web marketing, it is denoted and used with various jargons such as e-marketing, internet marketing, e-commerce, e-business, etc. The paper studyConcepts and Challenges for Brands in Implementing Strategies.

Keywords: *Digital Marketing, Internet, Digitalization, Brands*

Introduction

Digital Marketing: The Concept

The rise of digitalization has brought a new perspective to implement in their all walks of life to ease-up their day to day life with same expected efficiency. Different people use digital marketing concept in different manner. With the evolution of internet and web marketing, it is denoted and used with various jargons such as e-marketing, internet marketing, e-commerce, e-business, etc. Although, these terms are inter-related, there is quite a difference in all these terms (Rowan, 2002). The term 'Internet marketing' means promotion of the goods and services on the internet platform, in real time, live with the internet connection (Hanson and Kalyanam, 2007). The term 'E-business' can be understood in a broader concept as it deals with the application of technology in the promotion of business transaction and its internal processes with third party. This involves two processes e-marketing which indicates its marketing side and e-commerce which represents its commercial side. Electronic marketing or e-marketing utilizes the digital technologies and internet to promote goods and services through media and electronic methods (Hoge, 1993). According to the Rowan (2002), e-marketing can be described as practicing and using the information technology to complete the marketing process which involves various process such as communication, creation and delivery of value to customer in order to maintain and manage customer relationship (Lamb, Hair and McDaniel, 2001). While the term 'E-Commerce' reflects the commercial side of the business which involves selling and buying of goods and services using the internet platform and promoting financial transaction using electronic media.

The 'digital' term can be expressed as electronic data transmission which is non-variable and finite in nature (Kaufman and Horton, 2014). These digital frequencies consist of analogue signals which interpret sound waves into electrical signals for continuous data transmission technology. However, currently the marketing action when relies over a digital medium in order to perform marketing function, it becomes digital (Deighton and Kornfeld, 2009; Yasmin, Tasneem and Fatema, 2015). Kierzkowski McQuade, Waitman and Zeisser (1996) in their research study explained digital marketing as a promotional tool to promote their goods and services using various digital and electronic media source. In the research study conducted by Techopedia (n.d.) the researchers expressed the digital marketing propensity by implementing multiple methods and promotional practices to access customers via various digital technological platforms. Bird (2007) also explained digital marketing as a mode of communication which uses different media activities of digital transmission that creates a direct link between the prospects or customer as an individual and the company. The term medium within digital marketing refers to as applications, channels, manners, instruments and devices which function on the basis of digital codes (Rowan, 2002). The various platforms are operated and channelized

by the digital media such as social networking sites, search engines, websites, online communities that are the content based platforms which can be accessed by using internet technology on devices like digital TV, mobile phones, digital outdoors etc.

The digital marketing is different from the internet marketing. Digital marketing is operated by real time internet connection with the use of emails, blogs, social media and search engine optimization. It also includes other channels such as business websites, business networking sites, paid advertisement, apps and online tools. On the other hand internet marketing is basically built on web presence and responsible for increasing sales through websites, pay-per click-ads, and search engine traffic. The digital marketing includes short message service (SMS), multimedia message services (MMS), digital outdoors, billboards, digital TVs, mobile applications, call back, e-books, that are run online or offline to promote product and increase sales by generating traffic (Scharl, Dickinger and Murphy, 2005; Pandey and Shukla, 2010; Gayatri and Rekha, 2014). Additionally, the rise of the new aged technologies, such as augmented reality, is also pushing the boundaries of digital marketing beyond internet marketing. This makes internet marketing a sub-category of digital marketing (Merisavo et al., 2008; Yasmin et al., 2015).

