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Impact of Demographic Factors on Awareness of Digital Distribution Channel of Life Insurance

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Impact of Demographic Factors on Awareness of Digital Distribution Channel of Life Insurance

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Abstract :

In this situation of Covid19 people are going to secure their family's future by purchasing life insurance policies. As there are different distribution channels of life insurance one of evolving and modern distribution channel is digital channel. We use this channel as per our comfort and convenience, because using this channel we can purchase a life insurance policy from comfort of our home and at any time. In this paper we have tried to find out how many people know about this modern distribution channel, as well as what factors affects people's decision to take life insurance policy. Also we tried to find out how demographic factors of respondents affects the level of awareness of digital distribution channel of life insurance.

This study shows that there were a very low level of awareness of digital distribution channel among the people. It also shows that main factor that leads people to take life insurance is their own decision following by insurance agents. It also describes that insurance agent is the convenient source of getting life insurance. The study also analyse that there is a significant impact of demographic factors on the awareness of digital channel of life insurance.

Keywords : Digital, distribution channel, Life Insurance, Internet,Awareness, demographic factors etc.

1. Introduction:

The current epidemic of Covid19 has created a fear in the minds of the people which has led them to take care of themselves and their families.So more and more people are rushing to get life insurance to protect themselves and other family members.But due to the lockout, people are not able to leave their homes, and in some places insurance agents or other traditional distribution channels are unable to reach them.But there is a unique distribution channel that can reach all people and that is the internet or digital distribution channel.

The digital channel of life insurance is a method that any personcan use from anywhere. People can get information about any insurance policy as well as buy a life insurance from the comfort of their own home using this digital channel.

What we need to know now is how many people know this new methodof distribution of life insurance and how they use it.From this study, we want to know how much people are aware of this new digital method, as well as how their demographic factors affect the awareness about this new digital distribution method of life insurance.

2. Objective of the study:

- To know the different factors that influences the decision to take life insurance.
- To study the awareness level of digital distribution channel of life insurance.
- To know the most convenient source of getting life insurance.
- To analysehow demographic factors affects the awareness level about digital channel of life insurance

3. Scope of the Study :

The scope of this study was limited to the general public of Jalgaon district.

4. Research Material and Design :

The study is exploratory and descriptive in nature. The findings and analysis of the study isbased on primary data. Primary data is the main source of the study. Secondary sources ofinformation such as books, journals, articles, websites etc. were used for developing basicunderstanding about the topic.

The sample includes the general public of Jalgaon district. Questionnaire is used to collect the primary data. In the data collection process 120 questionnaires weredistributed to the people of Jalgaon district, out of which only 100 complete questionnaires wereobtained for analysis. The sampling method used was convenience sampling. In the survey,objective type, yes-no type questions were framed. Data analysis was done using frequencies, cross tabulation and percentage etc. The statistical software SPSS 23 was used to analyse the result.

5. Findings and Interpretations:

5.1 Factors that influences the decision to take life insurance:

	Percentage	Frequency
Myself	51%	51
Advice from family and friends	14%	14
Advice of Insurance Agent	30%	30
Electronic Media/Internet	1%	1
Requirement of Financer	4%	4
Total	100	100

Table 5.1

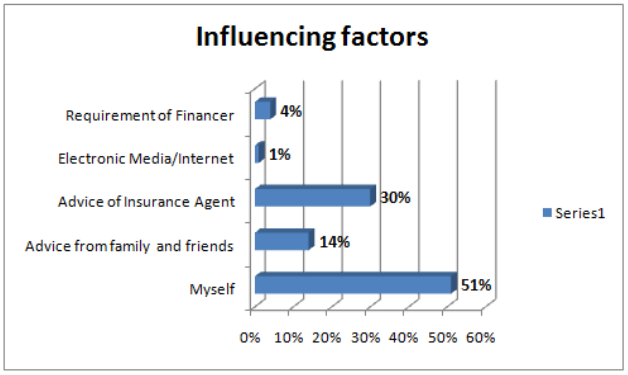

Chart 5.1

Interpretation : Above chart shows the factors which influences people's decision to take life insurance policy. It shows 51% people decide for themselves whether they want to take out insurance policy or not, and 30% people decide whether or not to take out a policy based on what the insurance agent says. And the decision of only 1% of people depends on modern method.

5.2 Awareness level of digital distribution channels of life insurance.

	Percentage	Frequency
Completely Aware	21%	21
Partially Aware	41%	41
Not at all aware	38%	38
Total	100	100

Table 5.2

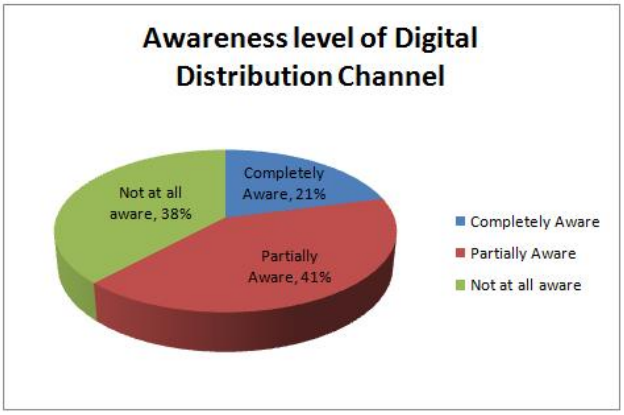

Chart 5.2

Interpretation : Above chart describes the level of awareness of digital distribution channel. it shows that 21% people are completely aware of digital distribution channel of life insurance whereas 41% people are partially aware of it. It means almost 62% people are fully and partially aware of digital channel of life insurance.

5.3 Comparative analysis of awareness level of different distribution channels of life insurance:

Distribution Channels	Percentage	Frequency
Life Insurance Agent	81%	81
Digital Distribution Channel	21%	21
Corporate Agent	11%	11
Insurance Broker	20%	20
Bank	19%	19
Direct Insurance company	21%	21

Table 5.3

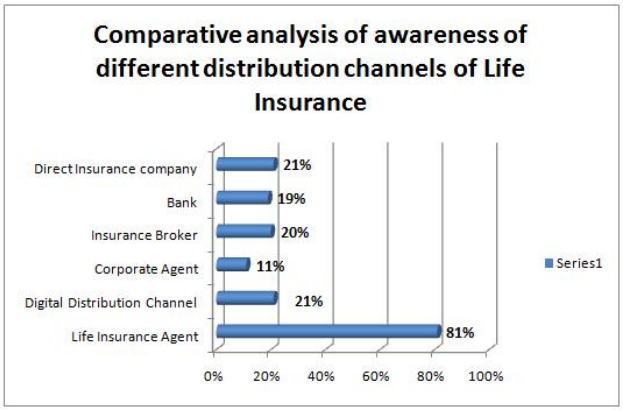

Chart 5.3

Interpretation: above chart depicts the comparative analysis of awareness of different distribution channel of life insurance. It shows 81% people are completely aware about insurance agent, whereas only 21% people are completely aware about digital channel.

5.4 The most convenient source for getting life insurance policy :

Most convenient source	Percent	Frequency
Insurance Agent	53%	53
Bank	8%	8
Insurance Broker	4%	4
Direct Insurance Company	3%	3
Digital Channel(Internet)	32%	32
Total	100	100

Table 5.4

Interpretation: above table shows that 53% of people think that the easiest way to buy a life insurance is to have an insurance agent. And only 32% people are thinking that digital channel is the convenient source to buy a life

insurance policy.

5.5 Analysis of the effect of demographic factors on the awareness of digital distribution channel of life insurance :

5.5.1 Effect of Gender on level of awareness of digital distribution channel :

	Gender		
	Male	Female	Total
Completely Aware	19%	2%	21
Partially Aware	32%	9%	41
Not at all aware	22%	16%	38
Total	73	27	100

Table 5.5

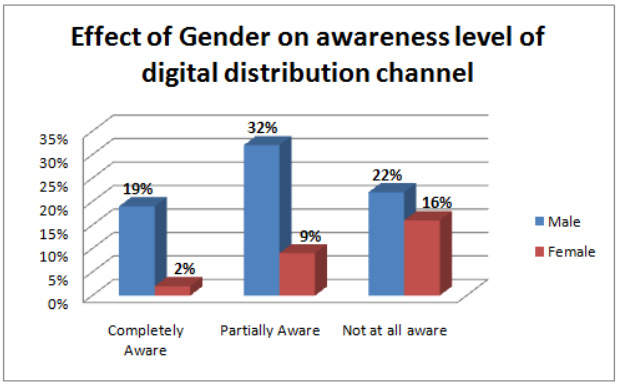

Chart 5.4

Interpretation : the above table 5.5 shows that out of 100 respondents 73 were male respondents and 27 were female respondents. The above table 5.2 shows that 21 respondents were completely aware about digital channel out of which 19 were male and only 2 female respondents were there.

5.5.2 Effect of age on level of awareness of digital distribution channel:

	Age (in years)				
	Below 26	26-35	36-45	Above 45	Total
Completely Aware	6%	12%	2%	1%	21
Partially Aware	8%	15%	16%	2%	41
Not at all aware	1%	4%	5%	28%	38
Total	15	31	23	31	100

Table 5.6

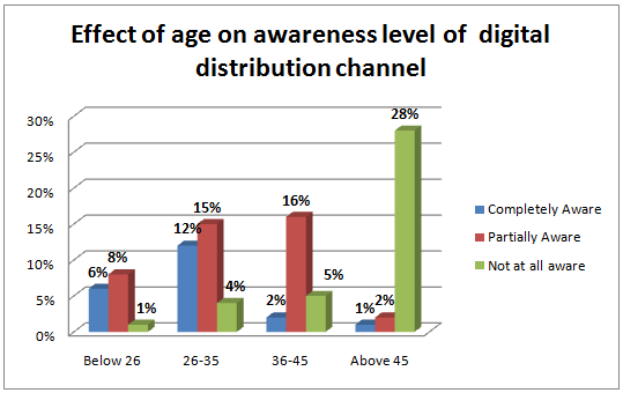

Chart 5.5

Interpretation : above chart describes the effect of age on awareness level of digital distribution channel. It shows high awareness level in the age group of 26-35 years, followed by 36-45 years.

5.5.3 Effect of Education on level of awareness of digital distribution channel:

	Education				
	Below HSC	Under Graduate	Graduate	PG	Total
Completely Aware	0%	0%	5%	16%	21
Partially Aware	1%	7%	11%	22%	41
Not at all aware	14%	3%	7%	14%	38
Total	15	10	23	52	100

Table 5.7

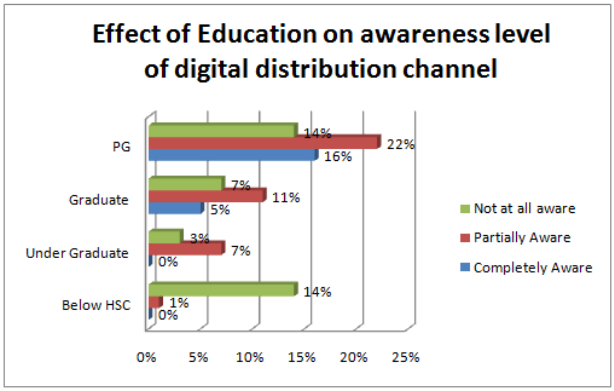

Chart 5.6

Interpretation : Above chart describes the effect of education on awareness level of digital distribution channel. It shows high awareness level in the people who have completed their PG as well as graduation. It also shows that high volume of people who were not aware about digital channel are from below HSC education group.

6. Conclusion and Recommendations :

The study shows that 21% respondent were completely and 41% respondents were partially aware about digital distribution channel of insurance policy.

This shows that the number of people who are completely aware of the digital channel is very low. So insurance companies need to pay attention to these things. Because there is a lot of scope for improvement in this place.The above study also shows that among the influencing factors that have the greatest impact on people when taking out an insurance policy is the self-determination, followed by the insurance agent. It also reveals that the convenient source of getting life insurance policy is insurance agents, this shows that even today most people trust insurance agents to take life insurance.

The study also analyse the impact of demographic factors on awareness level of digital channel. It shows that awareness level is high in male respondents as compare to female respondents. This suggests that insurance companies should conduct some special awareness campaigns for women. This shows that awareness is higher among those below 35 years of age. Therefore, insurance companies should come up with a different strategy for people over the age of 35 years.The study also shows that people who are more educated have higher awareness levels.

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Sustainable Ideas for Business in New Normal

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Index

A Study on Five Years' Journey of Goods and Services Tax and its Impact on Indian Economy

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Abstract:

It has been almost five years since the introduction of the Goods and Services Tax (GST), India's biggest tax reform, on 1 July 2017. It has been a roller coaster ride for the government, industries, and consumers due to the amount of changes and reforms introduced in the past five years since its inception . These changes were primarily focused on rationalizing rates, simplifying procedures, and curbing tax evasion.The Goods and Services Tax is constantly under tremendous pressure to find solutions to some core issues, such as GST filing and forms related issues, which are commonly faced by all taxpayers.Stabilizing one of the world's biggest online tax systems, GST Network, GSTN, was also a key focus area for the government.

This paper aims to look at some statistics and key indicators to know how successful this historical tax reform has been in achieving its desired objectives and how it has impacted the Indian economy.

Key words: Goods and Services Tax, GST Network-GSTN, Indian economy

1. Introduction:-

Goods and Services Tax (GST) in India is a comprehensive, multi-stage, destination based tax that's levied on every value addition.This is an indirect tax levied on a consumer buying a good

or service. GST has replaced many indirect taxes which existed in India previously. The 122nd Amendment Bill of the Constitution of India has introduced a Nationwide Goods and Services Tax in India from 1st July, 2017.

GST is a comprehensive indirect tax which is designed to bring the indirect taxation under one roof. More importantly it has eliminated the cascading effect of taxes that was prevailing earlier. After 17 years of continuous efforts the present GST law has come into force. The journey of the GST law in India was not easy, unlike other laws. From its proposal in 2000 to its implementation in 2017, it has gone through many reforms. The Goods and Services Tax is being considered as the most reformative measure taken in the field of indirect Taxation in the history of India. It has been termed a promising game changer, the single biggest tax reform undertaken by India in 70 years of Independence.

The introduction of the GST on 1st July, 2017 in a single stroke converted India into an unified, continent-sized market of 1.3 billion people. It will bring uniformity of tax rates and structures throughout the country. It will enhance certainty in ease of tax rates and structures across the country. It will increase the ease of doing business by making it tax-neutral, irrespective of the place of doing business in the country. In order to understand the features and objectives of the GST Act, first we need to go through the previous taxation system. Previously taxes were charged at every stage such as VAT/CST/ Service Tax on sales/ services, entry tax or octroi on entry of goods in local areas, excise on manufacture, etc. This cascading effect of tax i.e. tax on tax, used to increase the prices of goods and services. These taxes were levied by the Centre and the states differently according to the lists in the Constitution of India. The new concept of GST would make it a single tax system which would be levied on 'supply' of goods and services. It will be imposed by the Centre and States both with the suggestion of a federal institution called the GST Council.

GST is levied in three different types: (i) CGST, (ii) IGST and (iii) SGST/UTGST.

CGST is the Central Tax which is levied by the Government of India on any transaction taking place within a state. CGST has replaced all the existing central taxes including Service Tax, Central Excise Duty, CST, Customs Duty, SAD etc. The rate of

CGST and the SGST rate are usually equal. Both taxes are charged on the basis of price of the product.

IGST (Integrated Goods and Service Tax) is applicable for interstate (between two states) transactions of goods and services as well as on imports. This tax is collected by the Central Government and then distributed among the respective States. IGST is levied when a product or service is moved from one state to another.

GST (State Goods and Service Tax) and UTGST (Union Territory Goods and Services Tax) are applicable for the goods and services supply which takes place in the respective States and Union Territories. It has replaced all the existing state taxes including VAT, Central Sales Tax, Purchase Tax, Luxury Tax, Entry Tax, Entertainment Tax, Taxes on advertisements, lotteries, betting, gambling and state cess and surcharge.

The current form of GST has five slabs of tax for goods and services – 0%, 5%, 12%, and 28% for different items. It does not include five petroleum products i.e. crude oil, petrol, diesel, jet fuel and natural gas, as well as liquor and electricity from the purview of GST. Additionally, some basic items such as unbranded products, vegetables, milk, fruits, bread, salt, bindi, curd, sindoor, natural honey, bangles, handloom, besan, flour, eggs, newspapers, books etc. are also exempted from tax.

2. Literature Review:-

VS Krishnan proposed that It was an adventurous fiscal arrangement done in the intention of strengthening the fiscal capacity of the country.After five years of implementation of the GST, it appears that the labor of transition are slowly yielding to the nectar of greater revenues. Fiscal upthrust has returned largely due to better compliance, enhanced by matching of supplier and buyer invoices and more severe rules of granting registrations. This has brought down the volume of fraudulent input invoices and increased the cash-to-credit ratio in the total duty payable. There is some evidence to show that the traditional 20:80 cash-to-credit ratio is increasing to a level of 25:75. This means that we are moving towards a new horizon of monthly GST collection of ₹1.25-lakh crore instead of the usual ₹1-lakh crore.

Mishra (2018) provided a glimpse of the rates. It throws light

on the impact of GST, on pharmacy, agriculture, telecommunication sector, textile, mobile and accessories, real estate, FMCG, automobiles, banking, financing. The study concludes that the implication of a single tax system will attract more manufacturers to work in the sector. The individuals will benefit as the prices of the products will decrease and consumption will increase which may lead to the increase in GDP. Increased GDP may attract the foreign investment which leads directly or indirectly to create employment opportunities.

Kumar and Nayak (2017) accommodated the various advantages of implementing GST, such as removing the cascading effect, increasing the efficiency of logistics, regulating the unorganized sector etc. The paper shows the impact of GST on FMCG, telecom, cement, banking and insurance, airlines, E-commerce, technology sectors on the basis of facts and figures. The study concluded that the GST will provide a positive impact on the economy and will increase the growth of GDP, and will generate employment, but it may show a negative impact on the service sector because the rates of GST in the service sector have increased. GST will bring innovation, accountability, and transparency in the tax structure.

Sacchidananda Mukherjee proposed that the success of the GST in terms of compliance and revenue mobilization depend largely on provision of incentives for tax invoice based transactions and simplification of tax administration. Based on the proposed design, a large part of transactions (both in goods and services) remain outside the tax net. There is no mechanism to verify the authenticity of the tax invoice issued by the vendors or service providers.

The introduction of GST has helped in the consolidation of state and federal taxes. The cascading effect of multiple taxes has been reduced due to it . As a result of this, the tax burden on businesses and consumers has decreased. Also, the number of taxpayers has grown, which resulted in a considerable increase in tax income. The whole tax system is now simple to administer. Moreover, small and medium-sized firms can expand their operations. It is considered that the positive impact of GST would assist more Indian businesses in entering overseas markets.

3. Research Gap:-

From the literature it is clear that Impact of GST on the Indian economy is an emerging issue for the research in the subject of economy. At different levels many studies have been conducted to find out the impact of GST on various sectors. Keeping in view, the study attempts to identify the level of awareness and impact of GST on various sectors and on the overall economy of India.

4. Objectives of the Study:-

1. To find out the sectoral impact of GST.
2. To Identify the Impact of GST on Indian Economy as a whole
3. To study about the achievement of set or predicted objectives of GST before implementation.

5. Research Methodology:-

As it is an explanatory research , secondary data from journals, articles, newspapers and magazines are the main sources of data collection. Giving due consideration to the objectives of study, descriptive type research design is adopted so as to get more accuracy and rigorous analysis of research study. The secondary data which is accessible is intensively used for research study.

6. Impact of GST on Indian economy:

Goods and Services Tax or GST was introduced in July 2017 and is a giant tax reform in the Indian economy. It has made business more transparent and simple. Double taxation or cascading effect of taxes is also nullified totally by GST. The tax liability of the producer to the government is the final tax paid by the consumer on deducting the input tax paid by the producer.

1. Simpler tax structure: The taxation system of our country has become simpler due to GST. It is a single tax which ensures easier calculation. With GST, the buyer knows precisely the amount paid as tax when buying certain products. This is important when considering GST and its impact on the GDP.
2. More funds for production: Another effect of GST on the Indian economy is the reduction in the total taxable amount. This saved fund can again be reinvested into

the production cycle to increase production.

3. Support for small and medium enterprises: Based on the size of the organization, the amount of GST depends on the firm's annual turnover, provided that the firm has been registered under the Composition Scheme introduced by GST. Enterprises with 1.5 crores worth of turnover have to pay 1% GST, Enterprises with a yearly turnover of 50 lakhs have to pay 6% GST .
4. Increased export volume : When analyzing GST and its impact on the Indian economy, customs duty on export of goods has reduced. So now production units save money while producing goods and also while shipping them. This savings by two ways has attracted many production units to export their goods, increasing the export quantity to great extent.
5. Enhanced operations throughout India: Nowadays with a unified taxation system, transporting goods around India has become easy which has boosted operations throughout the country.
6. Cascading effect is abolished: With GST, taxes of the State and Central Government are merged. This has abolished the cascading effect of taxes, lessen the burden on the buyer and the seller. So even if it may look like one big chunk of tax to be paid, lesser hidden taxes needed to be paid..

7. Impact of GST on different sectors

1. Impact on real estate: The introduction of GST will reduce the amount of buying a house, mostly when booked before construction. Now as the liability shall be passed on to potential buyers developers too shall enjoy input credits on GST paid on goods and services delivered by them.Taxes levied over real estate have also become simpler because the government has removed stamp duty after the implementation of GST, thereby making the impact of GST on the real estate sector more prominent. The under-construction properties will total to 5% of GST without the input tax credit. GST is not applicable for ready-to-move-in properties. If you are

looking to purchase a house, consider such effects of GST on properties.

2. Logistics:In a vast country like India, logistics plays a key contribution to the economy. A logistics industry can grow exponentially if it is well-organized and structured, especially under the Make in India banner.
3. E-commerce: E-commerce has tremendous growth potential. However, e-commerce companies shall have to tolerate with tax collected at source factor for GST.
4. Pharma: The pharma and healthcare sector have a positive impact due to GST due to its simplified tax structure. It will also avail a tax relief in lieu of making healthcare cheaper and accessible to people of all income groups.
5. Telecom: A fall in prices can be expected in the telecom sector, as costs like warehousing, logistics, etc., will get reduced.
6. Textile: Indian textile is one of the largest employers of skilled and unskilled labor. With the textile industry also making 10% of total exports in India, the numbers are likely to increase with the removal of customs duties. GST shall also affect the worth of cotton, a cloth on which most small-scale textile industries depend. These are a number of the impacts of GST on small traders.
7. Agriculture and farming: Agriculture is the biggest contributor to India's GDP, covering more than 16%. With the ease of logistics, transportation costs of agricultural produce will also go down. Thus, the impact of GST on wholesalers has been greatly positive.
8. FMCG: With GST eliminating the need for multiple sales depots, FMCG shall save a lot on logistics and distribution costs.
9. Automobile: Under the previous taxation system, several taxes like excise, VAT, sales tax, road tax, motor vehicle tax, registration duty were applicable, which has now been replaced by GST. Automobile prices are likely to drop because the producers are saving more within the sort of taxes now.
10. Startups: GST has tremendously benefitted Indian

startups with perks like a DIY compliance model, increased limits for registration, a free flow of goods and services and tax credit on purchases. It has also become easier for companies with a pan India presence to calculate taxes, especially if belonging to the e-commerce sector. Understand the impact of GST on small-scale industries if you're a neighborhood of this sector.

11. Self-employed individuals: Self-employment or freelancing is a young industry in our country, but filing for taxes has become easier as they fall under service providers with GST implementation. Understanding the impact of GST on micro small and medium enterprises is vital for such individuals.

Entrepreneurs engaged in the hospitality sector should also check out the impacts of GST on the hospitality industry.GST comes with its set of pros and cons, affecting both buyers and sellers. One must be aware of GST's negative impact on the GDP as well. So one side, when taxes became simplified, they also led to an increase .

8. Impact of GST on Revenue Generation:

Data from various secondary sources reveals that GST revenues were Rs 7.19 trillion in 2017-18 and Rs 11.77 trillion in 2018-19. Prior to GST the total of excise duty and VAT revenues increased from Rs 3.58 trillion in 2014-15 to Rs 6.36 trillion in 2016-17. GST has been able to put tax revenues on a higher trajectory. The higher tax base as exemption to pay GST for manufacturing was reduced from Rs 1.5 crores to Rs 40 lakhs which leads to steep rise in tax. So a wider tax net has come into effect. But the exemption limit for small businesses and services has been raised from Rs 10 lakh to Rs 20 lakhs then again doubled later. But the loss thanks to this latter was done away by the previous and also due to better compliance. The number of GST returns filers increased from 9.8 million in 2017 to 13 million in 2020. Also due to politics, GST on several items were reduced after 2018. This could have led to tax elasticity due to lower rates.

Better compliance of GST was given importance to extend tax buoyancy. There are 21 rules that GST payers have to obey

as failing which businessmen would be punished with monetary fines and jail terms. Several people have been punished thus far .

IT infrastructure is additionally getting upgraded every day which enlarges the tax revenues. Macroeconomic impacts of GST are lower inflation and higher economic growth in the country. GST is a good taxation system as it brings honesty in the economy. As the registration of businesses is mandatory the black money has been removed by about Rs 3 trillion .This can also be attributed to the fact that sales figures need to be quoted to the tax authorities. So GST will definitely put India on the ranks of advanced economies of the world in terms of business culture and good leadership.

9. Conclusion:

The impact of GST on the Indian economy has been very positive thus far . Inflation drastically reduced because the GST regime caused a consistent tax structure within the country. The revenue from the taxes for the govt also increased with an extended tax net and therefore the fiscal deficit also remained under check. Cash inflow has increased as exports have grown substantially, moreover the Foreign Direct Investment (FDI) has also increased. India has also improved its rank by 23 positions in 'Ease of Doing Business' within the latest Report of the planet Bank. All these achievements were the outcomes of implementing GST in India as a comprehensive tax . The entire process of GST from registration to filing returns is formed online and it's also simple. This has been beneficial for startups, as they do not need to run from one place to a different place for approvals.

Goods and Services Tax has all the essentials of a modern seamless taxation system. But its success will depend on taking onboard all the stakeholders and also eliminating all the irritants which go against the principles of GST. Goods and Services Tax also will contribute towards a strong macroeconomic environment, thereby improving investor sentiments. Finally, the consumers are going to be the last word beneficiaries, because it will eliminate the cascading effect of taxes.

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A Study on Green Employee and Green Human Resource Management and its Practices

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Abstract

Across the world, we are moving to industrialization, that builds, business creation, innovation and other business activities. This was floods human straightforwardness, yet additionally expands its way of life. Yet, on the opposite side, it additionally increments natural peril that came about biological dangers to individual. So this is a period Peoples need to utilize Green practices to save the climate and most significant asset of the planet for example Human. Greening representatives through and through is anything but a simple assignment, yet star ecological arrangement

The paper centers upon the GHRM, different Green Human Resource Practices and clarifies the job of green human asset process in making strides toward environmental friendliness. This study focuses on various green HRM Practices that will be adopted by the organization that can make their employee environmentalist or naturalist to achieve the objective of environmental sustainability.

Keywords: Green Employees, Green Environment, Green HRM, Green HRM Practices.

Introduction

Today, a worldwide temperature alteration is central issue which alarms Government, public and Industries. To keep up with Environmental Sustainability in the business association

the reception of green HRM arrangements and practices is vital for all the business associations. In human asset the board, the green HRM approaches are planned and created to accomplish natural maintainability. Green HRM Practices have effectively been famous in natural and social parts of present corporate world.

Meaning of Green

The Green has various implications for an alternate individual, yet for a hippie or nature - darling A green‟ as an area or land that encompassed with grass, spices, plants, trees, outside air and regular assets yet some way or another, it implies something applicable to nature or indigenous habitat.

"Green characterizes as a thing" as preservationist, Ecologist, nature-sweetheart or eco-extremist.

Greening

Becoming environmentally friendly signifies to pursue practices that can prompt all the more harmless to the ecosystem and biologically capable choices and ways of life, which can assist with ensuring the climate and support its normal assets for current and people in the future.

Becoming environmentally friendly aides the environment by reducing how much infection that enters the dirt, water and air. By utilizing elective energy sources and staying away from the consuming of petroleum products, reusing and decreasing waste and driving all the more proficiently, less toxins are delivered into the climate.

Meaning of Green in the Context of HRM

Biologist - Biologist tries out to be exceptionally careful in the process of concerning the common environment to allow it to keep going as far as might be feasible. At the end of the day, the person does utilizing the common habitat at the base level so people in the future will actually want to use it.

Naturalist -Naturalist does keeping the regular habitat in its unique structure and shielding it from damage, misfortune, or negative change.

Non-polluter - Non-polluter keeping from (or limiting) contaminating the water, air, climate and so forth through undesirable and harmful substances and squanders. In the Other Words the person in question turns into a gatekeeper against practices and results that will eventually jeopardize the planet/

earth where people and non-people are residing.

Producer - Producer does making nurseries and looking-like regular spots. At the end of the day the individual purposefully constructs stops and places which have plants, trees and grass.

Green Employee - When an employee accomplishes above four roles, he or she becomes as "Green Employee".

Hence, a Green employee is a nature-lover or an eco-activist.

General Reasons for Greening

- To avoid or minimizing global warming.
- To avoid or minimizing natural disasters such as Acid rains, red rains,, flooding, hurricanes, Tsunamis, droughts etc.
- To restrict or minimize health diseases due to pollution.
- To avoid or reduce harms to animal or other natural living being.
- To safeguardproper balance of relationships among plants, wildlife, societies and their environment.
- To ensure the survival of humans and business organizations for a prolonged period of time.

Green Human Resource Management

Green Human Resources Management can be characterized as the arrangement of strategies, practices, and cycles that empower a green conduct of an organization's representatives to make a naturally smart, asset proficient and socially dependable work environment and generally speaking association. Green HRM can be utilized to lessen cost, better proficiencies, to decrease carbon impressions, to make green readiness among the representatives and start green balance between fun and serious activities.

Need for Green HRM

Today, the requirement for green human asset the executives are significant for from one side of the planet to the other. The biological cognizance of every human drives the living style and climate. The overall representatives are keen on green human asset the executives on account of its significant and need in the current work environment. Our own and expert way of life is impacted because of numerous results.

Importance of Green HRM

- Increase employee's efficiency and effectiveness.

- Reduce cost and better employee engagement.
- Increase employee motivation.
- Easy to hire new employees/ can attract suitable qualified candidate pool.
- Reduce labor turnover and absenteeism.
- Healthier and care management system within the organization.

Literature Review

(Bangwal & Tiwari, 2015)in their study " Green HRM – A way to greening the environment" discussed how Green HRM can benefits or helps the employee and their organization practices and behavior against environment. Employees absorb so many things either from work life and private life and due to these learning individual performance varies toward environment. This is only possible by the effective execution of green HRM within the organization.

(Sarode, Patil, & Patil, 2016) mentioned out in their study"A study of Green HRM and Its Evaluation with Existing HR Practices inIndustries within Pune Region" Green HRM has great position in today's scenario. Employees are not well competent about theterm but they are sensible to save environment.Whole-hearted participation of employees to go towards greening has to increase.

(Deepika R, 2016)Pointed outin their study "A Study on Green HRM Practices in an Organization", Green human resources effort have resulted in increased efficiencies, employee Conservation and enhanced productivity and also other tangible benefit.

Distinct Green HRM Practices

Green Recruitment and Selection - Green enlistment and determination is the mix of Environmental Management with enrollment and choice, where HRM strategies are utilized to advance natural maintainability and the prudent utilization of assets inside business associations.

Green Performance Management - It connects the natural worries of the associations (the issues connected with the "green wave", the incorporated administration execution) to the overall hierarchical interaction by which workers are further developing their expert abilities expecting to accomplish the authoritative

qualities, objectives and destinations in a best way.

Green Training And Development - Picking up, preparing, and improvement arrangements can incorporate projects, studios, and meetings to help representatives for improving and getting information in climate the board, green abilities, and mentalities. For future gifted green supervisors, work pivot in the green task ought to turn into a significant piece of their vocation improvement plan.

Green Employee Relations - In the association, the representative connection is the significant part of HRM which is worried about sending off great boss and worker relationship. Through this Green HRM practices, the inspiration and confidence of the representatives will raise and it further improve efficiency of employees.

Green Compensation and Reward - The pay bundle ought to be adjusted to compensate green abilities fulfillment and achievement by workers. Financial, nonmonetary, and credit based green award and month to month executive rewards can be given reliant on execution results in natural stability.

Conclusion

Today, to minimize the effects of pollutions, industrializations, maximum uses of natural resource there is a need of going green in every aspects of society that may be business organizations or academic institutions. Green thoughts and ideas are beginning to gain momentum within the human resources space.To achieve environmental sustainability the Green HRM play important role. The implication of Green HRM practices is essential for inspiration of employee confidence and Green HRM benefit both the organization and the employee. A number of recommendations were made on the basis of working skill and to reduce challenges of the employees and to increase the interest to practice Green HRM.

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Employability Skills: A Vital Skill for Survival

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Abstract: (Okada, 2012)

Every student has a dream of getting a job with a good starting salary once when he completes his education. But most of the students are not able to fulfil this dream. Those who get the jobs are being paid peanuts even after investing a huge sum of money in their education. The most common reason behind this situation is the gap which exists between the skills the industry /employees are expecting and the existing skills which the students have. This gap is generally called as Employability skills.

This study explores the existing literature on "Employability Skills". The focus through this is to understand the importance of Employability skills, why it is important? Good Employability Skills will help an individual not only to sustain his career but will also keep him ahead of his competitors. This paper focuses on the vital issues of variety of Employability Skills which are necessary for an individual to be successful in his career.

Keywords: Employability skills, soft skills, learn ability

Introduction:

This paper lays stress on the importance of employability skills which are vital for individual's survival in this era of globalisation. In today's world a person with good employability skills can definitely ace the job market and can become indispensible to his organisation.

Education definitely helps a person to acquire his dream job

but learn ability (ability to learn new skills) is the propeller which will take a person's career higher and higher.

(Mayur, 2022) in his article titled "10 Career Skills You Must Have!" suggest that An individual must have tolerance for ambiguity and will have to learn to adapt to changing scenarios. Today, each one of us has to relook at what is required to sustain and succeed in the workplace. While technical skills are a must, both general and domain specific, there are 'softer skills' that have come to gain importance.

While employability skills remain the same, one needs to adapt them to suit the digital workplace.

Here are some skills that will help you make a mark in the digital workspace Digital literacy, Decision making, Adaptability, Pattern thinking, Resilience, Emotional intelligence, Creative mindset, Leadership, Learning to learn, Stress management.

According to Irwin Anand, MD, Udemy India "The key attribute for success in today's working environment is the ability to learn and acquire new skills."

(Kumar, 2021) in his article titled "Explained: Where is the maximum employability gap? Explains that The service sector relies almost exclusively on a skilled workforce and as the confluence of business and technology continues most jobs will be redefined to be knowledge oriented. We are seeing several industries where the employability gap is ever increasing as more and more future skills-oriented jobs are created. These sectors include not only the traditional IT/ITES but also traditional sectors such as banking and financial services, manufacturing, pharma & healthcare, telecommunications, and infrastructure.

Of course, the employment gap is not restricted to any particular industries but rather transcends across all industry segments as digital and technology become the way of life.

The skills that are contributing to the employability gap can be categorized into hard skills and soft skills.

Hard Skills - These are taught skills which an employer can easily define and measure for their employees. Some of the most in-demand skills across industry segments include : - UX Design, - Data Science, AIML, Blockchain

(Nair, 2020) in the article titled "Tech Up-skilling: An Investment into A Future-proof Career" justifies that The ongoing pandemic has brought with it the possibility of a new normal - starting with transformed consumer behaviour and reshaping of the economy. It is almost like a time-shaping phenomenon, that will transform industries and the workforce alike. It is predicted to particularly impact the IT industry - traces of which have already started coming to the forefront. Companies are accelerating digital transformation and technological advancements to stay competitive in the market.

(Narayan, 2020) in his article titled " 10 JOB skills that really matter right now " suggests that the job market is eternal. Going by the latest trend, technology-driven careers are becoming more and more popular. And why not? After all, the world has gone digital. Irrespective of what field you chose, there are always certain skills that increase your likelihood of success. Besides, there are skills that you can learn afresh while some needs polishing to help you in your career path. Such skills assume special importance at times of crisis like the current economic slowdown.

Today, recruitments are at pause, the employment window is narrow, and competition is stiff. The digital transition has only created the need for WFH-specific skills central to thrive in the new normal. So, maybe this is the time to refresh your resume. Here are the ten most valuable skills to make you stand out to employers. Creativity, Persuasion, Collaboration, Adaptability, Skill enhancement, Emotional intelligence, Risk management, Communication skills, Time management, Self-motivation etc.

(Narayan, 2020) in his article titled "Top 10 job skills in demand now" suggest that Experts at coding, Web development, and digital marketing, will be on every organisation's hiring list. He further suggests that the pandemic has changed the future of working and the digital mode is here to stay. Certain skill sets are essential to survive in the transitioned work environment. There are certain skills which are necessary for the workforce to survive in this period to mention a few: - Flexibility and adaptability, Video production, technical skills and much more.

(Bhattacharayya, 2020) in her article titled "IT companies step up re-skilling of employees as they prepare for post-pandemic scenario" suggests that The training being imparted is in the fields of cloud technology, artificial intelligence, machine learning, data analytics, cyber security, Internet of Things (IoT), user experience (UX) and digital networking, among others.

(Kaklasaria, 2020) in the article titled "Staying relevant: Re-skilling workforce for AI, ML, IoT, era must for MSMEs, start-ups to survive, scale" argues that Pandemic induced lockdown and the consequent social distancing have given a chance for online learning to showcase its effectiveness as a primary learning model, rather than as a supplement to traditional classroom training methodology. Re-skilling and up-skilling has attained new importance, particularly for start-ups & SMEs in this new economy.

(Okada, 2012) in his article titled "Skills Development for Youth in India: Challenges and Opportunities" has stated that Today, youth across the world face serious challenges regarding skills and jobs, challenges fundamentally different from those their parents faced. In the globalized economy, competition has become intensified among firms and industries in developing and developed countries alike, requiring their workers to have higher levels of skills to enable them to engage in innovation, improve the quality of products/services, and increase efficiency in their production processes or even to the point of improving the whole value chain process. Rapid technological change demands a greater intensity of knowledge and skills in producing, applying and diffusing technologies.

The challenges are greater for developing countries like India, which have long suffered from a shortage of skilled labor. But today, developing-country firms and producers have become increasingly involved in the global value chains, requiring them to meet global standards of quality and efficiency.

This paper has identified an enormous skills gap in India between what industries demand based on recent rapid economic growth and the skills that young people acquire through vocational training. For more than a half century, well-institutionalized public

vocational education and training systems have been in place both within and outside the formal education system. But they are not large enough to accommodate many school graduates, and they have not been able to provide young people with the vocational skills that industries need. Thus, youths' access to vocational training continues to be limited. However, the Indian government has recently embarked on a drastic reform of its training policy, intensifying its efforts to increase the number of skilled workers. It has formulated National Skills Development Policy and National Manufacturing Policy; set up a new institutional framework to accelerate and coordinate skills development efforts, and developed the National Vocational Education Qualification Framework (NCEQF). Training institutes now have more autonomy and private-sector involvement, and have improved their governance and curriculum. These changes are too recent to examine the effects on training outcomes. But it will be interesting to see how these reforms improve access to and demand for vocational training among youths as well as the outcomes of training

(Bansal, 2019) in his article titled "Indian Graduates and Employees are on High Alert! Reskilling is Must to Stay Employed!" justifies that The rapid emergence of new technologies like Artificial Intelligence, Robotics and Automation are generating the need for new skills which in turn disrupting the existing job market by creating a huge digital and technical skill gaps in employees. These emerging technologies are dominating and would continue to dominate the future industry, creating a constant need of up-gradation of technical skills of employees to sustain not only in the current job market but for the future market as well. With technology changing exponentially over the last decade, the shelf life of skills has shortened. Skills that were relevant at the beginning of the career have now become almost obsolete. Most of our Indian graduates lack the skills and aptitude required to learn new and advanced technologies that are needed to survive in the future job market.

(Ralhan, 2017) in his article titled "Skilling and Staying Relevant: The Only Way to Survive in the Age of Automation" explains Technology is evolving at a very fast pace. Cutting-edge

technologies of today would either become outdated or evolve into unrecognizably advanced forms 15 years from now. To add to this, there is the fear that Artificial Intelligence (AI) would outsmart humans and replace manual labour. Therefore, today's software and programming languages will be rendered obsolete by the time today's students join the future workforce. In such a scenario, skilling and up-skilling become the need of the hour to stay relevant at the workplace.

Employability Skills -

Employability is the ability of any graduate to get the job with the help of some required skills (Harvey, 2001). Employability skills are some basic skills which are necessary for getting, performing and maintaining job (Robinson, 2008). ASTD (American Society for Training and Development) prescribed 16 basic employability skills across all jobs are: reading, writing, speaking, listening, observing, quick learning creative thinking, goal setting, problem solving, career planning, teamwork, negotiation skills, leadership skills, understanding organization culture, ability to do more than one work at a time i.e. multitasking, ability to leverage technology etc.

In layman words employability skills refer to a set of transferable skills which are necessary for an individual to be employable lifelong. Employers today recruit people with diverse skills in addition to academic skills. In order to stay relevant and employee has to focus on building his employability skills with the ever changing market expectations.

Objectives -

- To understand the importance of employability skills
- To sustain oneself in times of crises.
- To develop the skill to learn and explore new things.

Methodology

This study is analytical and uses secondary data which is collected from different sources viz. websites, journals, periodicals, journals etc.

Conclusion

To sum up in the present scenario the employers are always look out for people who possess the necessary skills plus the required qualification and experience.

Giving the necessary training to the employees involves a

huge amount of time and money. Education and experience will definitely help a person to be recruited, but he has to possess the required plethora of skills called as " employability skills" Employability skills in this context means not only the specialist or technical skills which are associated with the job but also the soft skills which are required to sustain his job.