Internet: The Core of Digital Marketing

Internet is regarded as an inevitable part of digital marketing due to its compatibility and easy integration with various digitally operated gadgets like tablets, watches, mobile phones, computer, laptops, TVs and many more (Smith, 2011). The 21st century gave rise to the most important invention i.e. 'Internet' which has completely changed the perspectives of marketing. Initially it was just initiated as a medium to serve multi-channel functioning of marketing such as sales, distribution, and relation building with the customers. But sooner, it was used to launch, display, market, distribute and purchase the products. The onset of internet marketing completely transformed the traditional marketing mix strategies as it enabled the marketers to sell their products to a large mass. It also increased customer participation as they could easily compare the prices of the products available in the market. Internet has promoted a new channel of distribution which is easy, fast and convenient. It has changed the promotional methodology from commercial messages or orders that were taken to the conversation with customers. The evolution of internet includes the use of different strategies such as search engine optimization (SEO), search engine marketing (SEM), pay per click (PPC), affiliate marketing and many more that assists the marketers to reach large audiences, provide them quality services and enhanced brand value.

Internet has helped in interconnecting the entire world with the help of digital devices such as computers, laptops, smart phones and tablets and using routes and servers (Whittaker, 2002). It includes the use of web pages which are globally held by computers and accessed by other interconnected computers (Tanenbaum, 1996). There are three major component of internet such as 'Intranet', 'Web' and 'Extranet'. While focusing on the 'Intranet' component, it runs internally using browser and Hyper Text Mark-up Language (HTML) in an organization. Secondly, 'Web' which majorly uses graphic interface for hypertext navigation with the help of browser. Finally, 'Extranet' which is a combination of two or more proprietary networks, connected to share information (Beal, 2010). The historical context of internet indicates that it was started by the two MIT researchers named J.C.R. Licklider in 1960 and Leonard Kleinrock in 1961. They introduced and wrote about the galactic networks in their packet switching theory. Then in 1972, the first public demonstration of today's internet and electronic mail was made in Advanced Research Project Agency Network (ARPANET). Later in 1985, there was a huge support of broad community of researchers and developers who were involved in establishing new technology. However, till 1990 internet was not accessed for the commercial purpose but after the Tim Berners-Lee's invention of World Wide Web (WWW), internet revolution took place in the year 1991. Later in the year 1993 internet was fully accessed to commercial traffic. With the release of various internet browsers, slowly and steadily internet became

the basic tool for searching any kind of information. Eventually technological inventions like digital data transmission and wireless connections stepped in that brought new revolution of digitalization. As a result, the marketing strategist started using these wireless platforms to reach large audiences by using digital marketing tools (Merisavo et al. 2007). VSNL was the first public internet service company to initiate these services in India, in the year 1995. In the year 1997 ICICI Bank was the first banking organization to open online banking site. The 1999 was considered to be the 'dot com' boom year in India when Satyam (first internet provider) floated SatyamOnline (sify) and invested INR 499 crores to acquire India World (internet services) that included Samachar, Khel, and Bawarchi. It attracted several companies to form their dot com companies and get access to the satellite international gateway for Indian service providers. Moreover, in the year 2000, when the Information Technology Act was passed by the Parliament, it promoted high growth in the industrial sector and encouraged businesses to use internet services to expand their commercial activities. Thus, Indian Internet industry saw a splendid growth in various sectors such as tour, travel, education, aviation, railways, stock market, shopping, banking, gaming, news and many others. It also encouraged the use of digital devices, internet based platforms, social networking sites amongst the consumers and industries in India (Rao and Manzar, 2013).

Digital Marketing Communication

The researcher and strategists Smith and Taylor (2004), in their research study suggested that the term marketing communication can be defined as an exchange process of information, ideas and thoughts among two parties such as consumers and marketer with the aim of achieving common goals. Its main aim is to convey information to share with its customers and public such as new product, community initiatives, promotional activities, offers, and the marketers wishes (Kotler and Keller, 2012). In the communication process the messages are organized in a systematic manner and sent to the receiver via some channel or media (Steinberg, 2007). The business is also opted and planned considering the investment cost, benefits and communication flow. Considering the digitalization and heavy reliance on the mobile and internet, all the expansion and channels are chosen according to the digital packages including text, data, calls, images, and their combinations (Corniani, 2006).