The current scenario will definitely bring in a sea change in jobs in demand in the next few years to come. A person has to constantly up skill himself to stay abreast in his career. In this changing scenario if a person does not have the necessary employability skills then he becomes redundant to the organisation. A proverb saying "Change or perish" is best suited to this context

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Study of Natural Language Query Interfaces to Database Systems

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Abstract:

This paper is the study of Natural Language Query (NLQ) interface to any type of database in any domain focusing on how natural language query interface are constructed and various techniques are used to implement it. Natural language processing(NLP) is the computational linguistic field which deals with analyzing and understanding people language.In this stage, databases are the main sources of storing and retrieving data and difficulty arises while information retrieval from database by using database query language because everyone does not know database query language.We can access any kind of data from database using natural language like English,Hindi and Marathi etc.and it's easy technique to access data. The technique which provides such a solution is known as Natural Language Interface to Databases(NLIDB).In the study of Natural Language Query Interface, we found that it allow users to compose questions in Natural Language and in turn users get the responses in Natural Language(NL).This paper is simply the discussion about databases,natural language processing and natural language interface to databasein various domain like clinical databases,agricultural databases,banking databases etc. This paper is an introduction to Natural Language Interface to Databases(NLIDB).

Keywords:NLQ,NLP,Database,DBMS,NLIDB,SQL.

1.Introduction

Nowadays databases are present everywhere in every field for maintaining records and we always need to access these records from database whenever required. When we obtain information from database, we need expertise in constructing SQL queries but unfortunately many users don't have such sufficient expertise to formulate queries to obtain such information.

NLIDBS are the most important tools which allow users to access information in a database by a query formulated in Natural Language. While using Natural Language Interface to Database (NLIDB),user simply types a query in natural language like Hindi,Marathi,Punjabi,English etc. and this interface interprets the query and translate it database query language statement which is submitted by NLIDB to a DB management system to gain information requested.One of the most interesting area of Natural Language Processing(NLP) is the development of Natural Language Interface to Database Systems. The main objective of this interface where user can interact with database easily using their own natural language and access or retrieve information they requested.

1.1 NLIDB

The person with no knowledge about accessing database finds itself difficult to access database and non expertise user many times may need to query those relational databases to retrieve information.That's why idea of natural language instead of SQL is raised and development of new type of processing method Natural Language Interface to Database had been emerged with time.We can also state that NLIDB system which converts the user query in native language into SQL statements and vice versa.

Example:We consider a query in Natural Language Hindi "उन विद्यार्थीयोंके विभाग नाम और शहर बताओ जिनके अंक ७९ से कम या बराबर है"[31]

SQL Query Generated by NLIDB System is "select student. department_name, student.city from studb.student where student. marks<= 79"[31]

1.2 Motivation

The research has been very popular for developing natural language interfaces to access structured knowledge.The interfaces still requires the user to be familiar with the queried knowledge structure. Many times user wants to access data instead of their queries not matching exactly to the queried data structures.

1.3 Components of NLIDB

Computing scientists have divided the problem of natural language access to a database in two sub components:

a) Linguistic Component: This component is responsible for converting natural language input to a formal query and generating a natural language response based on the results from database search.

b) Database Component:This performs the traditional database management function.A lexicon is a table that is used to map the words of natural input into the formal objects of the database i.e. relation names and attributes names etc. Both parser and semantic interpreter makes use of lexicon and the natural language takes the formal response as its inputs and observe the parse tree in order to generate adequate natural language response. Natural Language Database systems make use of syntactic knowledge and knowledge about the real database in order to relate natural language input to the structure and contents of that database.Syntactic knowledge always resides in the linguistic component of the system, in particular in the syntax analyzer whereas the knowledge about the actual database resides to some extent in the semantic data model used. Queries entered in natural language are translated into formal query language.

1.4 Architecture of NLIDB

This is the most widely used architecture of NLIDB system shown in below fig.1.4a) which uses the both semantic and syntactic grammar system architecture. The common architecture is discussed below:

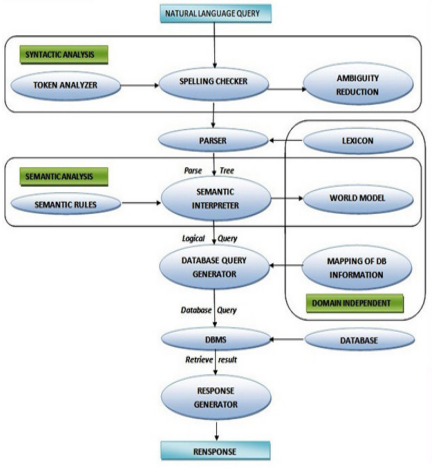

Fig.1.4 a)Commonly used Architecture of NLIDB[1]

Syntactic Analysis: The main aim of syntactic analysis is to find syntactic structure of a sentence.This splits the sentence into simple elements called Tokens.

Token Analyzer: It splits input string into sequence of primitive units called is called tokens and are treated as single logical unit.

Spell Checker: This module makes sure that each token in the system's dictionary (Lexicon) and if this is not the case then spelling correction is performed and new words are inserted in system's vocabulary.

Ambiguity Reduction: It reduces the ambiguity in a sentence and simplifies the task of parser.

Parse Tree: Parse tree is the output obtainedfrom syntactic analysis which represents syntactic structure of a sentence according to formal grammar. Parse tree is a set of nodes and branches.In a parse tree, an interior node is a phrase and is called a non-terminal or non-leaf node of the grammar, while a leaf node is a word and is called a terminal of the grammar.

Semantic Analysis: This is related to representations for meaning of linguistic inputs.It deals with how to determine meaning of sentence from meaning of its parts.It generates a logical query which is input to Database Query Generator.

Database Query Generator:The job of Database Query

Generator is to map elements of logical query to the corresponding elements of used database.

Database Management System:The purpose of this system is to get correct result from database. It executes queries on the database and returns correct results to users.

2. Techniques used to develop NLIDB

Pattern-Matching System:To answer user's questions, many NLIDB systems was based on pattern matching techniques. The main advantage of this approach is it's simplicity i.e.no elaborate parsing and intermediate modules are required and easy to implement. The idea of this approach to NLP is to interpret input spoken or written statements. These interpretation are obtained by matching patterns of words against the input utterance.Another way to reduce number of patterns is by matching semantic primitives instead of words.

Syntax-Based Systems:In this system, user's query is parsed or analyzed syntactically and the resulting parse tree is directly mapped to an expression in some database query language.Syntax based systems use a language system which explores feasible syntactic structures of user's query.Syntax based NLIDB usually interface to application specific database systems which provides database query languages, specifically designed to facilitate the mapping from parse query to database query.

Semantic Grammar Systems: In this system, questionand answering is done by parsing an input and mapping the parse tree to a database query.The difference,in this case is that the grammar categories do not necessarily corresponds to syntactic concepts. Semantic information about knowledge domain is hard-weird into the semantic grammar due to this systems based on this approach are very hard to port to other knowledge domains.

For an NLIDB, configured for a new language domain, a fresh semantic grammar has to be written. Semantic grammar classifiedareusually chosen to enforce semantic constraints.Much of the system developed till noware like LUNAR,LADDER,use this approach of semantic grammar.

Intermediate Representation Language:Most of the current NLIDBs,at first transform the natural language questions into an intermediate logical query, expressed in some internal meaning representation language. The intermediate logical query convey

the meaning of the user's question in terms of high level world concepts, which are independent of the database structure. Then the logical query is translated to an expression in the database's query language, and evaluated against the database.

Due to the many problems of directly translating a sentence into a general database query languages using a syntax based approach and the intermediate representation systems were proposed. The idea is to map the sentence into a logical query language first, and then further translate this logical query language into a general database query language, such as SQL. In the process there can be more than one intermediate meaning representation language Figure 2.1 shows a possible architecture of an intermediate representation language system.

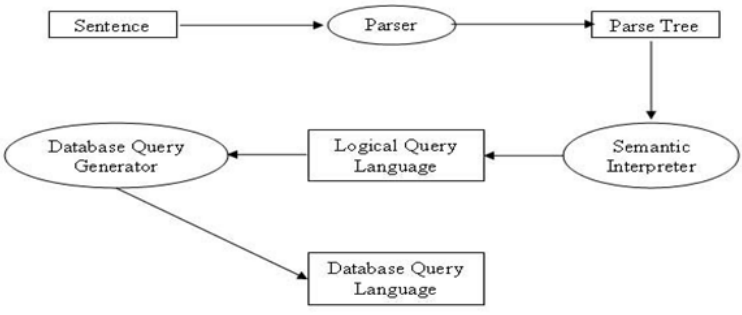

Figure 2.1 Intermediate Representation Language Architecture[9]

3.Previous Work :Literature Survey

From last 50 years, many attempts had been done to implement an intelligent Natural Language Interface to query the database.

1] The first NLIDB was appeared in late sixties and early seventies i.e. BASEBALL system to questions about baseball game[11] and LUNAR systems which answers questions about samples of rocks brought from moon. Both of these systems are NLIDBs dependent on database domain and could not be easily reconfigured for use in other area of database.[12].

2] At the end of 1970s,several other NLIDBs system were appeared like PLANES[13].

3] LIFER/LADDER system used semantic grammar to

parse questions to query a distributed database.[14] and the RENDEZVOUS system appeared in late seventies. In this system,users could access databasesvia relatively unrestricted natural language.[15]

4] In the mid -1980s ,CHAT-80 was referenced NLP system and it was implemented in Prolog.It is one of the best known system for its effectiveness in this period. But it's main problem was that it can be used only for specific database domain.[16].

5] The CHAT-80 system formed the basis for several another systems like MASQUE, DIALOGIC which allow users to answer their questions very quickly. The research in this area continued in 1990s .The majority of these contributions focused on querying relational databases using Natural Language instead of SQL.[17]

6] After 1990 ,many NLIDB approaches have been proposed which is a major advantage of NLIDB systems/interfaces. PRECISE is a system developed at the University of Washington by Ana-Maria Popescu, Alex Armanasu, Oren Etzioni, David Ko, and Alexander Yates (2004).This system is motivating because it combines linguistic and mathematical approaches to achieve complete independence of information without any support or configuration.But PRECISE suffers from the problem of managing nested structures[18]

7] NALIX is a generic and an interactive interface, developed at university of Michigan by Yunyao Li et al. in 2006.The database used for this system is extensible markup language (XML) database with Schema-Free XQuery as the database query language. Schema-Free XQuery is a query language designed mainly for retrieving information.NALIX can be classified as a syntax based system and since the transformation processes are done in three steps: generating a parse tree, validating the parse tree, and translating the parse tree to an XQuery expression.[19][20]

8] The NaLIR system (2014) is a generic Interactive Natural Language Interface for Querying Relational Databases. NaLIR can accept a logically complex

English language sentence as query input to resolve ambiguous interpretations. Thesystem that is developed this year that allows user queries to be evaluated with high security: when ambiguities exist, the system generates multiple probable interpretations for the user. Next, so many systems were developed such as a system for querying the database using a Universal Natural Language Interface based on Machine Learning approach (2016)[21]

9] Then an Arabic Natural Language Interface was implemented for Querying Relational Databases based on Natural Language Processing and Graph theory methods in 2018[22]

4.Comparative Study of NLIDB Systems

Research of Natural Language Interface for Relational has started in 20th century.The first NLIDB appeared in 1970s ,the NLIDB system was called LUNAR. After that many NLIDB interfaces were invented and used. Some of them are listed below :

System Name& Year	Domain	Language	Approach	Technique
LUNAR(1973)	Rock Samples from moon	English-SQL-English	Connectionist (neural Network)	Syntax-based system[12]
LADDER(1978)	US-Navy ships	English-SQL-English	Empirical (Corpus based)	Semantic grammar system[13]
CHAT-80(1980)	General	English-Prolog-English	Dialogue based Semantic grammar	Semantic grammar system
PRECISE(2004)	Air Travel Information System & GEOQUERY	English-SQL-English	Lexical analysis and semantic constrains	Keyword matching and semantically tractable sentences[18]
WASP (2005)	GEOQUERY	English-Prolog	Semantic Parser	Statistical Machine Translation techniques[30]
NALIX(2006)	XML database	English-XQuery-English	Keyword search in XML database	Syntax-based reverse engineering[19]
GINLIDB (2009)	General	English-SQL-English	Lexical analysis and Syntactic analysis	Augmented Transition Network and Context-Free Grammar[32]
Punjabi Language Interface to Database (2010)	Agriculture	Punjabi-SQL-Punjabi	Shallow parsing	Mapping Punjabi language words to English words[26]

Hindi Language Interface to Database (2011)	Employee	Hindi-SQL-Hindi	Shallow parsing	Mapping Hindi root words with corresponding English words[27]
Intelligent Query Converter (2013)	General	English-SQL-English	Semantic analysis	Semantic matching[28]
NaLIR(2014)	General	English-SQL	Dependency Parser	Parse tree and mapping
Arabic Natural Language Interface (2018)	General	Arabic-SQL-Arabic	Syntactic and Semantic analysis	Mapping of ANLQ to IXLQ and IXLQ to SQL[22]

5.Conclusion and Future work

Research has been done from many decades on Natural Language Interface.In this paper, we have studiedmany NLIDB systems from 1970s to till now. In this paper ,we have discussed previous work on NLIDB system and compare them by using some parameters like domain, languages and approaches and techniques used to implement that systems. On comparison we found that they have used various techniques for gaining better accuracy each time. In future ,we are trying to build such a NLQI(Natural Language Query Interface) to database so that it becomes easier to retrieve information from databases and anyone can deal with this SQL based system using Natural Language Interface.

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The Study of E-Governance with Reference to Maha-E-Seva Kendra of Jamner Taluka

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Abstract:

E governance is an importance revolution in India. There are various service provided by Maha e-Seva Kendra and CSC centers for the citizens. It includes services of central government as well as State government. E governance is playing a vital role in development of Digital India. Present Research is based on primary as well as secondary Data.The term of e-government ensures that the Govt. administration becomes a fast and more transparent operation as visualized by the Government of India under the National e-Governance Plan. It also helps saves huge costs. E-Governance can be defined as the operation of communication and information technology for delivering government services, exchange of information, deals, integration of earlier being services and data portals.

Keywords: E-governance, Maha-e SevaKendra

Introduction

The conception of e-government has wide connotations ranging from the " the use of information technology to free movement of information to overcome the physical bonds of traditional paper and physical grounded system" to " the use of technology to enhance the access to and delivery of government services to serve citizens, business mates and workers." Therefore, it's an operation of information technology to the functioning of the government so as to make government information and services

accessible 24X7 in a way that's concentrated on the requirements of the citizens. It relies heavily on the effective use of internet and other arising technologies to admit and deliver information and services fluently, snappily, efficiently and inexpensively.

The strategic ideal of e-governance is to support and simplify governance for all parties- government, citizens and businesses. The use of ICT's can connect all three parties and support processes and conditioning. In other words, in e-governance uses electronic means to support and stimulate good governance. Thus, the objects of e-governance are analogous to the objects of good governance. Good governance can be seen as an exercise of profitable, political, and executive authority to more manage affairs of a country at all situations, public and original.

Four pillars ofe-governance

1. **CONNECTIVITY:** Connectivity is needed to join the people to the services of the government. There should exist a strong connectivity for an efficient e-governance.
2. **KNOWLEDGE:** since knowledge refers to IT knowledge. Government should assume skill full masterminds who can address thee-governance in an effective way. These masterminds also manage all kind of weakness that may do during the working of e-governance.
3. **DATA CONTENT-**To share any kind of knowledge or data over the internet, there should be its database. The data content which is related to government services these databases should have
4. **CAPITAL-** Capital can be on public or private cooperation. It refers to plutocrat used by government to give their services or to that sector of the frugality grounded on its operation

E-governance Models

E-governance services can be participated between citizens, businessman, government and workers. These four models of e-governance are as-

1. Government to citizens (G2C) Services of Government to citizens
2. Government to government (G2G)

3. Government to workers (G2E)
4. Government to businessman (G2B)

Executive Services can be profited at a Maha-E-Seva Kendra

1. Age Nationality & Domicile Certificate
2. Caste Certificate
3. Income Certificate
4. Residence Certificate
5. Senior Citizen instrument

Objectives of the study: -

- To study the services provided by Maha-E-Seva Kendra.
- To study the awareness of services provided by Maha-E-Seva Kendra among people in Jamner city.
- To study the factors impacted on availability of services provided by Maha-E-SevaKendra.

Collection of Data: -

While dealing with this research project data at hand was on adequate and hence it become necessary to collect the data from these methods

1) By Observation.
2) By Questionnaire.
3) By Survey.

Research Methodology

1. PRIMARY DATA: Structured questionnaire is prepared for primary data collection.

Citizen in Jamner city	Responses
Male	71
Female	29
Total	100

Citizen in Jamner city	Responses
Students	78
Employee	16
Other	6
Total	100

2. SECONDARY DATA-

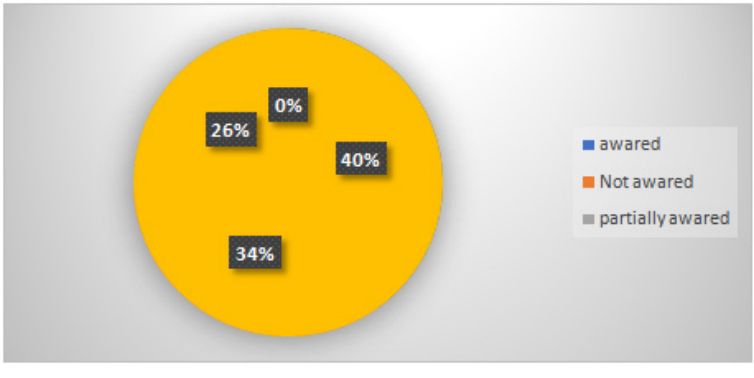
This paper reviews the literature on the base of secondary data composed from various sources which before exist in issued from such as articles, books, review, public/ international journal, magazine, periodic reports, government publication and on-government publication and company authorized websites, etc.

Data Analysis

Awareness about the Services provided by Maha e-Seva Kendra.

Awareness	Percentage
Aware	40
Not aware	34
Partially aware	26

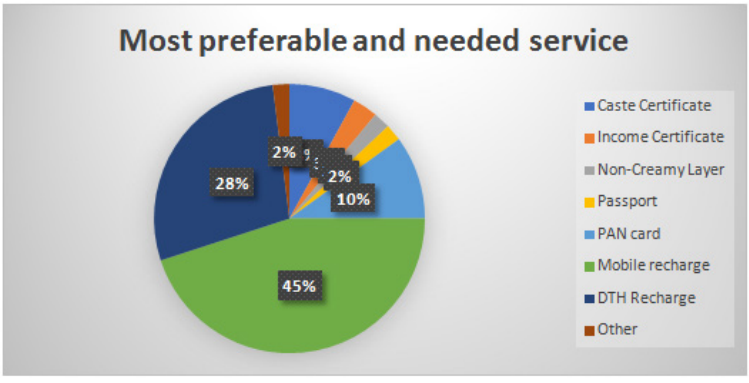
Source: Primary Data



Most preferable and needed service

Service	Percentage
Caste Certificate	8
Income Certificate	3
Non-Creamy Layer	2
Passport	2
PAN card	10
Mobile recharge	45
DTH Recharge	28
Other	2

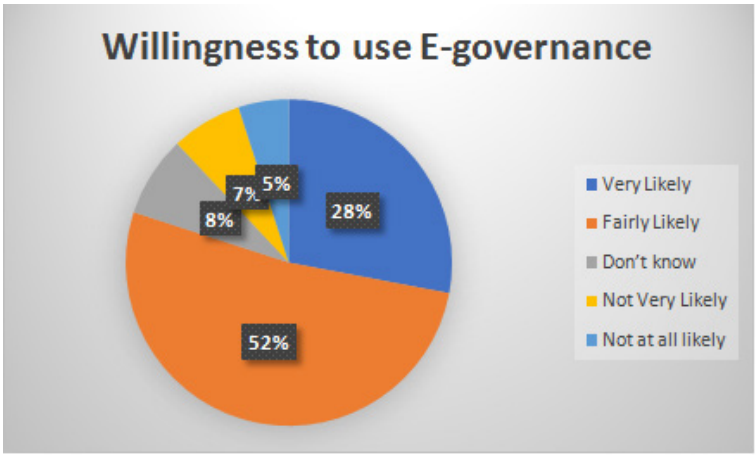
Source: Primary Data



Source: primary Data

Willingness to use E-governance

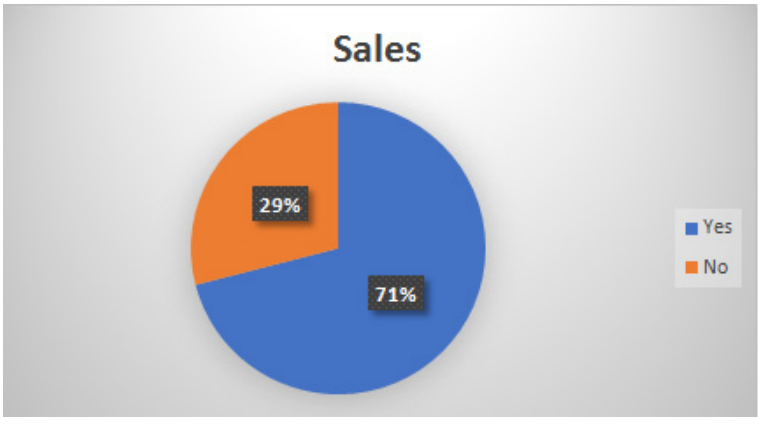
Willingness to use E-governance	Response
Very Likely	28
Fairly Likely	52
Don't know	8
Not Very Likely	7
Not at all likely	5
Mobile recharge	45
DTH Recharge	28
Other	2



E-Governance and Trust associated with it.