With the various communication channels, digitalization has profoundly enabled private and corporate communication channels. Private channels have higher communication cost in comparison to the public communication channels which encourages corporate to choose public channels of digital communication to keep their projects cost-effective and maintain their popularity among the people. Such channels enhance the capacity to profile target audiences, personalize, customize and generate feedback, and help to track their activities (Salehi, Mirzaei, Aghaei, and Abyari, 2012.). However, digital technologies help marketers to personalize the experience of the customers to motivate and enhance their interest. This active interest of the customers pulls them towards the targeted information or content which enable them towards, passively subject to these marketing communication. Moreover, it can be said that digital marketing communication is a measurable, integrated and targeted communication which targets the customer using digital technologies. This in turn helps marketers to fetch new customers and retain the existing ones, to maintain and nurture a long-term business relationship to make profits (Digital Marketing Institute, Dublin, Ireland). The major digital channels include mobile phones; digital outdoors, computers, digital TVs etc. and they act far more influential than traditional communication. Various social media and video sharing sites, social networking sites enables the strong bond and meaningful relationship building with the customers (Solomon, Marshall and Stuart, 2012). This new aged digital channels along with the traditional channels try to produce various exponential and effective results for marketers

Characteristics of Digital Marketing Communication

The major characteristics of digital communication can be that it is interactive, informative, compatible, responsive, quick, versatile, cost effective, measurable, and customizable (Merisavo et al. 2007). It is can be said that the digital marketing communication is the fastest medium to reach maximum number of people in comparison to the traditional communication (Smith, 2011). This strategy requires heavy data mining and data storage to work effectively. The data mining is described as a process used to extract usable data from a large set of raw data. It implies analyzing data patterns in large batches of data using various software and application in order to unveil the most profitable customer segments, potential customers, opportunities for cross and up-selling, product and territories, by using most effective promotional media at affordable and appropriate pricing policy to grab desirable distribution channel for the marketers.

Digital marketing offers enormous information to the consumers about products and services which help them to make decisions as per their choice and need. Consumers like to access this information as it is interactive and easy to retain for long (Deighton, 1996). Interactivity helps in establishing communication with consumers and marketers in two ways. The establishment of communication with the consumers help the marketers to understand their needs and demands properly. As a result, the marketers are able to provide quality services to consumers and meet their expectations adequately.

The digital communication enables an individual targeting by reaching them using a preferred channel of choice with tailored message which is not possible in traditional marketing. This medium also gives access to track and measure customer behaviour, choices, preferences with the keyword they use to search on various search engines, type of website a person prefers to access, frequency of visit, amount and time of purchase, demographic details, type of channel, details of conversation, sharing of digital content and many other to modify and utilize the strategies of marketing (Ryan and Jones, 2012). These types of tracking is made possible by using various analytical tools, amongst them 'Google Analytics' is the most preferred and popular tool available in the market.

These communication strategies use quite reasonable content marketing like short message service (SMS), multimedia message services (MMS), search engine optimization (SEO), search engine marketing (SEM), social media marketing and channels such as online forums, e-mails, websites, and others. These digital platforms are usually charged as per the pay per click (PPC) method which also acts as cost effective in comparison with the traditional commission method. Moreover, it provides colossal data collection for the marketer to collect or track every individual action such as click, listing, stop, interaction over digital channels. Accordingly marketers can plan their strategies and customers can connect with similar interest of other sharing to access such links or communities to evade the barriers or space and time.

Concept of Digital Marketing and its Application in the Commercial World

According to Minculete and Olar, (2018) digital marketing is a marketing process that uses electronic means and interactive technologies such as online communities, mobile communications, and messaging to establish an association between consumers and manufacturers. Kannan (2017) examined that digital marketing has evolved significantly over the years and increasingly used by marketers to promote goods and services. It facilitates the functioning of firms by developing connections with large audiences through the internet. Additionally, digital marketing has become an integrated part of the economy as it is majorly adopted by all the firms that are operating in the commercial world. Banerjee, (2016) analyzed that digital marketing includes different tools and techniques such as website marketing, search engine marketing, social media marketing, content marketing, email marketing, mobile marketing, and banner marketing to promote products and services to the marketers.