Do you trust online services?	Response
Yes	71
No	29

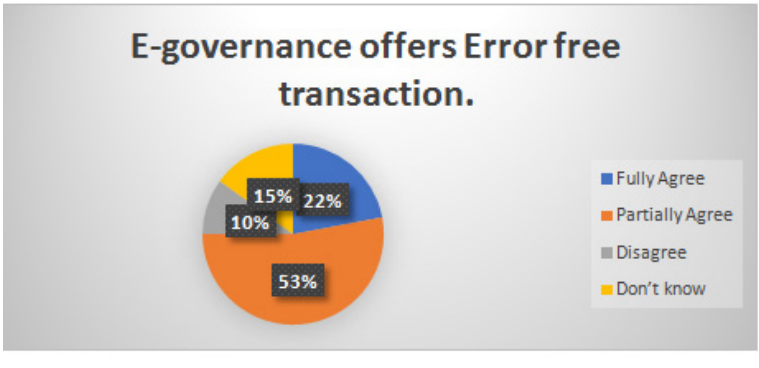
Source: primary Data



E-governance offers Error free transaction.

E-governance offers Error free transaction	Response
Fully Agree	22
Partially Agree	53
Disagree	10
Don't know	15

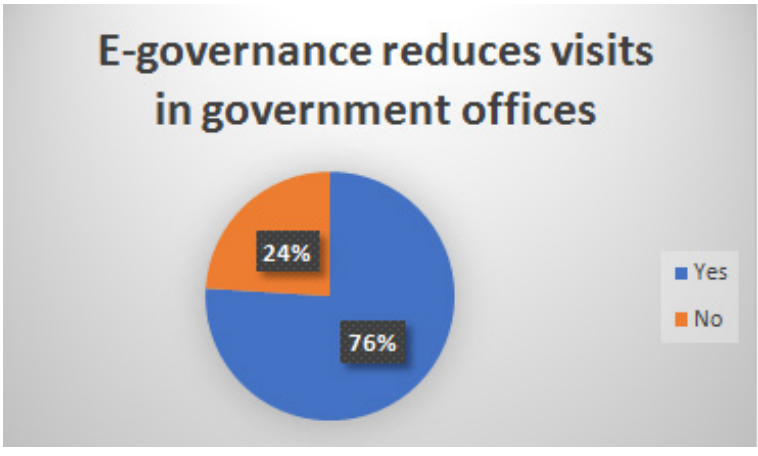
Source: Primary Data



Reduces Visits in Government Offices.

E-governance reduces visits in government offices?	Response
Yes	76
No	24

Source: primary Data



Review of Literature

Butt, & Marya. (2014). In their research article "Result-oriented e-government evaluation: Citizen's perspective" shows that such studies are usually distributed with in an intention to benchmark the govt. bodies and to rate one agency over the other; however this paper presents a result-oriented approach from citizens' perspective to judge the government websites. The full task of e-government evaluation is administered in three phases. The primary phase discusses the planning of a scale for e-government evaluation. The second phase accentuates on developing the test cases for every indicator (of the devised scale) to gather the citizen's feedback. The third phase refers to check run the approach within the selected government bodies. Since the approach is result-oriented, the reports on the premise of generated results are delivered to the stakeholders to initiate learning process. The study showed that the evaluation conducted all told three government bodies succeeded to trigger certain level of learning within the government body

Dr. Jayanta Choudhury & Reshmi Ghosh (2015, March). In their research article "E-Governance and Rural Development: an Assessment of CSC' in Tripura" explained that E-governance in Tripura, is available for health, education, and livelihood sectors and it provides services like Utility services, Rural Banking, Training Courses (Computer), Microcredit, Insurance service, Health Services, Online PAN card service, Aadhar Card, Commercial services through Common Service Centre (CSCs) to the people living in the remote areas. CSCs are playing a dynamic job for rural progress through delivering varied services in the rural areas which weren't accessible before enforcinge-governance. Because ofe-governance the rural population fluently accesses the several facilities in nearest to their village & similarlye-governance playing key part in the field of rural development. Present study provides an insight into the part ofe-governance in supplying essential services to people of Tripura. The study attempts to discover the socio-economic situation of the rural people in study area; status of knowledge among rural peoples regardinge-governance; the services available in the Common Service Centre (CSC) undere-governance. It also makes an attempt to identify the problems during access the services and make necessary suggestion for bettere-governance in rural areas.

Kaushik Datta & Anant Saxena. (2013, April 17). In their research article "Developing entrepreneurship and e-government in India: Role of common service centers" described that Elaborating-Governance and entrepreneurship in rural India is the biggest difficulty for Indian government. Number of enterprise has been held by government to boost both entrepreneurship and e-Governance, one of which is Common Service Centre (CSC) project. CSC system is an ambitious project of Indian government grounded on PPP architecture to boost entrepreneurship and e governance in Rural India. Genuinely some studies have concentrated on the job of Common Service Centres (CSC) in development of Rural India. This study tries to fill this gap by throwing light on the benefits gathered from the CSC project and some of the major backups of the system. The study concludes with major recommendations to overcome these backups to increase the impact in the field of e-governance and entrepreneurship.

Kriti Priya Gupta, Preeti Bhaskar, & Swati Singh (2016,

October) In their research article "Critical Factors Influencing E-Government Adoption in India: An Investigation of the Citizens' Perspectives", the authors present an integrated model grounded on Unified Theory of Acceptance and Use of Technology UTAUT, trust and citizen satisfaction, to explore the factors which impact the acceptance of e-government services in Delhi India. The findings indicate that effort expectation, performance expectation, and faith in technology followed by trust in government, citizen satisfaction, and easing conditions are significant predictors of citizen acceptance of e-government. The findings also reveal that smoothing conditions can be divided into two factors' Available Facilitating Conditions' AFC which are concerned with the easing conditions available at the user's end and' delivered smoothing Conditions 'PFC which relate to the easing conditions delivered by the government. According to the findings of the study, AFC has a higher impact one-government acceptance, as compared to PFC.

Sujeet Kumar Sharma, Bhimaraya Metri, Yogesh K.Dwivedi, & Nripendra P.Rana (2021). In their research article "Challenges common service centers (CSCs) face in delivering e-government services in rural India." Explained that numerous developing nations across the world are allocating a significant portion of their budgets fore-government enterprise. Common service centres (CSCs) are e-government initiatives that aim to increase access to public services and promote easy and direct dealings with the government. These e-government initiatives are largely underutilised, especially in pastoral areas in developing countries. This study attempts to identify the crucial challenges facing CSC's and determine their hierarchical associations in the environment of rural India. A set of 15 challenges was linked through a strict literature review and by surveying experts and CSC proprietors. Data were collected on the linked challenges and were analysed using explanative structural modelling (ISM)-MICMAC-fuzzy MICMAC analysis. After, we developed a hierarchical model of challenges. The findings revealed that "longer trip time and sale cost", "low digital education", and "low attention" of e-government services are among the vital challenges CSC's face in rural India. This study suggests several recommendations to all the stakeholders involved in the administration of CSC's to improve the delivery of e-government services in rural India

Vijaya S. Uthaman, & Ramankutty Vasanthagopal (2017). In their research paper "A Comprehensive Multidimensional Conceptual Model to Assess the e-Governance Service Quality at Common Service Centers in India." Described that, a new way of life where ITC (Information Technology and Communication) has believed to enhance the communication and services of government is E-governance. It has reduced cost and time of accessibility and delivery of services to citizen and limited corruptions when compared to traditional way of providing government services. CSC is one of the core architectures under NeGP (National e-Governance Plan) in 2006 by GoI (Government of India). It envisages the socio-economic status of rural population by including them in development process and delivering sustainable digital access. The main goal of CSC is to deliver forward end delivery points for government (G2C), private and social sector institutions (B2C) to support for the benefit and inspire of the rural community in ultimate places. A large number of studies have been conducted by academics to measure the service quality ofe-governance. But they didn't come out with a comprehensive model for assessing the service quality of CSCs. The present organized and descriptive exploration is accepted with two main objects-to review majore-governance G2C service quality models and to assess the crucial confines for developing a comprehensive multidimensional abstract model fore-governance service quality of CSCs in India.

FINDINGS: -

1. Maha-E-Seva Kendra owner should produce awareness about the services through Announcements, Flyers, Rally Fares, Campaigningetc. so that the client feel informed and it may produce interest among them.
2. Faith is also an important point of concern. The trust between the client and the service provider is veritably important.
3. The main attention of administration should be concentrated on the evolution of utility of system, trust structure and cost reduction.
4. It's also come to know that customer will borrow Maha-E-Seva Kendra if they find it easy to understand.
5. It is found that visits to government offices are reduces due to availability of services in Maha-e Seva Kendra.

6. There are technical factors like Internet access, availability of internet in rural areas,

Conclusion

Sincee-governance have capability in term of creating same opportunities, comfort and convenience to the lives of citizens through kiosk. E-governance is, and should exist, instrument to an end, not the end itself. To transfer theun-reached is to spread the attention ofe-governance among the citizens. Electronic service delivery is changing from government centric to citizen centric. The citizens are the most important in citizen centric government service delivery. To develop citizen centrice-governance enterprise, there's a need of strong vision and political self-control. The perpetration of citizen centrice-governance system can be made actually successful and effective by taking up some of the infrastructures, which handle the major establishments.

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Integration of Cloud with IOT – A Novel Approach

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Abstract:

In recent era, in order to facilitate our lives, the Cloud and Internet of Things (IoT) are developing standard that allows the communication between electronic devices and sensors through the internet. Challenges and issues related to various business, governmental and public/private industries across the world uses cloud services with IoT by different smart devices and internet to provide innovative solutions. In human life,cloud computing and Internet of Things (IoT) both the technologies plays important role. Their acceptance and usage is predictable to be more and more universal, making them important components of the Future Internet.Cloudand IoT are merged together is predicted as troublesome and as an enabler of a large number of application scenarios which is working as an innovative paradigm. In this paper, we focus on integration of cloud with Iot with block diagram explanation followed with benefits, challenges and applications faced by integration of cloud and Iot.

Introduction:

In ancient time the term cloud is refer as combination of small modules of water vapor which are combined together to form a semi-solid state structure. Same as that of in cloud computing technology used as combination of Internet & other smart communication devices.This paper present an overview of integration of cloud with IoT with their application and

provocations. This paper presents advantages resulting from this integration process and also focus on provocation encountered due to this integration. Section I provides basic concepts of cloud computing with services and section II IoT with working scenario; Section III discusses benefits of cloud and IoT integration; provocation raised by integration of cloud and IoT discussed in Section IV; Section V illustrate the cloud based IoT application; the paper concludes in Section VI.

I. Cloud computing:-

Cloud computing concept start from 1963 by Defense Advanced Research project Agencies with MIT but they have put condition that DARPA provide funding to MIT only they have to develop technology which allowed 2 or more peoples to used one computer. Then in 1970s virtualization concept was invented virtual m/c concept occurs which act as real computer which fully functional operating system. In 1999, salesforce.com is 1st company who shifted on cloud [6]. then for storage & computation services in 2002 Amazon started their Amazon web services & in 2009 big companies like Google, Microsoft, Oracle shifted their services providing system on cloud[venter W Whitley] Google Doc's, Google Drives, Microsoft OneDrive etc. are examples of cloud storage, then Google CO-LAB is one of example which allows/provide environment to run programmers like python program also Bolt-IOT is platform/environment which used to develop or sun code & also stored work on it. Microsoft Azure is one more platform which provide all services like VM's, storage & having contribution in IOT, NLP, Ai, big data.

Types of cloud services:

1) Infrastructure as a Service(Iaas):- In this service , service provider manages , compute, networking, storage and user have to manage operating system, virtual machine and application, storage from service provider main benefit of this service is user will installed/ purchased operating and application as per these needs.
2) Platform as a Service (Paas):- In this service, service provide is responsible or manage, operating system, managed only application and data access. As service Provider provides/ by default create, build, test and deploy software as fast a possible. Pass is complete

development and deployment service of cloud to develop & deploy software.

3) Software as a Service (Saas):- In this service, service provider is responsible for or manage all responsibilities like Apps, operating system, virtual machine, compute, networking, storage.

II. Internet of things(IoT)

The internet of things(IoT) is a system of interrelated computing devices,mechanical and digital machines in daily life, like Cars, Watches and Printers etc. are connected together using the internet of things (IoT). The use of IoT is to integrate and perform communication among various devices using internet connection, and also IoT is used to store both real-time and historical data for decision making function from devices and control their actions. So, IoT provide cost effective automation technology[1].Fig. 1 shows that how IoT is connected with different appliances.

Fig 1: IoT in different environments [5]

Working of IoT:

The ability of internet of things (IoT) is to transfer data over a network without requiring human-to-human or human-to-computer interaction [2].Iot devices sent sensors data and collect it into IOTcloud gateways for analyzing purpose like, bolt IOT is

the one of the platform which stored its sensors data to their own storage centers.

III. Cloud with IoT:-

In the current generation of technology most of industries makes profitable business by using Cloud Computing Services as a backend for IoT Projects [2]. Cloud this computing integrating with IoT will be deadly combination. This integration undoubtedly provision facilities like transfer data on cloud generated by IoT using internet.Which helps user to quickly analyze data & tookquick decision. IoT device's which make the use of API & back end infrastructure quickly received Security updates from cloud to avoid security breaches [5]. Integration of both technology Provide feature like Security, Availability of data, remotely control IoT devices& stored its data.IoT with cloud Provision cloud Services which help IoT area to make users data Secured. Also integrating IoT devices with cloud model provision features to maintain user's decisive data.Fig. 3 presents block diagram of integration of cloud with IoT, as shown in figure IoT sensors generates data which is stored on cloud. From cloud data collected from Iot sensors is accessible to users 24X7 from any location with the help of internet.

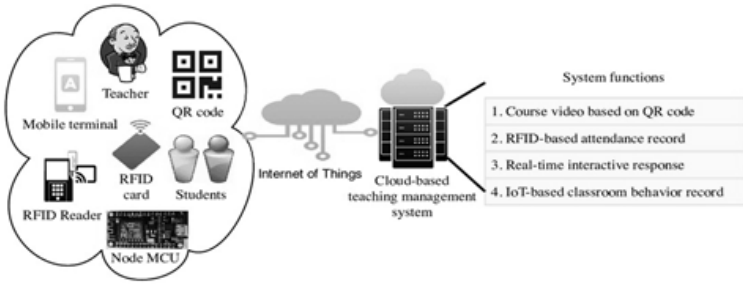

Fig. 2 Cloud with IoT[3]

Integrating IOT with cloud provides benefits mentioned as follow:-

1. **Increased Scalability-** IoT devices required loT of storage to Store & share crucial data. So blending IoT with Microsoft Azure cloud can provide greater Storage to user which can be escalate or draw as per user demand [5].
2. **Increased Performance -**IoTdevices needed acute

performance to interact &connect with each other. So IoT with cloud provide the connectivity to share information between devices with Fast rate [5].

3. **Pay as you Go model–**Cloud computing provide benefit of Pay-As-You-Go model, which is also helpful in the integration of cloud with IoT. As per this model users have to pay for only that services which they consumed. Also users can draw or escalate services as per their needs [5].
4. **Processing Capabilities -** IoT devices have limited processing capabilities which prevent complicated data processing. For this cloud provides unlimited virtual processing capacities to process such a complex data without any interruption [5].
5. **New Facilities -** IoT characterized by variety of its devices & technologies. So by integrating IoT devices with cloud we can achieve featureslike scalability, reliability, security and efficiency [5].

This integration also increase computational capabilities of IoT devices.

IV. Challenges raised by integration of cloud & IOT:-

1. Manipulation of large amount of data: Handling and manipulating large amount of data is a crucial task especially when there are number of IOT devices. This devices produce large amount of data which require high computational power and methods for cloud, but there are no methods for cloud to manage, storage and provide computational power [2].
2. Networking and communication protocol: IoT devices have machine to machine communication so it is great challenge to manage their protocols, because managing such a variations in protocols is hardened since most of application are not portable and flexible [2].
3. Sensor Network: Integration of cloud and IoT have increased utilization of IoT sensors. This sensors produce large amount of data. However processing of this huge amount of data within a time with security and privacy is major challenge [2].
4. Monitoring:Monitoring is the one of necessary action

in cloud computing to manage security, SLA's, performance, resources, similarly cloud based IOT technique also demands same requirement from Monitoring this is the one of the challenge in cloud and IOT fusion [4].

V. Applicationsof Cloud-based IOT:

1. Healthcare: Cloud based IOT devices automatically monitor human health in critical condition. It provide medicines and treatment as per need. [E.g Intelligent drugs control system [4].
2. Mobility in Auto-motives: Integrating cloud computing with GPS enable IOT devices solve many recent challenges like current traffic state, remote vehicle driving and tracking [4].
3. Smart energy Appliance: Cloud with IOT combined effort effectively helps customer to smartly manage of energy consumption this combination provide prevention against the accident due to unrestrainedenergy [4].
4. Video or motion surveillance: combination of IOT and cloud effective in video surveillance system also. It stored and process video contain using video sensors. Also helps to detect live being motions which helps to degrade future crime rate [4].
5. Smart Homes:-In today's world cloud with IOT is very helpful in home activities like controlling home appliances and home access, Discovery of water, gas leaks and many other which are very helpful for the daily life [4].

Conclusion:

Cloud computing and IoT are future internet trends. The growths of IoT technology are very fast. There is no definite applications to follow for service providers and operators. Whereas cloud solutions are dependent on service providers since in this paper discussed study of integration of cloud computing with IoT to solve these issues together.Uses and structure of cloud computing, IoT, and their integration is provided which is useful in various industries. In next sections paper will discussed the

benefits and uses of this integration.

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Financial Literacy: A need to be Inculcated Among People in Next Normal

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Abstract

Financial literacy refers to the ability to understand and apply different financial skills effectively, including personal financial management, budgeting, and saving. Financial literacy makes individuals become self-sufficient, so that financial stability can be accomplished. Financial literacy also requires the experience of financial principles and concepts, such as financial planning, compound interest, debt management, efficient investment strategies, and money-time value. Financial illiteracy can lead to poor financial choices which can have negative effects on an individual's financial well-being.Household income (relative to expenses) remains the critical factor explaining whether one can accumulate sufficient savings for emergencies. Quality of life is the completeness of life, taking into account both physical and financial wellbeing. There is a direct and proportional relationship between physical and financial wellbeing. COVID-19 has increased the financial stress leading to the loss of efficiency levels. Also, it has caused untimely time offs alongside higher amounts of disturbances and distractions among people.

The key steps to improve financial literacy include: - Learning the skills to create a budget - Ability to track expenses - Learning the strategies to pay off debt - Planning for retirement effectively.

Keywords:

Financial Literacy, Next Normal, Covid-19.

Introduction

Financial literacy has become a part and parcel of human life. No one can predict future exactly. One has to be financially literate in order to face unforeseen situations in life. As such one situation that had financially affected people globally was COVID 19. In this Pandemic situation in India nearly 81 per cent of Indian employees faced a financial shortfall between pay periods leading to mental distress, health problems and lower morale, impacting their workplace presence, resulting in lack of motivation, focus, decreased productivity and higher absenteeism.

People at both high-income and low-income levels suffered financial crisis due to Covid-19. Nearly 60 per cent of the respondents whose monthly salary was more than Rs 1 lakh per month failed to meet their expenses with their salary during the pandemic. With Covid-19 leading to factors like inflation, job cuts, meagre salary, more than 70 per cent of the respondents found it difficult to meet all their expenses with their monthly salary.With the impending third wave of Covid-19 looming large, India could be facing new issues, unimagined till a year ago. For something that began as a new health threat, the novel coronavirus pandemic turned into a bigger crisis, impacting not only our physical and mental wellbeing but our financial health too.

The most vulnerable were hit first and the hardest and many from marginalized communities are still bearing the brunt of it. Even as the government is working on economic recovery, one cannot ignore the fact that the country's lack of adequate financial literacy has contributed significantly to this problem. And with so many Indians facing unprecedented financial problems, we will never be able to overcome the crisis if we don't make financial literacy a priority right now. The good side of the coin is, people realized the importance of savings and investments to tackle any exigency. Consumers realized how prudent money management could help them secure their future and keep them away from the rainy days.

According to GP Garg, executive director, Securities and Exchange Board of India (Sebi), said, "In a country like India we have close to 80% literacy, but when it comes to financial literacy we are not that lucky. Last year, National Centre for Financial Education did a survey which says that only 27% of Indians are

financially literate.

Why Financial Literacy is required:

1. To set S.M.A.R.T life goals
2. Plan your Budget & Cash Flows.
3. Prevent any Debt Burden.
4. Prepare for a Rainy Day.
5. Select worthy Investment Avenues.
6. Secure family's Financial Future.

Objectives of Paper

1) To analyze how financial literacy plays an important role in human life.
2) To study how Covid 19 had financially affected people in negative as well as positive way.
3) To Summarize Next Normal situation and steps taken to enhance financial literacy among people.

Need for Financial Literacy in India.

At a time like today, when economic growth of a country is very important, Financial Literacy has become one of the top priorities for most of the countries. India is home to around 17 percent population of the world with a literacy rate around 74 percent. And what might come as a surprise is that out of the total population, only 24 percent of the Indian population is financially literate. About 76 percent of Indian adults don't even understand the basics of financial engagements, and what is worse is that 80 percent women in India struggle from financial illiteracy. Without sound financial understanding, one may not be equipped to make the right financial decisions needed to navigate through the difficult times with financial adaptability.

Financial literacy can be one of the key ways to bridge the gap between your wealth creation journey and economic growth. It essentially includes your understanding of the way accounts work, the use of credit cards and the ways to avoid debt. The absence of financial literacy will lack a strong foundation in terms of your decisions concerning savings and investment. At the same time, financial literacy will provide in-depth knowledge of financial education and strategies that are crucial for financial growth and success.

As per 'Deciphering Financial Literacy in India' and article published in the Economic & Political Weekly, India also deals with tremendous inter-state difference within the country itself. Metropolitan areas like Maharashtra, Delhi, and West Bengal have financial literacy rates of 17%, 32%, and 21%, respectively while the states like Bihar, Rajasthan, Jharkhand and Uttar Pradesh where poverty is rampant, suffer with low literacy rates. While Goa as a state has the highest literacy rate of 50 percent, Chhattisgarh is lacking financial education and has the lowest literacy rate of 4 percent.

While the journey towards a financially inclusive India is futuristic, Reserve Bank of India (RBI) is continuously striving to ensure financially aware population in India. The Reserve Bank of India (RBI) has launched the National Strategy for Financial Education (NSFE) 2020-25, a strategy which aims at inculcating financial literacy concepts among the people of India, encouraging their active savings behaviour while boosting the participation in financial markets. The prime focus is on '5 Cs' - Content, Capacity, Community, Communication and Collaboration. The NSFE intends to formulate the content for financial education and develop capacity and code of conduct for the providers.

Financial literacy is an important skill to learn to achieve financial growth and success. The most basic way to start being financially literate is understanding budgeting, managing debt, saving and investing.

- **Debt:** Debt is basically spending money that isn't yours for eg: loans or credit cards. But debt can be good too. If you are taking debt for things that are necessary for making a living for example school's tuition fee or buying a car to go to the office. Whereas borrowing money for things that aren't really needed should be avoided.
- **Budget:** The most crucial way to being financially literate is understanding your budget that you can live on, this plays an important role in achieving your financial independence. The simplest rule for budgeting is that income should be greater than expenses.
- **Saving:** Saving is securing the present and the unseen future. Saving can become your emergency fund or a

way to keep your expenses in control. Saving is not investing.

- **Investing:** Investing will help you in generating and growing wealth for the future. Investing is what will make you money while you sleep because of the effects of compounding. Investing can be a gateway to achieving your financial goals.

Financial literacy is the most basic and critical skill that everyone should have. But in India, talking about finances at home is not a common practice, many lack the basics of managing money, whether it's savings, investing, buying insurance or emergency funds.

From savings to investments, creating wealth or managing debt, a good financial planning is the need of the hour. While one could manage finances personally or get a financial planner on board. Inculcating financial literacy early on is essential. The younger you are when you learn to manage money and invest and prioritize financial planning basics, the wealthier you will be. The simple mantra to financially secure future is to 'invest early and invest well'. Additionally, financial literacy must also be a part of school and college curriculums because, undoubtedly, more the number of wealthy individuals the healthier the economy of a country, which is good for all.

The importance of savings and investment is an important value that must be inculcated from early on. This will help one understand the golden rule of investment- to start early. Being financially literate is one factor that determines the economic growth of a developing nation like India.

As per a global survey by Standard & Poor's Financial Services LLC (S&P), India is home to 17.5 per cent of the world's population, but nearly 76 per cent of its adult population does not understand even the basic financial concepts. It will not only help you build wealth for the long term but also protect you and your family in case of emergencies.

Steps taken by RBI for Promoting Financial Literacy

One of the objectives of the Financial Inclusion/Literacy agenda is to ensure that the sections of the society that are hitherto undeserving of credit facilities are made credit worthy. Initiatives such as setting up Rural Development and Self-Employment

Training Institutes (RUDSETIs) and Financial Literacy and Credit Counselling Centres (FLCCs) by different banks are aimed at ensuring this.

Some of the other steps taken by RBI to promote financial literacy are as under:

- Outreach visits by Top Executives of Reserve Bank of India to remote villages on a continuous basis – to spread the message of financial awareness and literacy.
- The Reserve Bank website - A link on Financial Education in the Reserve Bank website for the common man, containing material in 13 Indian languages which includes comic books on money and banking for children, essay competition etc.
- Awareness - by distributing pamphlets, comic books, enacting plays and skits, arranging stalls in local fairs, exhibitions, participation in information / literacy programme organized by Press
- Inclusion of Financial Education material in school curriculum by various State Governments
- Use of mobile Financial Literacy vans by banks in the North Eastern States
- Weekly Radio programme on Financial Literacy in some States by banks & similar programme in Tribal districts by NABARD.
- Awareness programme on various Government Sponsored self-employment schemes involving bank loans & subsidy by Government agencies like KVIC,DICs, SC/ST corporations
- Mass media campaigns, tie-ups with educational institutes, financial awareness workshops/help-lines, books, pamphlets and publications on Financial Literacy by NGOs, financial market players etc.
- National & State level rural livelihood missions have large number of field functionaries for proper handholding support to large number of Self Help Groups
- Large number of other websites/portals of banks/ /State Level Bankers Committees disseminating information on banking services

- Conduct of training programme for farmers club, NGOs & SHG members by NABARD

The Reserve Bank of India will observe February 14-18, 2022 as Financial Literacy week 2022. Reserve Bank of India (RBI) has been conducting Financial Literacy Week (FLW) every year since 2016 to propagate financial education messages on a particular theme across the country. Banks have been advised to disseminate the information and create awareness among its customers and the general public.

Next Normal

"The Next Normal" is a term coined by McKinsey. It is based on the assumption that there is a before and after; the period before COVID-19 and the new normal that will emerge in the post-viral era: the next normal.

As we enter into the next normal, digital transformation is no longer a process or future end goal. It is actually a need that will define how organizations will continue to survive in today's new era.

Before COVID-19, organizations were undergoing digital transformation, some at varying paces. As we enter into the next normal, digital transformation is no longer a process or future end goal. It is actually a need that will define how organizations will continue to survive in today's new era.

Given the rapid pace of digitalization across the globe and the advent of fintech companies, several digital solutions have been helping consumers with financial literacy and saving plans. Multiple personal finance apps have come up, which can track and categorize one's expenses and investments, help save in a disciplinary manner, and check and improve the credit score. Some apps even help consumers identify unwanted subscriptions so that consumers can cancel them and focus on savings. Many of these apps come with investment guiding tools and methods. Such apps provide a great way of guiding consumers with investment options and can be considered as a key tool for consumers' financial literacy. However, consumers should always be alert to the credibility, usage and security of the apps and then opt for them.

With the remote and virtual communication structure today, many companies and entrepreneurs are offering financial

literacy virtually. Many institutions are providing courses that are customizedfor Indian consumers; the courses are well-researched and objective. Such courses are further bifurcated for entrepreneurs, MSME owners and women. Virtual courses have also been highly effective in the penetration of financial literacy in smaller cities.

Post-Covid, there has been a huge growth in seminars and conferences offering financial literacy. Right from banks to financial platforms, personal finance companies, individual financial experts have initiated such virtual events to help consumers understand investment tools and build a corpus as per their financial needs. Attending such conferences can boost confidence in young professionals, women take more informed financial decisions.

Another significant aspect of personal finance, which should never be forgotten is investing in a balanced insurance portfolio. Consumers need to understand that insurance will not only help in protecting their future and families, but it will create a protection cushion for securing the financial corpus that is being built. Traditional insurance companies and the new age digital insurance companies are working assertively in educating consumers about the importance of insurance and multiple insurance products. Many digital insurance companies are helping consumers choose the right insurance products through their tech-based platform; guided by an insurance advisor network. Such platforms and models have proved to be significant in improving the insurance literacy rate in the country.

While personal finance has been gaining significance in the last few years; there is still a huge gap in the financial literacy rate. Consumers in smaller towns and cities are comparatively more vulnerable when it comes to the understanding of finance and growing wealth. Thus, the public, as well as, the private sector need to join hands together for increasing financial literacy in the country. Digital should be used more and more to reach out to consumers and bridge the financial literacy gap in the country.

Conclusion:

Financial Literacy is related to Saving, Investment and application of funds in right direction. For this one has to have financial knowledge of how they can save money for their rainy

days and how they can invest their money in proper way. During pandemic situation people has to confront with financial challenges because of Job loss, pay cuts, severe health problems and other adverse effects. Many people has to sale their properties for coming out with this situations. In some cases whole and sole of family on which family was depended for their day to day life had lost their lives and other family members had to struggle for their livelihood. In next normal were conditions are slowly becoming normal people are understanding the importance of financial literacy and as digital transformation has become a need and not remaining only an end process one has to be financially literate.

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A Review of Machine Translation Systems for Indian Languages and Their Issues

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Abstract

The advances in machine translation for Indian languages are examined in this research. The survey covers three types of machine translation methodologies: rule-based systems, empirical-based methods, and hybrid-based approaches .It has a set of benefits and drawbacks all of its own. Machine translation's primary purpose is to bridge the linguistic gap between two people, organizations, or countries by using automated computing facilities to convert one natural language into a new form. Machine translation (MT) is tough because it involves a number of challenging subtasks, such as inherent language ambiguities, linguistic complexities, and variances between source and target languages. This research gives an overview of machine translation in Indian languages. This research looked at the present state of machine translation on a national and international basis. This machine translation literature review covers three languages: Hindi, Marathi, and Urdu.

Keywords

Machine Translation, National Language Machine Translation

1. INTRODUCTION

Language is a powerful and systematic means of communication that expresses a person's thoughts, feelings, wishes, and other expressions. According to [1], there are over

6,800 live languages in the world. As a result, we must develop tools for translating information from one language to another in order to access information written in another.

The transfer of a text's meaning from one language to another for a new relationship is known as "translation."In a multilingual country like India, there is a strong demand for translation tools as a means of information transmission between areas. Machine translation systems can be built for two languages (source language and destination language) or for several languages (multilingual translation), and the system's accuracy depends on the number of languages involved. Orientation can be bidirectional or unidirectional. Many Indian systems are essentially one-way [3].

During the 17th century, machine translation research began with the aim of employing dictionaries to overcome linguistic barriers between different locations. In India, studies began a little later, a little over two decades ago. Because of their morphological variety and thousands of dialects, machine translation for Indian languages is a little more difficult than for other languages. The language barrier is an issue that stifles the expansion of international business deals in the business community. Because it is easier for worldwide audiences to read and converse in their native languages, it is difficult to obtain a footing in international trade. Human translators were used to begin with, but they were unable to keep up with the demand for translated content. Machine translation was created as a result of the limitations of human translation. Active research in the field of machine translation (MT) has resulted in a significant shift in language technology, allowing language computing tools to be used to improve products and services in high-growth markets [2], such as health care, mobile communication, online retail, call Centre's, the media, and publishing.

2. Machine Translation Techniques

There are several approaches to machine translation [6]. The points that will be discussed using Figure 1 are as follows.

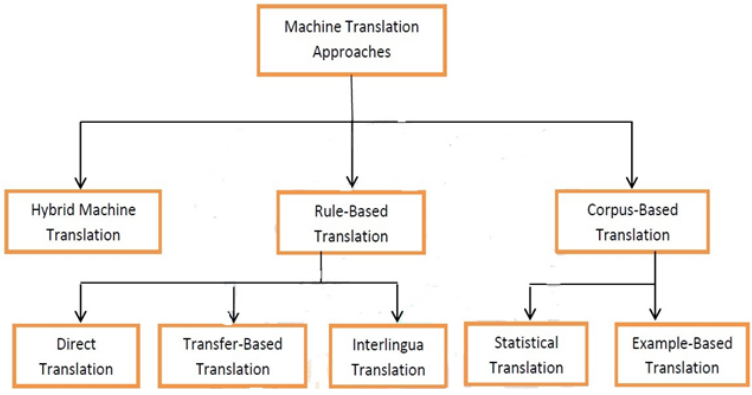

Figure 1.Machine Translation approaches

2.1 Rule-based MT

The source text is parsed by a rule-based machine translation system, which provides an intermediate representation such as a parse tree or an abstract form [6]. This method necessitates language proficiency. For example, an expert system could assist a doctor in making the correct diagnosis based on a cluster of symptoms. The three paradigms of rule-based machine translation are direct machine translation, transfer-based machine translation, and Interlingua machine translation.

2.1.1 Direct-based MT

One of the most fundamental types of machine translation is direct machine translation. Direct machine translation [5] uses a bilingual dictionary to do a direct word-by-word translation of the input source, followed by some syntactical rearrangement. Direct translation techniques include:

- Borrowing
- Calque
- Literal Translation

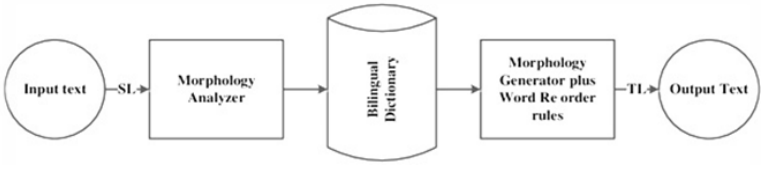

Figure. Direct MT system

2.1.2 Transfer Based MT

This translation system converts text from one language to another using a database of translation rules. When a statement is explicitly translated using a dictionary, it corresponds to one of the rules or examples. Starting with the source language, it does morphological and syntactic analysis on the source language's base forms to create as or to Interlingua, following which it translates them to the target language's base forms and improves the translation [7].

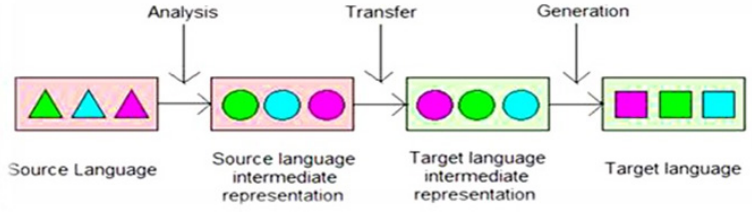

Figure. Transfer Based System

2.1.3 Interlingua Based MT

Interlingua machine translation is another traditional way of machine translation. This is a transfer mechanism that is an alternative to straight translation, which is less efficient. Interlingua, a language-independent intermediate abstract language, is used to translate the source language. The target language is then generated using Interlingua [6].

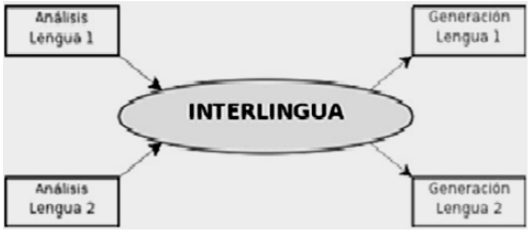

Figure. Interlingua language systems

2.2 Corpus-based MT

For each language pair, corpus-based MT systems require sentence-aligned parallel text. Additional classifications are conducted for corpus-based statistical research and example-based machine translation algorithms [5].

2.2.1 MT based on statistics

In 1949, Warren Weaver proposed the concept of statistical machine translation. This methodology leverages statistical methodologies to create translated forms from bilingual corpora, this methodology leverages statistical methodologies. Factual translation models are used in statistical machine translation, and the parameters are determined from corpora in monolingual and bilingual languages. The process of developing statistical translation models is simple, but it is highly reliant on existing multilingual corpora for innovation. [4].

2.2.2 Example Based MT

Example-based systems produce translations for a given input based on past translation examples. When the system receives an input sentence, it searches the example database for a similar source sentence and translates it. Creating a parallel corpus with limited resources is extremely challenging, and the outcomes are unpredictable depending on the quality of the available resources [5].

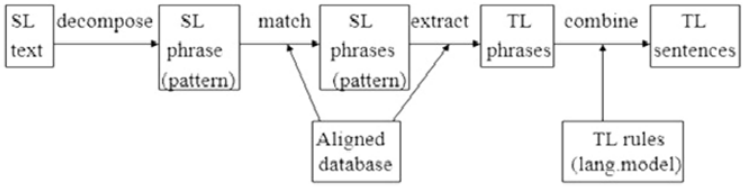

Figure .Example Based MT System

2.3 Hybrid MT

The hybrid MT system combines rule-based and statistical-based methodologies to develop a novel hybrid approach that addresses both systems' flaws while outperforming existing systems. Many companies now utilize a hybrid approach that incorporates both data and user-defined criteria. In a few cases, rule-based translations are used, with later output based on statistical data or the other way around [5]. In terms of performance enhancement, hybrid-based MT is more adaptable than others.

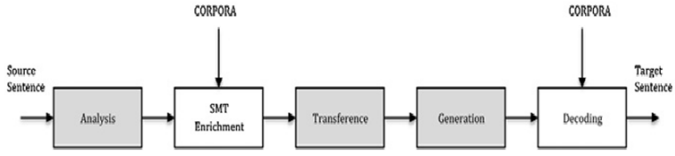

Figure. Hybrid MT System

3. Approaches to Machine Translation's Strengths and Weaknesses

As previously stated, there are various machine translation techniques, each with their own set of benefits and drawbacks.MT systems are utilized in a variety of ways in different languages, depending on the needs and structure of the language. Table 1 summarizes the benefits and drawbacks of each technique.

Table 1: Differences in MT Approaches

Sr. No.	Machine Translation Approach	Advantages	Disadvantage
1.	**Direct method**	**1.** The reader can easily understand the translation with little effort.	**1.** Because it involves analysis, it does not focus solely on the lexical structure of the word and its relationships to other words. **2.** It is primarily geared for the development of certain language pairings and is not appropriate for other language pairs. **3.** Multi-language implementation is more expensive.
2.	**Interlingua system**	**1.** It's a good fit for a domain-based approach. **2.** It is extremely beneficial in multilingual systems	**1.** In comparison to direct machine translation, there is lower time efficiency. **2.** Bringing the intermediary representation those results in a meaningful statement is difficult. **3.** Representing a variety of languages is difficult due to differences in culture and organization.
3.	**Transfer based**	**1.** The system can deal with ambiguity in a variety of languages. **2.** It establishes the modular framework.	**1.** At the end of the text, the significance of the text may be lost.
4.	**Dictionary based**	**1.** It aids in the human translation process by improving the sentence's syntax and grammar.	**1.** less applicable in sentence translation
5.	**Example based**	**1.** It is ideally suited to languages with similar structural similarities.	**1.** It necessitates a large bilingual corpus of the language pair for which the translation is required.
6.	**Statistical based**	**1.** It is language agnostic, as it was not created for a specific language pair. **2.** It is applicable to any language pair. **3.** It is less expensive than a rule-based system. **4.** Because it is trained by real-time messages, translations used to be natural.	**1.** It necessitates a lot of hardware configuration. **2.** A domain-based translation necessitates a corpus of at least a million words.

4. Indian Language Machine Translation Systems

Machine translation has been a hot study topic in India since 1991. The first study was conducted at IIT Kanpur, and it has since been replicated at a number of other universities. In this section, we'll look at some major national (Indian) language MT efforts. The primary parameters that we shall cover are as follows: Application Name and Year of Publication for the MT System

Table 2: Depict the translation of a variety of national languages as target or source.

Table 2. Source or target language translation system for "Marathi", "Hindi", "Urdu"

Sr. No	System of Machine Translation	Year	Translational languages	Application/ Domain	Approach Used	Observations
1.	Cross Language Information Retrieval Evaluation from Hindi to English and Marathi to English[8]	2007	Hindi – English And Marathi – English	Cross-Lingual Information Retrieval System	Dictionaries that are bilingual	The CLIR systems for Hindi to English and Marathi to English, A basic rule-based technique is used to translate terms that are not listed in dictionaries.
2.	A Hindi-to-Urdu Transliteration System [27].	2009	Hindi–Urdu	The transliteration procedure from Hindi to Urdu is extremely accurate.	Rule Based	Multiple/zero character mappings, variations in pronunciation and orthography, transliteration of proper nouns, Urdu word boundary, and other challenges have been addressed by developing special rules and utilizing lexical resources such as the Hindi spell checker, Urdu and Hindi word frequency lists, Urdu word bigram list, and Hindi-Urdu lookup table, among others.
3.	Machine Translation from Hindi to Urdu Using Transliteration [9]	2010	Hindi – Urdu	General	Based on Statistics	This system proposes two innovative probabilistic models for the problem, based on conditional and joint probability formulations.
4.	Transliteration system from Hindi to Urdu based on rules [10].	2012	Hindi – Urdu	General	Rule Based	Some issues, such as unclear characters and nukta-related errors, have been overcome by developing unique rules and utilizing a database.
5.	Machine Translation of English to Marathi: [11]	2013	English-Marathi	General	Translation Divergence Classification	We looked into the topic of translation divergence classification for MT between English and Marathi. Established that the discrepancy in translation between.