Bala and Verma, (2018) examined that website marketing is one of the fundamental tools that is used by the brand to campaign its products. It includes forming a personal or professional/company website to position

oneself in the virtual platform/market. Jain and Yadav (2017) examined that if a brand establishes a website it receives several benefits such as search marketing, online PR, online partnerships, offline communication, viral marketing, email marketing, and interactive platform. Website marketing is highly useful as it helps in eliminating geographical restrictions and increasing the reach of the business to large consumers. Website advertising is cost-effective in comparison to the traditional means of advertising as it helps in reaching to large consumers in an easy and time effective manner. Websites also update the subscribers about recent developments and progress occurring in the market with the help of e-mails and provide visitors with the facilities of receiving updated information at each visit. Sayed Gilani (2018) examined that search engine marketing (SEM) is an effective digital marketing tool that is used by the brand to increase visitor traffic and generate leads. It performs important functions with the help of Search Engine Optimization (SEO) and Paid Search Advertising (PSA). SEO includes optimizing techniques that help in increasing the ranking of the products and company in the search engines such as Google Search and Yahoo. Paid Search Ad (PSA) is also regarded as an effective marketing tool that is used by marketers' to attract a larger amount of visitors to the advertisements. For example, Google Adwords and Pay Per Click (PPC) are used by marketers to campaign products on Google and other networks.

Dwivedi et al., (2020) analyzed that Social Media Marketing (SMM) is another digital marketing tool that is used by advertisers to increase market presence and establish interactions with the consumers. Wang, et al., (2019) identified that social media marketing includes using different social media platforms such as Face book, Twitter, Google+, Instagram, Pinterest, YouTube, LinkedIn, and Snap chat so that direct communication is established with the consumers. There are different brands such as Boohoo, PlayStation, The Royal Academy, Depop, and Chipotle that use social marketing strategies to increase their market presence. For example, Boohoo uses a social media platform such as Instagram to promote its products and increase engagement levels with the consumers. The company has launched '#BoohooInTheHouse' campaign on Instagram to encourage people to stay home during the Covid-19 pandemic lockdown situation. As a result, due to the use of social media marketing, Booho increased its market presence and sales by 45% in the first quarter of 2020. On the other hand, the social media marketing strategy is also used by Sony's PlayStation to increase market presence and increase customer engagement with the brand. The Twitter account of PlayStation has 18.7 million followers. Due to social media awareness and increased use of social media among the consumers, the followership of PlayStation increased by 12 million followers from 2014 to 2019. Thus, by using social media platforms, the brand was able to increase its followership growth with 376% by using engaging game trailers and streaming events.

Chaffey and Smith, (2017) suggested that affiliate marketing is also used by digital marketers to increase revenues and establish a high position in the virtual marketing platforms. Affiliate marketing helps in broadening the audience market and boosting brand reputation. It is also known as the most cost-effective form of digital marketing wherein the advertisers only pay for the converted leads without bearing any overhead cost related overall marketing campaign. Affiliate marketing also helps in rapidly scaling the sales and traffic to the website. Bolos, et al., (2016) examined that email marketing allows marketers to customize the message as per the customer demographics, location, and lead status. As a result, marketers reach target specific audiences and convert them into consumers. It also helps in increasing brand awareness by exposing products and brands through mails. Email marketing helps in drawing accurate metrics and providing relevant information about open rates and subscriber retention rates. Rowles (2017) examined that mobile marketing is effective digital marketing as an increasing number of consumers are using mobile phones for digital connectivity. Therefore, marketers are making websites, mobile compatible so that brands reach consumers through mobile phones. Mobile marketing provides easy accessibility

to users and provides viral advertising benefits to marketers. Mobile marketing also allows marketers to reach consumers at any location at any time. It also allows establishing direct communication with the consumers and performs instant transactions cost-effectively. Kotler, Kartajaya and Setiawan (2016) examined that when video marketing is included in the website or social media marketing, it increases the audience traffic and engagement levels. A creative and informative video provides relevant product information, enhances brand image, and attracts consumers to the website.

Bala and Verma, (2018) examined that digital marketing is beneficial to the brands as it allows them to promote goods and services to large audiences at any time and at any location. The digital marketing tools such as social media helps the brand to establish interaction with consumers and receive positive as well as negative feedback from them. Digital marketing is highly cost-effective as compared to digital means as it helps in reaching large number of consumers without incurring any additional cost. Traditional marketing includes using print media, radio, and television for advertising purposes. However, these mediums are expensive as compared to the digital means which require little investments for advertising and campaigning as due to the evolution of websites, blogs, and videos. Digital marketing also provides an adequate return on investments by providing increasing leads with the help of email and social media marketing. It also helps in brand development by using high-quality blogs and articles for website promotion. Additionally, the increasing involvement of the brand with customers through social media sites also help in creating a positive image of the company as a positive response by the consumer enhances customer value. Thus, the consumer develops high regards for the company and product. Digital marketing tools such as social media platforms (Face book, Instagram, Twitter, Pinterest, and Twitch) are used by Amazon to increase its market presence and visitor strength. For example, the Twitter account of Amazon uses engaging content to increase customer involvement and has consequently increased the followership to more than 3 million individuals. On the other hand, the Face book account of Amazon, mainly used for product promotion and company updates, has increased the followership to 23.3 million. Thus, it can be said that digital marketing has become an effective platform to establish an association with consumers, promote products, and increase brand value in the competitive market. Soboleva (2018) examined that digital marketing is used by brands in the form of social media marketing, content marketing, search engine optimization, and websites which help in reducing costs considerably as compared to using traditional means of advertisements. As a result, the business incurs less cost in providing external services, campaigning cost, processing cost, organizing cost, and interface design cost. The increase in brand awareness is another major advantage received by brands when using digital marketing tools and techniques. Digital marketing of products through websites, blogs, social media sites, and online communities provide relevant information about the product to the consumers and reduce uncertainties regarding making purchases. Thus, through digital marketing, the consumers are well-informed about the product, their design, specification, user comments, reviews, and quality which help the consumers to make a better product buying decision. Digital marketing makes it easier to track online conversions as compared to offline means. A social media marketing tool of digital marketing allows a brand to establish personal interaction with consumers daily. As a result, there is a development of a good rapport between the company and the consumers and they intend to buy products from a known company instead of venturing for a new unknown brand. Thus, there is a development of trust and bonding with the customers which helps in developing a strong customer base comprising of loyal consumers. Digital marketing also allows marketers to reach the target audiences easily by setting up the criteria for age, gender, and location demographics. It also provides e-commerce facilities wherein the customers can select their preferred goods and services anytime and anywhere and make purchases from a wide range of merchandise. It increases the engagement of consumers and

provides improved conversion rates by providing flawless and immediate customer services. Thus, it can be said that digital marketing is highly beneficial to the brands as it helps in reducing cost, increasing accessibility to consumers, spreading awareness about products, and enhancing the brand image in the competitive environment.