6.	Assertive Sentence Translation From English To Marathi Based On Rules[12]	2013	English-Marathi	General	Rule Based	The developer is working on rule-based English to Marathi aggressive sentence translation. A bilingual dictionary is used in this method.
7.	An Experimental Result on Hindi, Urdu, and Marathi Languages [13].	2013	An Experiment on the Languages of Hindi, Urdu, and Marathi	General	Machine learning-based approach, linguistic approach	The main goal is to use a Hidden Markov Model (HMM) to conduct Named Entity Recognition in Natural Languages and to propose strategies to improve accuracy and performance metrics (precision, recall, and F-measure).
8.	Hindi to English Translation System [14].	2014	Hindi-English	General	Statistical Based	The usage of parameters such as number, case, and Tree Adjoining Grammar Information aids in improving English-Hindi translation, particularly by accurately generating morphological inflections.
9.	A System for Sentence Translation from English to Hindi [15]	2014	English–Hindi	General	Example Based	This study focuses on a simple technique to extract the translation by comparing sentences.
10.	Patterns of Linguistic Divergence in English-to-Marathi Translation[16]	2014	English-Marathi	General	Lexico Symantic divergence translation	The primary goal of this study is to comprehend the many forms of divergence issues that can arise when translating from English to Marathi. This subject has been looked at from several angles, and a variety of solutions have been presented to deal with it.
11.	A Method for Machine Translation from English to Marathi [17]	2014	English-Marathi	Transmuter	Rule Based	Based on certain traversals of the parse tree, the basic algorithm for determining the correct word order in the target language was devised. A word sense disambiguation model is one of the system's unique features.
12.	A Statistical Machine Translation System for Punjabi to Hindi [18].	2015	Punjabi–Hindi	General	Machine Translation Using Statistics	The framework for resolving the challenges is provided by algorithms such as the Unigram algorithm and the N-gram string matching technique. Subjective assessments, such as the intelligibility and accuracy tests, were used to assess the system's accuracy. This system can also be used in reverse.
13.	Machine Translation System Rules for English to Hindi Translation[19]	2015	English–Hindi	Homoeopathy	Rule Based	This paper outlines the grammatical rules for an English-to-Hindi machine translation system that will be used to translate homoeopathic literature, medical reports, prescriptions, and other documents.
14.	Machine Translation System for Hindi to English Transfer[20]	2015	English–Hindi	General	Machine Translation Based on Transfer	This system parses an input text to determine its structure. The text in Target language is generated using reordering principles.

15.	A Hybrid Mechanism for an Efficient English to Hindi Machine Translation System[21]	2015	English–Hindi	General	Machine Translation (Hybrid)	Machine translation from English to Hindi Declension rules are used to develop systems. They offered a useful methodology, and recommended a novel approach to MT system design that has yet to be explored in any of the existing MT systems.
16.	Sentences of Assertion and Interrogation [22]	2016	Marathi–English	Assertive and interrogative statements must be translated.	Rule Based	The suggested system's main purpose is to create software that will convert Marathi simple assertive and interrogative sentences into English sentences. To produce higher-quality translations, the system will employ shallow parsing, bilingual lexicon, and rearrangement algorithms.
17.	From English to Marathi: A Machine Translation Evaluation[23]	2016	English-Marathi	Hybrid Translation	Agriculture-related web pages and text documents have been translated.	Different ways of machine translation have been discussed by the developer. And there's a difference in divergence. The author has developed UI tags for web page translation, which suggests a hybrid technique that uses the RBI portal to construct a multilingual dictionary and a C parser.
18.	Punjabi and Urdu Language Machine Translation Survey[24]	2017	Urdu-English, Punjabi, Hindi	Survey	Different approaches	Study the various types of machine translation systems available for Punjabi and Urdu languages, the tools available for converting source language text into target language text for regional and international languages, and the various methods for calculating the accuracy of the translated output of systems designed for Punjabi and Urdu languages.
19.	Validation and Reliability of the 120-Item Big Five IPIP Personality Scale in Urdu[25].	2017	Validation and Reliability in Urdu	Item Pool of 120 International Personalities (IPIP)	Model of Darwish translation	Using the Darwish translation approach, researchers created a 120-item Urdu version of the International Personality Item Pool (IPIP). A panel of engineering specialists, as well as Urdu and English language experts, checked the translation. In addition, an empirical examination was conducted to establish the Urdu version's internal consistency, reliability, and construct validity.
20.	Sindhi to Hindi Sentence Translation System [26].	2018	Sindhi – Hindi	General	Example Based	This study focuses on a straightforward method of comparing sentences in order to extract the translation. The training algorithm was employed by the system.

5. Conclusion

Machine translation is as old as computers, although it has only recently become a hot topic in Natural Language Processing research. Because of their complicated language structures, machine translation is a difficult problem for Indian languages. According to the survey for Indian languages; many Indian systems are based on statistical and hybrid methods. The current study looks at the various language translation systems that have been built in India and around the world, each with their own approach. The study uses Hindi, Marathi, and Urdu as source and target languages. The direct approach to machine translation has been determined to be best suited for closely related languages, i.e. those with similar structures. The indirect and statistical techniques are useful for languages with a diversity of structures.

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A Study of Employees' Acceptance, Motivation and Use of New Technology in Banking Sector

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Abstract

The nerve center of trade, commerce and business in India is banking. The distribution of money for the development of trade, industry and commerce is done through the banking sector. Banks are providing huge market for the IT Industry. Whilenew private sector banks and foreign banks have the edgewhen it comes to computerization, public sector banks havenot lagged behind in making investments to computerize theiroperations. The State Bank of India (SBI) has been ranked first among the Top 50 banks in theworld, bagging the 36th rank, as per the Brand Financestudy. The information and technologyrevolutionhas touched everyaspect of people's life and banking is not an exception to it. The banking sector ischanging rapidly in order to face the challengesposed by the new developments elicited by the entry ofprivate banks and foreign banks into India.

Key words:IT, Employee acceptance, Motivation, Use of New Technology

Introduction

Indian Economy ranks eleventh largest in the world by nominal GDP and ranks the fourth largest by purchasing power parity (PPP).Indian Banks have to concentrate on three important areas for sustained development viz., Technology, Customer and Consolidation.

Technology has influenced the banking system considerably.

It is certainly the technology that is transforming the face of the banking industry.

Banks, public as well as private are at the different stages of adoption of technology. According to the guidelines of the central vigilance commission approximately 70% of bank businesses should be computerized. Indian banking is at the edge of paradigm shift .The application of technology and product innovations are bringing about structural changes in the banking system.

IT has revolutionized the urban sector of banking considerably but still e-banking in the rural areas has not been taken care. Implementation of e-banking in the rural sector would be a great boon to the rural areas. Still, these areas lack the basic infrastructure .so it is possible to introduce e-banking technologies.

The productivity of people, because they are the true strength of the organization is the main determinants of the profitability of any organization. It is therefore necessary to develop and manage the human resource thus making them adaptable to the changing environment. Eventually, the private and foreign banks have started appointing people havingcreativityand who are well- versed with latest technology.

The application and awareness of various tools, techniques, ideas and crafts is together known as technology. The 21st century business community operates only due to technological change. Employees should be motivated towards the application of technology. It is the information technology which can serve as a good source of competitive advantage in vast competition. It's a general expectation by every Employer that his employee would adopt the changes with respect to tools, techniques, crafts and ideas. Although the objective of an organization towards adopting a technological improvement is to develop the work processes still the attitudes certainly vary to the innovation.There may exists primary forces within the organization that administer attitude of an individual's towards a new technology or many times the individual experience, either good or bad, may govern their perception and thus ultimately their attitudes.

The ultimate need of technological advancement, understanding, and effecting employee motivation has certainly been a major concern for organizations, managers, and also the supervisors since employee's motivation towards the ever

changing technological environment has always been and will certainly be the determining aspect in work performance which in turn decides the overall success or failure of any organization. Accordingly, substantial study and research in this area has been directed, and rational volumes of findings been produced which ultimately benefits modern-day Organizations and management.

In order to ensure smooth processes, improvement in the efficiency, increase in production, enhanced salesand keeping well with the competition, Organizations are implementing new IT system, custom software's, and inclusive SaaS platforms

Although the change thus brought in be good for the organization thereby a necessity for their growth, many-a-times, it can also be hard for employees. Generally, people become habituated to a particular way of doing things and so the Change may create apprehension and thereby lead to opposition—specifically when the change would be directly affecting how their job are performed.

The willingness and ability to adjust to technology differs from person to person and also from department to department—this fact should be considered and never should it be underestimated.

'The only thing that never changes is change' and so the employees should know that change is unescapable in this ever-developing business world. Many a times the management be unsuccessful to ask for the input, opinions, or concerns of the employees due to which, they may feel disrespected. It's a kind of indication to the employees that their expertise and experience don't matter to those initiating the change.

Employees will fully comprehend the ideadriving the change or how the evolution will take place only if they are clearly communicated.Until and unless your team moves forward, your business cannot move forward, and therefore you have to help them.

Bringing about a major technology change is certainly a difficult task. It may be true that you have spent valuable time and energy striving over which technology to follow and delineating the distribution. Always remember toinvolve the employees along on the expedition.

Also it is certainly justified, planning for application requires even more time in the early stages, but you may experience smooth

process even more quickly

There are certain ways enabling the transition process even easier, which follows:

- "Make the employees know need for change as they need to understand about their goals before accepting an altogether new program." This is so because when people are clear as to "why" something is done, it creates significant action, they gets engaged, they want to make a difference at work and ultimately have a purpose.
- "Keep it simple" by not setting out excessively complicated system. Rather make it interesting so as to enable change, focused on the end-users' needs and embrace simplicity.
- "Provide them sufficient time" to be skillful with the new system which certainly will increase their accessibility to it.
- "Less dependency on formal communications". The first and the most important step is Formal communications which creates awareness about a development.
- "Opportunities for employees to learn from one another". Employees will certainly becomeeven more engaged and motivated When they are encourage to share their mastery of the new skills in which they have become proficient with their colleagues.
- "Encourage feedback and action on it". Only asking for feedback and doing nothing about it would result in failure as a leader. A leader should not only listen to the workers but also take necessary action on the feedback so received.
- "Extend support". The way we support our people with change today will certainly impact how they would sense about the next giant change we bring about. Executives should not only center on the preliminary employment of a technology, but also in the prerequisite for yearly care or the support to the user

New technology has developed as a feature in headings predicting the future of practically every industry.Althoughfew employees can figure out exactly what these changes would look like, most of them identify technology to interrupt the way

they work in the future. Eventually, workers are keen about the prospects to be proficient with the new technology, but also they also fear that technology may eradicate their present roles or future job prospects.

Literature Review

We are existing in an environment in which the resources are scarce. The productivity is reduced due to inefficient use of these scarceresources. Technology is the main source which can bring about the proficient use of the resources. Nonethelessthe employees in the organization frequently repel adopting the new technology. The key ingredient for triumph in any organization is deemed to be Motivation. For the organization, even if they have all the technical skills required, it is necessary to motivate their team in order to the achieve success. It is necessary to motivate employees to ensure the success of the organization such that everyone's goals are achieved. As far as organizational changes are concerned, it seems thatpeople'sreaction are generally in terms of feelings of uncertainty, concern of personal loss, habits and the firm credence that change is not in the organizational interest. Therefore, it is important to motivate employees in a dynamic environment. It is noticed that earlier motivating the employees was as simple as a simple exchange of loyalty and commitment of the employees in return for security of the job. Today the years of lifetime jobsand simple obligations are done. Layoffs are readily announced by the employees. In search of better opportunities, employees easily leave the jobs. There exists a world around us which is consistently changing. Today, the employees just don't want to be compensated for their invested hours, but also for the value they provide and eventually wants a Portion in the Economic Payments of what they produce. Based on this changedperception, many leading companies today are replacing the traditional compensation systems with compensation systems that link base pay to employee'sskills and proficienciesthereby providing incentive stretch out to group performance instead ofindividual performance. In order to enable the employees to adopt the changes, a feeling of trust should be built upon.Wandy Phaneuf inspectedthe basicsfor developing team trust, commitment and loyalty amongst the employees in this new world of work. In his opinion, the managers who steadily practice certain leadership

behaviors that matter to employees are remunerated with profoundly loyal staff. Such behaviors are based on the grounds of personal integrity. Whenever certain changes in the workplace are brought in the organizations, it is certain for the management to face a lot of oppositionfrom the employee.

Sara La Forest and Tony Kubica in their study on 'managing the transitions in the organization' concluded that whenever any organizational change as a new initiate is introduced, Majority of the managers and supervisors are tooconversant with long sighs and depressedgrunts from their employee. Employeesmay be motivated towards a new technology in the workplace with the help of many influences contributing on their attitudes.

David T. Bill in his article explained the influences on the employees thereby motivating them. He defined that in the workplace, the employees have to face new technological changes. The changes thus brought in are embraced by some employees wherein they seek new applications for the innovations whereas others become defensive and resists the change

Research Methodology

This research paper is namely descriptive in nature.Data collection method includes secondary data collected from various sources likeinternet, journals, books, publications.

Conclusion

The study concludes that development in the information technology isdwelling. Financial institutions are systematically working to utilize technology to improve their profitability and customer serviceBanksare implementing digital technologies. Theuse of technology is also promoted by the Governments.IT systems are integrated providing information automatically and frequently.

The IT in banking is becoming a motivation and hence,there is a stiff competition amongst the banks. As a result, only those banks will survive in the future who can manage the technology infrastructure? There is a continuously expansion of their networks by the banks according to the rules. The real strength in any organization is their Human resource. Creative and fresh mind people well versed with latest technology should be appointed in Banks.An initiative should be taken by Public bank and private banks to provide e-service in rural areas. Information technology

ease the operation by providing great relief to an individual not having a familiarity with IT but need to access banking in an optimum manner.

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Hawkins Stern's Impulse Buying Theory (1962) in Online Shopping, and The Shift in Consumer Behaviour Pattern During The Pandemic

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Abstract:

The world was stricken by a global calamity in the form of the COVID-19 epidemic at the start of 2020.

As a result, supermarkets have witnessed panic buying, empty store shelves, out-of-stock items, and an increase in internet transactions.

In the food industry, supermarkets, producers, marketers, and businesses have all had to adapt to shifting consumer purchasing trends. According to a recent study, price and quality are two of the most important components in the consumer decision-making process; in particular, buyers in crisis situations are apprehensive about growing price sensitivity and perceived quality of food supplies.

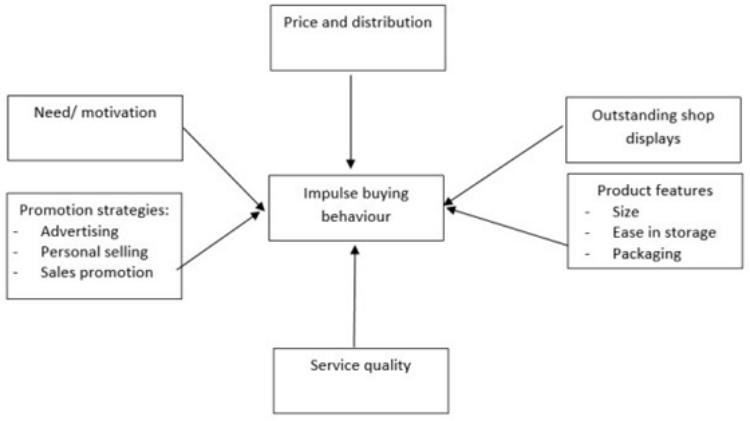
Key words: Buying Behavior, COVID-19, Pandemic, Impulse buying, online shopping

Introduction:

Hawkins Stern's impulse buying theory (1962)

The theory got its name from the proposer, Hawkins Stern who had put this forward in 1962. The Most contemporary consumer behaviour theories, such as Maslow's Need Hierarchy Theory of Motivation (1943) and Engel, Kollat, and Blackwell (1968), assumed that consumers always made rational and well-

planned purchasing decisions (Dutta and Mandal, 2018).



Stern disagreed with this viewpoint, claiming that customers engage in impulsive purchasing under the influence of external circumstances. According to the hypothesis, marketers can persuade customers to buy more than they had anticipated (Dutta and Mandal, 2018).Hawkins made a significant contribution. Stern's model is a classification system for spontaneous purchases (Shapiro, 2015).The model recommends four different types of impulse purchases.

Pure impulse buying

This includes purchasing only on the basis of impulse, resulting in clients purchasing items that are not on their regular shopping list.It's sometimes referred to as a 'escape purchase.'It deviates from the usual purchase trend.In pure impulsive purchase, visuals are extremely important (Dutta and Mandal, 2018).It plays on the buyer's emotions when purchasing novelty items.These purchases usually consist of products that are fresh to the buyer and visually appealing to him.The consumers end up overspending, while the marketers profit more.

Reminder impulse buying

When a consumer has prior knowledge or experience with a product but has no intention of purchasing it, this type of impulse buying occurs (Piron, 1991).It has a strong appeal to fashion merchandise buyers.

Suggested impulse buying

Suggested impulsive buying occurs when a buyer sees

a product for the first time and feels compelled to purchase it (Stern, 1962; Dutta and Mandal, 2018).In a traditional store, such purchases are usually made through the efforts of a salesperson.

Planned impulse buying

When a customer has a desire for a product but is unsure of its specifications, he or she engages in impulsive buying.In most cases, a lower price or other types of sales promotion strategies encourage planned spontaneous purchases (Stern, 1962).

Price as a factor that triggers impulse buying behaviour

Marketers employ a variety of tactics to encourage consumers to make impulse purchases.According to Stern, the most crucial trigger of an impulse purchase is the pricing decision.This is because it encourages customers to spend more than they had anticipated.However, it may not be appropriate for high-value commodities like vehicles.It's most frequent in products with a short shelf life, a low consumer need, a compact size, and easy storage.

Ease of storage

Items that may be conveniently stored without any specific needs are more likely to be purchased on the spur of the moment. The size and weight of a product have a significant impact on a consumer's decision to buy something on the spur of the moment. Because of the issue of heavyweight or large size, a buyer must make specific arrangements, such as transportation.As a result, the chances of buying it on impulse are reduced (Stern, 1962).

Relevancy of Stern's dimensions in online shopping

Online buying was not as popular as it is now when Stern outlined these factors.Stern discovered the majority of these characteristics in the setting of brick-and-mortar stores. Stern claims that ease of purchase, i.e. product availability, will likely enhance the likelihood of impulsive purchases, which is especially true in internet shopping.

Consumer traits, on the other hand, have changed dramatically throughout time.Changes in demographics, spending patterns, purchasing power, a shift from lifestyle-based to experience-based consumption, and an increase in their overall engagement in purchasing decisions are all factors to consider.As a result, in Stern's original model, several new dimensions have formed.

This covers, among other things, website quality (security, navigability, and visual appeal), payment methods, the virtual environment, product diversity, network availability, browsing behaviour, and online reviews (Octavia, 2015; Zou, 2016; Kem et al., 2018).

The Pandemic's Impact on HawkinsStern theory exhibits certain deviations from the above-mentioned relevance.Despite the positive outlook, consumers' behaviours from the pandemic appear to be hanging around, with customers stating that they prefer to shop at fewer locations and are less inclined to clip coupons due to the risk of hand-to-hand contact.Consumers' aversion to collecting coupons, on the other hand, hasn't stopped them from looking for a good deal, with the majority of respondents indicating they save money by trying new, lower-priced brands or purchasing store-brand items..

COVID-19 is changing howconsumers behave acrossall spheres of life:

Consumer behaviour will be influenced by the way of contagion, self-isolation, and economic uncertainty, which will last for years in certain circumstances.The new consumer behaviours affect all aspect of our lives, from how we work to how we shop to how we relax.Retailers and 'consumer-packaged-goods corporations' face significant challenges as a result of these rapid transformations. Many of the longer-term shifts in consumer behaviour are still in the making, offering businesses the chance to define the Next Normal.

1. COVID-19 is transformingconsumer lives - we havecovered a "decade in days"in adoption of digital mechanisms

Three change forces—economic downturn,preference shifts, and digital acceleration

2. Behavior changes are not linearand their stickiness will depend onsatisfaction of the new experiences

Ups and downs ahead of usStickiness = forced behavior x satisfaction, the jury is still out onvalue-driven behaviors

3. Future is NOW-Players should prepare

Prepare for lower consumption / a smaller footprint offer, and a different shopping experience for the new reality. While

marketing and communicating, consumers must be followed on their new decision journeys..

Conclusion:

In today's world, most digital marketers are encouraging consumers to trust on their instincts as well as their brains.Stern identifies four types of impulse purchase behaviours, and a mix of these might be planned when developing a marketing strategy.

The shopper's impulse buying is influenced by a variety of elements, including the shopping environment, the shopper's personal attributes, the product itself, and many demographic and socio-cultural aspects. Added online shopping experiences show a definite shift in buying behaviour, some of which is impulse, and some of it is more conservative given the recent onslaught of the second and third wave of the dreaded Covid-19.

This gives us an opportunity to consider probing in detail about various factors, that has influenced the buying behaviour during pandemic times for a more elaborate study.

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Reviews: SVM Clustering using Genetic Algorithm in Cognitive Wireless Network

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Abstract

In recent times, cognitive wireless network, SVM Clustering using Genetic Algorithm.The dynamic, and often unknownchromosome, operating conditions, modern wireless networking standards increasingly rely on supportive vector machine learning and artificial intelligence in genetic algorithms. Genetic algorithms (GAs) provide a well-established framework for implementing artificial intelligence tasks such as classification, learning, and optimization. SVM clustering risk minimization observe in SVM separable evaluation chromosomes of margins identifies.SVM clustering analyze the genetic algorithm in SVM clustering techniques to use as cognitive wireless network to specify the learn to predict and choose of qualified kernel and separated in largest margin of separation in chromosomes.

Introduction:

The study of nature is a rich source of inspiration for researchers working in the area of artificial intelligence and machine learning. The human brain and the biological process of evolution have helped develop and guide research in the neural network, and the evolutionary algorithms communities. A genetic algorithm (GA) is a met heuristiccomputational method [1], inspired from biological evolution [2] that aims to imitate the robust procedures used by various biological organisms to adapt as part of their natural evolution. GAsare successfully used in fields

as diverse as aircraft industry, chip design, computer animation, drug design, telecommunications, software creation, and financial markets [3].