Challenges Faced by the Brand in Implementing Digital Marketing Strategies

According to Moctezuma and Rajagopal (2016) digital marketing strategy is used by every business in the current times. It has become one of the major growth drivers that provide success to business in the form of sales and consumer engagement. However, the new technology-based digital marketing often becomes a challenge for the marketers as they face issues related to hiring and building of an effective marketing plan and framework. About 55% of the advertisers face difficulty in recruiting the right talent to frame an adequate digital marketing plan. The designing and framing of the digital marketing framework is not easy and requires in-depth learning about market competition and consumer perceptions. However, most of the brands face issues in identifying and hiring the right talent as there is a shortage of skilled digital marketing professionals. Another major issue that is faced by the firm is associated with the scaling of innovative practices within the firm. Digital marketing is an evolving segment which includes designing, piloting, and scaling projects continuously at short intervals so that the company stays in competition with other brands and develops an image for itself. To perform such online marketing and scaling activities, the brand needs to include right experts and agile digital marketing methods so that the company's aim is achieved with high returns. However, the deployment of the right expertise is a tedious task as there are not many professionals that possess digital marketing skills and deliver high returns on investments. Digital marketing a booming segment with more and more companies, businesses, and brands adopting digital market segment to promote their products and mark their market presence. Under such conditions, it becomes difficult for the brand to represent itself uniquely and create a separate identity. As per the survey conducted by Experian, it was found that advertisers are facing a major challenge to form a distinguished brand image. As a result, under such conditions, the brand faces issues when running a brand awareness movement or engaging new customers. The increasing competition in the digital marketing segments makes it difficult for the brand to attract target audiences to the website. If the digital marketing strategy of the firm is not efficient, it will not be able to attract target traffic and reduce its conversion rates. Another challenge is associated with a lack of lead generation. Most of the brands use social marketing platforms to establish a direct association with the consumers or run paid advertisements to spread brand awareness for lead generation. However, the competition in the digital marketing segment is extremely high and the marketers often face difficulty in attracting the attention of viewers and converting them into probable leads and consumers.

Kingsnorth (2019) examined that business and brand often face challenges related to choosing the right social media platform for business promotion. There are several digital marketing platforms to spread awareness about the brand such as social media, blogs, websites, online forums, digital communities, emails, video marketing, content marketing, and search engine optimization. Due to the availability of several options, the businesses at times get confused and fail to identify the right marketing platform suitable for them. Additionally, keeping up with the changing digital marketing trends is also a difficult task for the brand as the designers and marketers need to continuously update the changes and inform consumers about the latest offerings provided by the company. Updating and keeping the consumers informed about the product launch, season’s offerings, or events, help in increasing consumer engagement and enhancing brand value. However, to perform all these activities, there is a requirement of an adequate marketing force that keeps on updating the site and recording site performance accordingly. The security risk is another issue that is faced by the brand while performing digital marketing activities. A survey was conducted by the U.S. Internet

Crime Complaint Center (IC3) and it was found that there is a consistent rise in cybercrimes over years. Due to cyber frauds, there was a loss of $54 million US$ in 2001, which increased to 125 million US$ in the year and reached 200 million US$ in the year 2006. The survey provided that there was a loss of 250 US$ in the year 2008 and 1 billion US$ in the year 2015 because of cyber frauds. Thus, there is an increasing threat for digital marketing brands to lose their data and fall into the trap of cyber frauds. All these issues (lack of skilled professional, security threats, increasing competition, and changing digital marketing trends) make it difficult for marketers to perform digital marketing activities and sustain themselves in the competitive digital marketing environment. Therefore, to stay competitive in the virtual environment, brands must hire skilful expertise and workforce that possess the capability to frame, implement, and manage digital marketing plans effectively.

Digital Marketing Plan Essential for Brands to Succeed

Kannan (2017) examined that in the current era digital marketing planning and its promotion has become a crucial technique to target their customers and identify their needs and act accordingly to achieve the vision of the any business. The digital marketing can be described as a concrete planning by which audience interactions can be understood and managed by using various digital platforms (Face book, Instagram, Google, YouTube etc), digital devices (mobile, laptops, etc) with the effective use of digital data and technology to offer customer satisfaction (Piñeiro-Otero, & Martínez-Rolán, 2016). Creating an appropriate marketing strategy is a challenge. Firstly a strategist needs to draw their marketing plan. It will guide the business and its team mates to determine their goals and help them finding their voice. Secondly it helps to set their target demographically and finally support to identify and analyze the competitors to act wisely. A marketing process is only deciphered as successful if it has a capacity to satiate customer needs and generate profits for the business. As technology has become an integral part of our day to day lives therefore businesses should also have an emerging need to develop their strategies accordingly to promote and advertise technologically. Hence, digital marketing is a platform which attracts and retains their customers online to grow the brand. For that effective and right online marketing strategy plays a vital role in boosting small and large business. Digital marketing strategy is a plan of action which guides to achieve the digital marketing goal of raising brand awareness, conversion rate or lead generation and increasing return on investment (ROI).