The field of genetic algorithms (GAs) are established by John Holland who investigated the evolution of complex adaptive systems (CAS) comprising interacting genes, starting in the early 1960s, and culminating in the publication in 1975 [4]. Holland used the biological metaphor of chromosomes to refer to strings of binary symbols encoding a candidate solution tothe given problem. Holland proposed using the computational analogues of the biological evolutionary processes of random mutation, crossover, and natural selection [6] to enable populations of chromosomes to get increasingly better at problem solving. The underlying premisegiven enough time, the process will converge towards a population that contains a chromosome (or chromosomes) that solves the given problem. Apart from the mutation and crossover operators, the design of a GA framework also involves other design issues such as genetic representation (encoding), population initialization, fitness function formulation, and a selection mechanism. More recently, use of altruistic techniques in an evolutionary framework that involve cooperation as a fundamental primitive [7].

Motivations:

A. Support-vector machine

Support-vector machines (SVMs, also support-vector networks[1]) are supervised learning models with associated learning algorithmsanalyze data for classification and regression analysis. Developed at AT&T Bell Laboratories by Vladimir Vapnik with colleagues (Boser et al., 1992, Guyon et al., 1993, Cortes and Vapnik, 1995,[2] Vapnik et al., 1997).SVMs are one of the most robust prediction methods are being based on either statistical learning frameworks or VC theory which is proposed by Vapnik (1982, 1995) and Chervonenkis (1974).The set of training examples, each marked as belonging to one of two categories. SVM training algorithm builds a model that assigns new examples to one categories. The other making it a non-probabilistic binary linear classifier .SVM maps training to points in space maximize the width of the gap between the two categories. The same space and predicted to a category based on which side of the gap them

fall. The linear classification, SVMs can efficiently perform a non-linear classification using what is called the kernel trick, implicitly mapping their inputs into high-dimensional feature spaces.

When data isunlabeled, supervised learning don't possible, and an unsupervised learning approach is required, which attempts to find natural clustering of the data to groups, and then map new data to these formed groups. The support-vector clustering [3] algorithm, created by theSiegel Mann and Vladimir Vapnik, applies the statistics of support vectors, developed in the support vector machines algorithm, to categorize unlabeled data.

B. Genetic Algorithm:

1) Generality and Versatility: GAs are apply in a wide variety of settings and easily molded to particular problems. GAs constitute a very general meta-heuristic technique which thought of as the sledgehammer of the craft of algorithms, much like the technique of artificial neural networks (ANNs). GAs readily invoked in areas don't yield readily to standard approaches, or when more specialized techniques fail. GAs are capable of solving extremely large problems that are large search spaces. GAs are very good at navigating through huge search spaces to heuristically find near optimal solutions in quick time. GAs are work even when the objective function is not Exactly known since GAs rely only on an objective function's evaluation (without necessarily knowing the objective function explicitly). Although GAs guarantee optimality generally useful in practice. Bandar et al. [8] showed that although GAs don't guarantee convergence to an optimal solution, GAs avoid local optimal with a high probability through the use of mutation and crossover operators.

1) Addictiveness and Online Problem Solving: To understand adaptively in changing conditions, there are initially develop the idea of a 'landscape' both as a metaphor and as a mathematical object. Building upon the metaphor of fitness landscapes, and the insight of GAs as stochastic search algorithms, two landscape models of relevance to optimization through GAs are proposed [9]. Rugged landscapes are landscapes in which they are many peaks, valleys, and troughs (and not a single peak). Rugged landscapes fitness levels do not change; in evolutionary systems, the fitness function is also dependent on context, and on the behavior of other competitors. They can be captured by

the metaphor of dancing landscapes—which are adapted from rugged landscapes. Local peaks may change, making a solution that was earlier optimal no longer a peak when a landscape 'moves'. Traditional techniques from optimization theory assume static and well-known topologies and does not suited to dynamic environments. In many problems of practical interest, thisfocus is more on satisficing (i.e., finding a sufficiently good solution that satisfies one's purposes) rather than on optimizing (i.e., finding the best possible solution). A key benefit of GAs is that they are well suited to the optimization task in the dancing landscapes that characterize wireless networks. GAs are well suited for building met heuristic adaptive algorithms that can provide satisfactory performance in changing network conditions.

Another important aspect of GAs are an online adaptive algorithm that can operate in unknown environments in an online fashion.Such abilities are crucial in wireless networks in various Control settings by which decisions have to make automatically in run-time to cater to dynamic channel parameters. In dynamic channel conditions that typically exist in most wireless networking configurations, the optimal solution keeps changing as the conditions changes when optimization is done by an elusive moving target. In online adaptive optimization algorithms, they are fundamental tradeoff between exploration which involves looking for potentially better previously unexplored solutions and exploitation that implies the use of previously known good solutions. Exploration in effect is an attempt to find good adaptive building blocks and exploitation is the use and propagation of adaptations known to perform well. They can envision mutation and recombination of genes as analogous to exploration, whereas natural selection can be envisioned as a form of exploitation [9]. It is important to always keep on exploring when the dynamic environment changes, such as wireless networks. Holland's original GA work used schema analysis to show that GAs can achieve near-optimal exploration and exploitation tradeoff, under qualifying assumptions

2). GA Terminology: Since the field of GA is inspired from the biological genetic evolution, the field uses a number of biological metaphors in its terminology. The purpose of this short subsection is biological metaphors in the context of applications

of GAs in wireless networking.

The terminology through the following list.

- Organism: It represents the entity (e.g., a radio parameter,or a wireless resource) being optimized.
- Population: simulated genetic evolution is a collection of organisms.
- Chromosome: It encodes a particular solution to the problem under study. (Biologically, a chromosome contains an organism's genetic makeup.)
- Fitness: It represents the utility of the current chromosome.
- Gene: It is the basic building block of the chromosome defining a particular feature of the simulated organism. (Each chromosome can contain a number of genes.)
- Allele: Each gene can take several alternative forms, each of which is called an allele.
- Locus: It is the position on the chromosome containing a particular gene of interest. Support Vector Machines (SVMs) provide a powerful method forsupervised learningclassification. Use of SVMs for clustering (unsupervised learning) is now being considered in a number of different way

Supervised cluster evaluation

Support Vector Machine uses Structural Risk Minimization to compare various separation models and to eventually choose the model with the largest margin of separation.

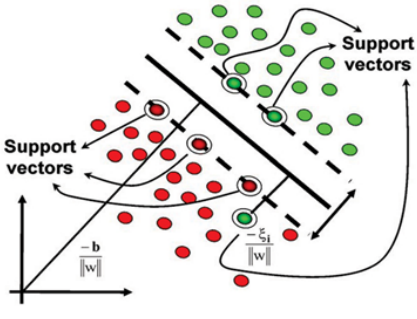

Figure1: Support Vector Machine uses Structural Risk Minimization to compare various separationmodels and to eventually choose the model with the largest margin of separation.

The performance of unsupervised algorithms, such as clustering, don't measured with the same certitude as for the

classification problems. The clustering is measured using the externally derived class labels for the patterns. Subsequently, theyare use some of the classification-oriented measures to evaluate their results. These measures evaluate the extent to which a cluster contains patterns of a single class ([4]).

3) Kernel machine: Whereas the original problem may be stated in a finite-dimensional space, it often happens that the sets to discriminate do not linearly separable in that space. The original finite-dimensional space mapped into a much higher-dimensional space, presumably making the separation easier in that space. [6]. To keep the computational load reasonable, the mappings used by SVM schemes are designed to ensure that dot products of pairs of input data vectors may be computed easily in terms of the variables in the original space, by defining them in terms of a function selected to suit the problem.[7] The hyper planes in the higher-dimensional space are defined as the set of points whose dot product with a vector space is constant, where such a set of vectors is an orthogonal (and thus minimal) set of vectors that defines a hyper plane. The vectors defining the hyper planes can be chosen to be linear combinations with parameters of images of feature vectorsthat occur in the data base. With this choice of a hyper plane, the points in the feature space that are mapped into the hyper plane are defined by the relation , each term in the sum measures the degree of closeness of the test point to the corresponding data base point . The sum of kernels above can be used to measure the relative nearness of each test point to the data points originating in one or the other of the sets to be discriminated. The fact that the set of points mapped into any hyper plane can be quite convoluted as a result, allowing much more complex discrimination between sets that does not convex at all in the original space.

Applications:

SVMs are used to solve various real-world problems:

- SVMs are helpful in text and hypertext categorization, as our application can significantly reduce the need for labeled training instances in both the standard inductive and transductive settings.[8] Some methods for shallow semantic parsing are based on support vector machines[9]
- Classification of imagesis also be performed using SVMs. Experimental results show that SVMs achieve

significantly higher search accuracy than traditional query refinement schemes after just three to four rounds of relevance feedback. There is also true for image segmentation systems, including those using a modified version SVM that uses the privileged approach as suggested by Vapnik.[10][11]

- Classification of satellite data like SAR data using supervised SVM.[12]
- Hand-written characters can be recognized using SVM[13][14]
- The SVM algorithm is widely applied in the biological and other sciences. They are used to classify proteins with up to 90% of the compounds classified correctly. Permutation tests based on SVM weights are suggested as a mechanism for interpretation of SVM models. [15][16] Support-vector machine weights have also used to interpret SVM models in the past.[17]Postdoc interpretation of support-vector machine models in order to identify features used by the model to make predictions is a relatively new area of research with special significance in the biological sciences.

Proposed Work:

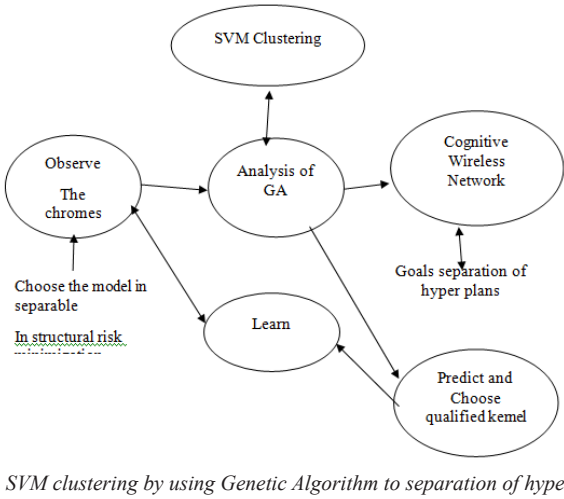

Figure: SVM clustering by using Genetic Algorithm to separation of hyper plane

In proposed system, SVM based clustering method by using

SVM model in separable in structural risk minimization to observe largest margin of separation in hyper plane. An analyze the genetic algorithm in SVM clustering techniques to use as cognitive wireless network.to specify the learn to predict and choose of qualified kernel and separated in largest margin of separation in chromosomes.

Conclusion:

SVM clustering techniques analyze the genetic algorithm in SVM to use as cognitive wireless network to specify the learn to predict and choose of qualified kernel and separated in largest margin of separation in chromosomes.

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Comparative Analysis of COVID 19 Cases in Jalgaon Maharashtra

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ABSTRACT

The period of COVID-19 in various parts of the world is a major worry for all the governing units of particular nations. India is additionally facing this extremely intense undertaking for controlling the infection outbreak and has dealt with its development rate through some exacting measures. In this paper we discuss the comparative analysis of COVID-19 cases of first, second and third wave in Jalgaon district. Wecollect data from newspaper first wave, second wave and third wave comparative analysis done with respect to finding out the domestic analytical data for this. Appropriate data analytical tools are used to understand impact of various domestic factors on the survival of COVID-19 patients. Interesting results are presented in this paper.

Key Terms: Introduction, Methodology, Discussion andComparative Analysis

1. INTRODUCTION

In 2019, a new coronavirus (COVID-19) was recognised as the source of a disease outbreak that originated in Wuhanin China that is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) [1].The World Health Organization (WHO) has announced the COVID-19 a pandemic [2]. The COVID 19 virus spread very fast among the community.

Usually Coronaviruses present with respiratory system showing respective causal symptoms in infected person.

There are the cases in which patient has symptoms, categories as symptomatic. These symptoms could be categorized as "Common", "most common", "less common", "sever", "more sever" of covid-19 are shown in following Table 1. Some patient will show no symptoms termed as asymptomatic. These types of patients are recovered without having special treatment. Those have natural resistance for the virus.

Table 1: Categories of Covid 19 Symptoms

Common symptoms	**Less common symptoms**	**Less common and may affect some patients**	**Severe symptoms**	**More severe and rare neurological complications**
Fever Dry cough Fatigue [12]	Irritability Confusion Reduced consciousness Anxiety and Depression Sleep disorders [12]	Loss of taste or smell Nasal blocking Conjunctivitis Sore throat Headache Muscle or joint pain Different types of skin rash Vomiting Diarrhoea Chills or dizziness [12]	Shortness of breath Loss of hunger Confusion Determined pain or pressure in the chest High temperature [12]	Strokes Brain inflammation Delirium And nerve damage [12].

According to Coronavirus Disease(COVID -19) weekly epidemiological update reportof 20 February 2022, over 422 million confirmed cases and over 5.8 million deaths have been reported globally[3].

India's, population is more than 1.34 billion that is the second largest population in the world. India will have trouble in controlling the transmission of severe acute respiratory syndrome COVID-19 among its population. Various systems would be essential to deal with this epidemic situation [4].

In Maharashtra, confirmed over 7.8 million cases of the coronavirus (COVID-19)with over 143 thousand fatalities and over seven million recoveries till 28th February 2022. In Jalgaon

district there are 149514 cases.

2. METHODOLOGY

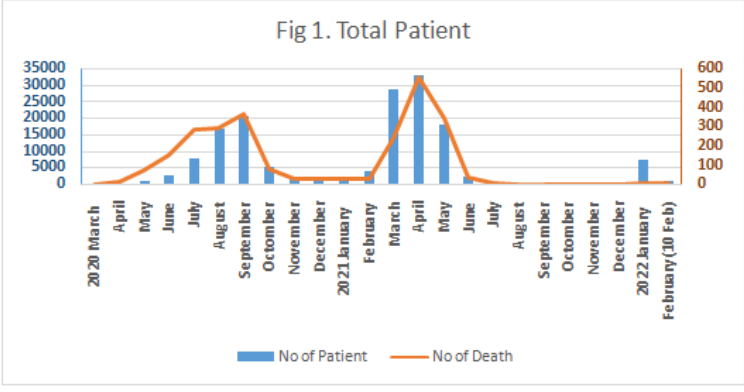
For this study, relevant data of the period March 2020 to 10th February 2022, has been collected from the newspaper. Data could be categorised as follows.

i) Month wise number of patients and number of deaths
ii) Number of people who takes the COVID vaccine first dose and second dose.

The data which is collected from newspaper, was first transfer on excel sheets for the purpose of systematic data analysis and visualization.

3. DISCUSSION AND ANALYSIS

From the analysis of this data some information could be drawn to extract some behavioural patterns of virus, changes in stages of patients, symptoms variations over the period of pandemic. The total number of patients, number of deaths shown by the month wise in the following Fig. 1.

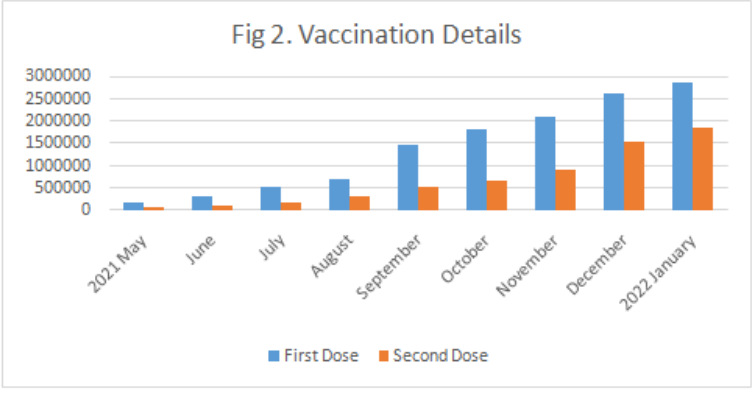


The graph shows the number of patients are increasing from month April 2022 to September 2020.In the period of October 2020 to February 2021 the total no of patients are decreasing. From March 2021 to May 2021 the patients are increasing drastically. This Period is known as second wave of COVID-19.In April 2021 the highest number of patients occurred from March 2020 to February 2022.From June 2021 to December 2021 there are very less number of patients. Again the patients are increasing in January 2022 this period is known as third wave.

In first wave of COVID-19 the number of deaths are high in

September 2020.In second wave April 2021 was the peak point of mortality. After April 2021 mortality rate was decreasing. We see the result that there is very less number of deaths from July 2021 to February 2022 i.e.death was decreasing because of vaccination.

The following fig 2 shows the vaccination details.



The number of persons who takes first dose are increasing from May 2021 to January 2022. As compared to first dose,there are less number of people who takes second dose. We can check the result, number of deaths are decreasing because of vaccination.

4. CONCLUSION

The new COVID-19 infection outbreak has challenged in the field of medical, economic and public health infrastructure of many countries. But we can control the mortality rate with the help of COVID-19 vaccination.It exhibits lower mortality rate.

From this study we see the month wise death pattern, total patients in Jalgaon district. This is a primary level of study , similar study will be perform by collecting data of nearby places to Jalgaon district to understand more influenced area in an around Jalgaon city. This study is useful for the Jalgaon district office to control the cases in this region and get the vaccination details.

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THE IMPACT OF WORK OVERLOAD AND COPING MECHANISM ON DIFFERENT DIMENSIONS OF STRESS AMONG TEACHERS IN JALGAON CITY

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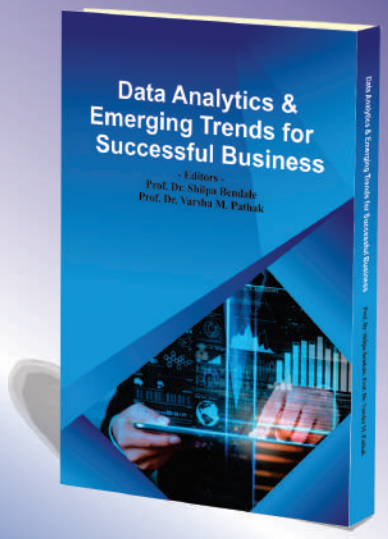
Teachers play a crucial role in shaping the lives of our nation's children. They not only play an important role in facilitating learning, but also influence a child's social and emotional development. Though technology has opened the door of new learning, it definitely has changed the course of education. Presently, teaching is one of the most stressful occupations in the country. The health and wellbeing of teachers is affected by the high levels of stress, resulting in teacher burnout, lack of engagement, job dissatisfaction, poor performance, and turnover. Stress not only results in lower achievement for students and higher costs for schools but also has negative consequences for teachers.

This research was conducted to study the influence of work related stress on the performance and quality of school teachers in the city of Jalgaon. Data was collected from 100 teachers who were employed in various Government, aided and unaided schools, affiliated to State Board, CBSE or ICSE. Teachers from pre-primary, primary and secondary sections were part of the survey which was conducted using questionnaires in order to seek information on their socio educational background, job details, opinion on the current organization, personality self-assessment, work culture, work life balance, compensation, job satisfaction, student teacher relationship, teaching style etc. The study reveals that stress plays an adverse role on the performance of teachers. Researchers believe that this study would help the authorities concerned, in understanding the working conditions, job expectations and preferences of the teachers and the other related factors that contribute to work related stress and the impact of stress on their performance.

Keywords: Stress, Performance, Work Environment, Work Culture, Education, Quality of Teaching



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Data Analytics & Emerging Trends for Successful Business

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Chapter 4
Scope of Artificial Intelligence in Business Model

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Abstract -

This chapter includes business applications of artificial intelligence including withautomation,data analytics and NLP. First section of this chapter contains scope of artificial intelligence in different business processes.Second section contains future scope of AI in 2020. Third section contains how AI is transforming business models? And Fourth section contains impact of AI on businesses.Fifth section contains benefits of AI in business.Sixth section includes understanding AI business potential.Seventh section contains examples of use cases. Eighth section includes best practices of AI in business.

Keywords - Artificial IntelligenceI, Machine Learning, Automation, Robotics Process Automation, IOT, Innovation, Chatbot, CRM

Section I - Scope of AI in different business processes -

Artificial Intelligence is used to solve many business problems.AI supports to detect frauds,to increase sales,automate work processes and provide predictive analysis etc. In reality AI has already become part of our lives.We use AI everyday.It is not only our smartphones,laptops and cars but everywhere.

For the last few years,AI has entered the consciousness of every industry. It has become part of mainstream conversations. Businesses of all shapes and sizes are considering artificial intelligence to solve real business problems.In the past, only the largest corporations could afford to invest in AI technology, but things are changing fast. In fact, the high-speed growth of AI makes it more likely that startups and younger businesses will be able to embrace the technology earlier than their corporate colleagues.

Industries like health care, automotive, financial services and

logistics have a lot to gain from AI implementations. Artificial intelligence can help health care service providers with better tools for early diagnostics. The autonomous cars are a direct result of improvements in AI.

Financial services can benefit from AI-based process automation and fraud detection. Logistics companies can use AI for better inventory and delivery management. The retail business can map consumer behavior using AI. Utilities can use smart meters and smart grids to decrease power consumption.

The rise of chatbots and virtual assistants are also a result of artificial intelligence. Amazon's Alexa, Google's Home, Apple's Siri and Microsoft's Cortana are all using AI-based algorithms to make life better. These technologies will take more prominent roles in dictating future consumer behavior. Most of your future transactions will be completed with the help of an AI-based chatbot or virtual assistant.

AI is equally valued for its versatility in business areas ranging from cybersecurity, because of scale and growing complexity, to customer relationship management (CRM) by turning the CRM system into a self-updating system that stays on top of companies' relationship management, to finance by integrating AI into regular banking operations, such as mortgage loans.