In order to make a successful brand it is essential to adapt digital marketing strategies which are classified into five parts:

Content Marketing

It is considered as an ideal way to engage the visitor and customer. It includes several steps; first step that mainly focuses on developing website content which is easy to operate and understand what it wants to deliver and how it can solve customer issues. The content retains customer attention when it is in their native language and easy to understand (**Waller, 2020**). Several national and international companies are developing their website which has language variable option so that a customer can be impressed with strong, fresh, interesting, value added content. It provides relevant information which also helps to turn such visitors into their future customer. Various e-commerce companies are working on this concept to attract more customer and website visitors with lucrative advertisement and information like flipkart, Myntra, Snapdeal etc. Within a small time span of 4 years, Myntra has shown its position ahead of all the other ecommerce brand race by using effective digital marketing planning and by using all social media platforms. Comparatively, Myntra successively holds 57% of customer engagement in comparison to the other apparel ecommerce brands and has 76% of more fans than others.

Social Media Presence

In the present era the main channel of customer attraction and engagement becomes easier on social media. To plan a strategy a company has to choose and understand a platform where

their target audience spend their most times on. After analyzing it, a company has to create and share valuable information with their customers by making them aware with various offers, discounts, latest news, and hot deals in the form of pictures, gif or videos to keep a constant hold on them. Similar strategy is followed by some of the cosmetic and fashion brand,, like Lakme and Louis Philippe. Lakme, managed to engage its target audiences by using various social media platforms like face book, twitter, YouTube, Pinterest etc by using attractive activities. Consequently, Lakme has more than 14,000 followers with total video viewer of more than 82 lakhs, amongst which it has a comparatively high male followers than their female counterparts. While Louis Philippe has 612K fans on Face book and 1600 followers on Twitter and more than 2 lakh subscriber on YouTube and other platforms. They share catchy, lively communication to engage and increase their likes.

Search Engine Optimization (SEO) Practices

It is one of the most essential components to attract extra attention in order to achieve business development and create brand awareness. Website visibility depends upon high search engine ranking in comparison with the competitors. For instance today Nike, one of the giant sportswear brands has established its name globally. It majorly supported its marketing strategy by creating brilliantly effective ads which narrates different stories and takes the audience to another journey by selling emotional benefits of the product. To encourage motivation, inspiration and innovation in a sportsperson they created a tagline which represented their brand as "Just Do It". It majorly works upon emotional branding.

Email Marketing

This is a very smart and effective tool to generate more leads and drive sales which result into enhanced conversion rates. This tool retains and creates engagement of the existing customers and attracts new ones by providing interesting and attractive offers to inspire them to choose a particular brand over others. It also helps in creating a personalized bond between the customers. Google is one of the major brands which market and strategize via innovative and effective campaigns to utilize advanced technologies using an integrated approach.

Video Marketing

Human's majorly perceive the information through visual elements like pictures, videos and info-graphics. Video marketing strategy is again one of the key tools to enhance brand engagement by sharing valuable information with customer. Coca-Cola is one of the companies which used Augmented Reality (AR) to create personalized cans in China. They implemented four-point digital transformation plan which includes business transformation and enhanced customer experience to stay on top of disruption.

Hence, it can be said that all above are the mediums of digital marketing plan that enable the different brands to adopt innovative ideas and address the large number of audience that automatically makes a positive impact on their productivity and profitability levels.

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