Section II - Future scope of AI in 2020 -

In the future, intelligent apps will transform every existing software category with AI-enabled capabilities, from security tooling to enterprise applications such as marketing or ERP. Using AI, tech providers will focus on three areas — advanced analytics, AI-powered and increasingly autonomous business processes and AI-powered immersive, conversational and continuous interfaces.

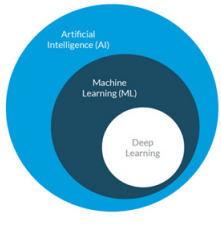

Fig.1

1) AI will become the international politics - 2019 has been the year where the major world power adds fences to protect

their national interests under defense and trade, not less between two AI powers, US and China. Despite the US tariffs & export restriction of AI goods& services, China became self-supporting to AI research and development.

On one hand, nationalist politics enjoy this revival; the compromise between corporations like academic and industrial organizations, on the other hand, creates rapid development as well as the deployment of the technology thus putting up the border around nations. It would be better to avoid such a disaster with the slow development of AI possibly increases the usefulness of artificial intelligence scope in future.Single answer but of most effective to maintain a steady seat in future. Yes, AI can predict an amazing opportunity for any policy makers to keep an eye on opponents' position and tactics that are helpful in modeling complex negotiations in international affairs.

2) Increased Job Opportunities - Technology can be shaped in ways wanted, when handled with proper plans and positive attitudes. Sometimes the predictions given by human turn out to be in another way. As such the introduction of machines will never cause human unemployment in every case.Gartner predicts that AI will cause 1.8 million jobs to lose due to automation and created nearly 2.8 million job opportunity.

3) Effective AI Assistants - Everyone has exposure to the name "Alexa" or "Google Assistants". These are the AI inspired human voice assistants that could search the internet to answer. In 2020, the rapid growth in the natural learning algorithm will accelerate the understanding and search result more accurate to what human requires.

4] AI and Automation ahead in Business:

By the end of 2019, almost every company is aware of AI's pros and cons. Entrepreneurs identified the areas of quick rewards and moving forward with proven results. Companies already installed with AI are:

- **Retail -** Collect data through entertainment programs and receipts to feed AI engines to market their products.
- **Financial -** Installed machine learning algorithms to make a thousand transactions per second.
- **Manufacture -** Predictive technology to precisely calculate machinery breakdown.

In 2020, the future scope of Artificial Intelligence will introduce its supportive service like recruitment process, logistics decisions, HR etc. more efficiently driven by automation. More companies will adapt to this procedure when they come to understand the complete value of technology.

As the research starts to bring positive results, thefuture scope of Artificial Intelligence has a wider landscape to satisfy. The year 2020 will be the upgrading platform for AI to retain its popularity.

Section III - How AI is transforming business models?

AI capability is already transforming business and commerce across nations. Rich or poor, developed or developing, small or large, AI has leveled the playing field for countries and brought their businesses a unique possibility to move forward and grow. In AI-driven automation, growth means more intelligence from data from connected devices, social media, industry data, and more that furthers the potential to revolutionize business models. Over the years, digital data has been growing at a staggering pace across nations. It is essential to understand:(i) how this new data-driven intelligence reality brings each business across countries an entirely new world full of opportunities and risks; and (ii) what the expected consequences for each market (existing and emerging) would be?

The following figure 2 shows how a business model is developed? Many AI technologies and organizational culture is combined to develop a business model.It includes enablers and AI based business model innovation steps.Then preconditions for success are set and business is scaled. Many industry sectors such as media,manufacturing ,consumer products,financial services ,health care etc are using this model.

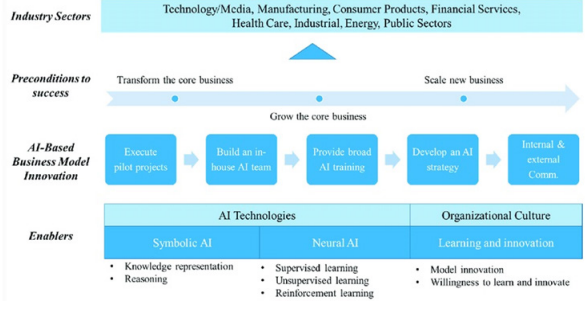

Fig 2 - Developing an Artificial intelligence (AI)-Based Business Model.

The Coming Data Challenges - Business across nations are facing extraordinary challenges and changes in the upcoming years. It is believed that automation driven will be the only constant in those changes. In AI- driven automation, growth means more intelligence from data from connected devices, social media, industrial data to revolutionize business models.

Business are trying to understand the implications of the evolving AI- driven ecosystem far beyond narrow artificial intelligence applications. The force and pace of AI- driven automation changes expected in the coming years will present each business challenges and opportunities for its profitability. It will be fascinating to witness how AI will change business power dynamics.

Business Model Transformation - As everything is getting connected, businesses now have the chance to collect more data, get the necessary insights, and innovate. As a result, we will probably see a much-needed evolution of the markets: faster marketplaces, leaner operations, vibrant businesses, growing profits, informed consumers, and dynamic businesses.

That brings us to a critical point: how are business models being transformed by AI? While businesses across industries and nations are at a different level of AI adoption, it seems that the current approach to AI strategy is overly narrow as businesses mainly focus on using AI for improving customer services, analyze data, predict performance to automate workloads, trading and more. The trend of AI application and adoption still does not respond adequately to rapidly evolving intelligence capabilities. Also, businesses often may foster an environment of mistrust and animosity towards each other within respective industries and nations. This is perhaps a reason that prevents a common approach to data collection and information access. Moreover, many countries lack the necessary digital data infrastructure. The lack of digital infrastructure, in turn, discourages data opportunities and innovations, making it challenging to address business data and information needs adequately-leaving businesses with outdated data, information, and intelligence.

While AI has the potential to transform businesses, business

models, and commerce across nations, concerns about geopolitics resulting in protectionist data practices and resistance to sharing data and information may thwart its potential. As a result, the possibility of creating and adopting large aggregate data pools and practices at local, national, and global levels remain unclear.

AI is not only changing how businesses work; it is also fundamentally transforming the traditional thinking and meaning of collaboration, competition, and innovation. While most AI initiatives create competitive advantage by perceiving an entirely new opportunity, enhancing current efforts, supplying a market segment that others have ignored, or creating new markets, connected devices that feed a constant stream of data about functionality, usage, production, needs and more to a central location will create even more fascinating competitive transformations. That brings us to an important point: As the IOT integration will allow for the development of environments where users and consumers can interact, how will it change business models further, as it will be possible to design experiences over products?

AI and RPA Together can Enhance the Business Growth -

Robotics process automation helps to cut off the operational errors and enhance productivity. The only drawback with RPA is that it does not have the ability to learn, think, and analyze. This situation necessitates the use of Artificial Intelligence into the process.

RPA and AI are two distinctive technologies, but often contributing towards the significant growth of a company by providing a competitive edge for the business in the market. RPA is an automated system which can reduce the human efforts by automating the data-entry operations without making any faults whereas AI works on speech and image recognition, decision making and prediction methods.

Section IV - Impact of AI on businesses -

AI is poised to impact not only content writing but also healthcare,manufacturing, shopping, entertainment and any area of our lives that you can imagine.AI can be either a supporting tool or a replacement tool for jobs, tasks and even entire industries.

Here are four specific AI trends that we expect to have a significant impact in 2019:

1. Image, object and facial recognition. A picture is worth 1,000 words, or more. As data from satellite imagery grows and acquisition prices fall?coupled with the need to identify images for a variety of purposes?so, too, will interest in image recognition, object detection and facial recognition. Image recognition and object detection are increasingly important for security and fraud prevention, as organizations rely on AI apps to find patterns and insights from still images and video. As AI technology evolves to analyze movement, new applications may arise in areas such as healthcare and law enforcement. For example, it could analyze the gait of people with neurological conditions, such as Parkinson's, and how a person's ability to walk may change. Also, when combined with sensor technology and cameras, AI can help identify what someone is doing on the other side of a wall, such as reaching for a weapon.

2. Static intelligence is no longer enough. For years, companies have focused on business intelligence for gathering key competitive information from past data and viewing it in dashboards and graphs. However, static information is no longer sufficient for making informed decisions. In today's competitive marketplace, companies require a view of not only yesterday and today's outcomes, but also what's expected to happen in the future so they can anticipate and plan for change. Instead of business intelligence, in 2019 the focus will be on business insights, where companies judge performance on outcome-driven analytics? measuring analytics according to outcomes, and predicting outcomes based on historical data. It will all be about the value that information can create for its users, rather than reports and dashboards.

3. "The edge" is the next AI frontier. With the growing use of sensors and other Internet-of-Things (IoT) devices, companies will be gathering information at the edge?meaning at or near the data source rather than in the cloud at a data center. They will focus attention on how to best collect, handle and clean data collected at the edge. Given that algorithms require heavy-duty computing power, the challenge will be how to crunch the data collected at the edge most expediently.

4. There still won't be enough data scientists. As demand for AI apps continues to grow, so too will the need for qualified

data scientists. AI projects require constant care and feeding from data scientists?it's never one-and-done. In addition to creating algorithms, data scientists need to train AI apps, and continually refine algorithms to reflect new data and insights. Since universities are not graduating enough data scientists to handle current needs, the shortage will only worsen as AI demand grows. Companies will have to rely on partners to either implement self-service AI for general solutions or custom predictive analytics algorithms for more complex problems.

There's no doubt that AI is changing companies and markets as diverse as healthcare, financial services and security. But, as far as we've come, we're just at the starting gate. As the technology becomes more advanced, new needs will emerge, and we'll continue to find ways to combine AI with other innovations, such as IoT. It's an exciting adventure, and the best is yet to come.

Here are the five areas we can implement now:

1. Automating Recruitment - Chances are you're already using AI in your business to automate boring and repetitive tasks, such as sending out email sequences to prospects or creating invoices.AI, however, can do more than that.One important subset of AI is Machine Learning-algorithms that analyze large amounts of data, identify patterns and predict outcomes.The cool thing about machine learning is that it goes further than automation, not just sending invoices when you tell it, for example, but predicting when the invoices should be sent, who's getting them and who's not, when payments are due, and more.Machine learning automation is now helping HR departments with employee recruitment, automating processes like screening resumes, tracking down applicants and scheduling interviews. AI will make hiring and recruitment more effective, saving a lot of time and using large amounts of data to match an applicant's experience, knowledge, and skills to the job's requirements.Furthermore, chatbots will interview the candidates as another part of the screening process, analyzing responses and even facial expressions to determine if the person is a good fit for the company.All this is good news for HR professionals, given that 52% of talent acquisition leaders say the hardest part of recruitment is identifying the right candidates from a large pool of applicants.

2. Personalizing marketing and sales - AI promises to

revolutionize marketing and sales and is in fact doing it right now. For instance, AI will qualify leads way faster and more effectively than humans, allowing sales reps to just close deals.

Think for example how much time a rep can spend updating and cleaning up the company's customer relationship management (CRM) system. AI can make the CRM a self-updating, auto-correcting system that simply works for you.Machine learning can analyze your prospects data and predict who will buy. Wouldn't that come handy? This is called Predictive Marketing.Not only that, but AI can also create a hyper-personalized email/chat messages for each prospect, create targeted content and cross-sell and up sell suggestions for each client. What's more, AI can do all that by itself, without much human intervention-you'd just have to set up a chatbot on your website. And of course, AI works for ad targeting, gathering and analyzing huge amounts of historical data to decide which ads work best on which people. Marketers can use AI to analyze behaviors and find unexpected connections between different variables, such as previous click patterns, location information, and frequency of app use to better target customers.

3. Simplifying customer support - Just like in sales, chatbots are taking over customer support. They answer queries quickly, are available 24/7 and only refer customers to a rep when necessary. There are two relevant stats here: Up to 80 percent of customer support interactions could be handled by a chatbot alone; and more than 40% of people prefer live chat over other contact methods because it prevents them from being placed on hold.

In fact, customers feel most satisfied during their buyer's journey when using a live chat feature (92%), compared to voice (88%), email (85%), and even social media messaging (Facebook 84%, Twitter 77%).

Customer support reps can actually partner with robots to simplify their work. An interesting case would be using AI to analyze customer call data, classify interactions based on positive or negative outcomes and then analyzing the patterns in each category to provide a script with the most effective phrases to use during support calls.

AI can also assist customer support through sentiment analysis (a.k.a. emotion AI)-classifying tickets as "frustrated", "neutral", "excited" and the like. With this info in hand, agents

can prioritize tasks and escalate queries more effectively.

4. Improving Security - With all the sci-fi movies predicting a dark future where AI robots enslave humanity, it's odd to think we should let AI take care of the security of our businesses.

The fact is, however, that most cybersecurity breaches are due to human error. So, AI can make our computers and networks safer, filtering out malware, spam and phishing emails even before a human opens them.

Machine learning that has analyzed our customer's behavior already can easily recognize who's a customer and who's not, thus preventing or reacting to cyberattacks in real time.

AI has many current and future applications for security besides defending against hackers, such as privacy protection and crime prevention. As security and personal data threats become more common (think about the Cambridge Analytics scandal, for example), your business will gain trust as you adopt AI into your cybersecurity.

5. Reducing operational costs - At this point it must be obvious that AI has the potential of saving time, eliminating mundane tasks from your to-do list and making your staff more efficient and productive. So, implementing AI automation in your business will free-up time for other tasks, reduce human error (which costs money), and even eliminate the need for some positions or at least the need to oversee certain tasks.

In manufacturing, AI solutions can make the production process more efficient and enable things like predictive and preventive maintenance and upgrades, which means lower downtime and less expenses.

What about the initial costs? Of course, there are implementation costs, but in the long term they're worth it. You just need to look at the available options. For example, when it comes to implementing a chatbot, you can either buy a ready solution or even try it out for free; use self-service platforms to craft a chatbot within a framework; or create a chatbot from scratch.Other AI applications have different cost structures, some involving hardware purchases rather than mere subscriptions to cloud-based software. As time goes by, however, AI will become more affordable, even for smaller companies.

AI keynote speaker Jeremy Gutsche says that the current

state of AI is such that robots are seen only as "cute" and helpful, but in the future they'll be able to do much more than even the most intelligent human — and that's when our reality will start to change dramatically.

In short, By deploying the right AI technology, your business may gain an ability to:

i) Save time and money by automating and optimizing routine processes and tasks
ii) Increase productivity and operational efficiencies
iii) Make faster business decisions based on outputs from cognitive technologies
iv) Avoid mistakes and 'human error', provided that AI systems are set up properly
v) Use insight to predict customer preferences and offer them better, personalized experience
vi) Mine vast amount of data to generate quality leads and grow your customer base
vii) Increase revenue by identifying and maximizing sales opportunities
viii) Grow expertise by enabling analysis and offering intelligent advice and support

Section V - Benefits of AI in business -

1. Automating Customer Interactions - Today, most customer interactions require human interaction, including email, social media conversations, telephone calls and online chat. However with AI, companies can automate many of these communications. By analyzing data from previous communications, computers can be programmed to accurately respond to customers and deal with their enquiries. Further, when AI is combined with machine learning, the platforms interact even more, becoming even better at communicating with the customer.

2. Improving Personalized Shopping Experiences - Companies are taking advantage of AI because it enables them to provide their customers with personalized marketing, which in turn increases engagement, helps to enhance customer loyalty and improve sales. Another advantage of AI is that it is able to identify patterns in customers' browsing habits and buying behavior, thus enabling companies to craft highly accurate offers to individuals customers.

3. Data Mining - Cloud-based AI apps are so advanced that they can quickly discover important information and relevant findings while processing big data. This gives businesses insights into previously undiscovered information, which gives them a major advantage in the marketplace.

4. Real-Time Assistance - Artificial Intelligence is fantastic for businesses that need to continually communicate with high volumes of customers during the course of each day. For instance, in the transport industry, train, bus and airline companies can use AI-powered apps to interact with customers in real-time, send personalized travel information and provide travellers with real-time updates about their transportation, such as where it is currently situated and its estimated time of arrival.

5. Predicting Outcomes - Finally, AI is great in the sense that it can predict outcomes based on data analysis. For instance, it detects patterns in customer data that show whether the products currently on sale are likely to sell, and the volume in which they will do so. It can also predict when demand for such products will decrease. This is fundamental information in helping a company purchase the right stock-and in the right amounts.

However this ability to predict is not just useful in the retail industry. Even in banking, AI is being used to predict currency and stock price fluctuations. Extraordinarily, it is being used in healthcare to predict outbreaks of infections by analyzing social media posts.

Section VI - Understanding AI business Potential -

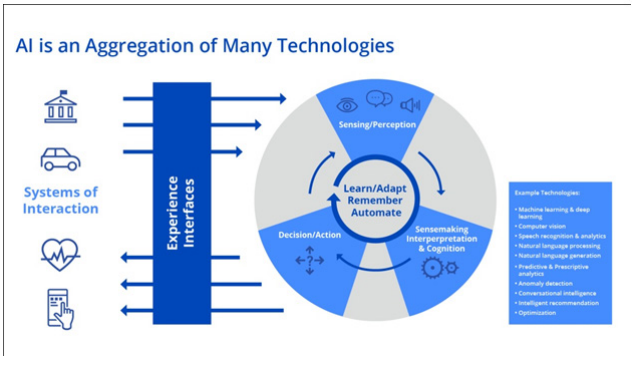

Fig.3 AI as an aggregation of many technologies

AI is an aggregation of many technologies. It is compatible to use with any technology in any business to ease our work.It is useful for companies to look at AI through the lens of business capabilities rather than technologies. Broadly speaking, AI can support three important business needs: automating business processes, gaining insight through data analysis, and engaging with customers and employees.Small and big businesses have already discovered its benefits and advantages.However,the potential of AI for industry leaders and different firms is not fully understood.In addition,AI itself is disruptive technology that offers more and more functions and applications every day.The expert predicts that in few years,AI will be used by 90% of business.

One of the rules that a successful company should follow is " innovate or die". It means it should find better ways to conduct the business than other competitors.AI offers new opportunities to companies i.e. better customer service, faster production and automation of many processes. That's why many businesses have already implemented AI to simplify their routine tasks. There are AI enabled tools that can quickly determine a product market fit by teaching machines to understand consumer segmentation. Instead of having to pour over endless amount of data manually, businesses can use AI to quickly gather and evaluate market analytics. Small and big businesses become more targeted in their advertising, both traditional and online.AI is able to pinpoint customers and give the business a better insight into targeting their customer base. The options for using AI might seems endless for business owners- gathering data analytics, finding and leasing corporate real estate, managing day to day communications, scheduling meeting and more.

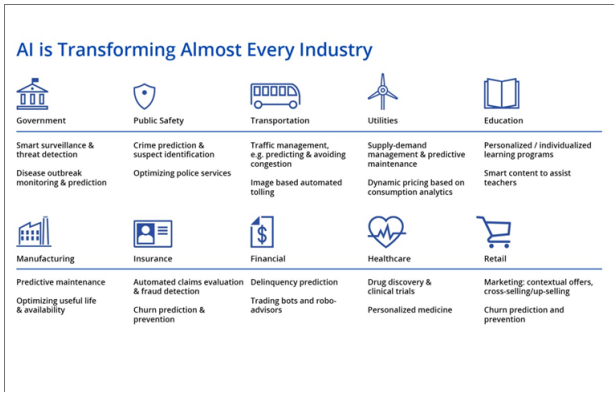

Fig.4 AI is transforming every industry

From the above figure 4,we come to know that every industry is being influenced by the intelligent, individualized and timely decision and process automation that is enabled by AI.

Section VII - Examples: Usecases -

These are some use cases in real world that are widely used in businesses nowadays.

Fig.5 Most common Use Cases of AI

1. Self driving vehicles

Solution and application target

- Traveling and logistics as a service
- Cars, trucks, buses, trains, boats, drones, etc.

MAIN DATA SOURCES

- Video
- Sensor data
- GPS

TECHNOLOGY AND METHODS

- Computer vision
- Deep learning
- Machine learning
- Reinforcement learning

BUSINESS VALUE GAINED

- Safer traffic
- Optimized traffic efficiency
- Saves time and money

1. Collect data from vehicles into a scalable storage and computing environment.
2. Train deep neural network models with preprocessed andcombined historical data to reach a predetermined Destination.
3. Deploy model to vehicles with specialized computing hardwareintegrated with sensors.
4. Vehicles travel to destination along best route and speed determinedby AI based on historical and real-time data.
5. Collecting data from the fleet of vehicles and teaching the AI continuously allows the AI to adapt to new Situations.

2. Information retrieval from images -

SOLUTION AND APPLICATION TARGET

- Browse through tens of thousands of scannedimages to automatically identify and storeinteresting text Strings.

MAIN DATA SOURCES

- Scanned images

TECHNOLOGY AND METHODS

- Deep learning, convolutionalneural networks
- Image processing techniques

BUSINESS VALUE GAINED

- Complete automation of large amounts ofmanual image inspection and data entry work

1. Set up a secure and efficient cloud computing environment toeffectively train deep neural networks
2. Train deep learning models to automatically identify interestinginformation from images
3. Finish the image processing pipeline by complementing the deeplearning models with ordinary image processing techniques.

4. Use the pipeline to automatically retrieve interesting informationfrom tens of thousands of images

3. Predicting supply chain -

SOLUTION AND APPLICATION TARGET

- Predict the item ratio of goods produced, sold-inand sold-through to end users

MAIN DATA SOURCES

- Sell-in data
- Possible transposed data
- Product registrations

TECHNOLOGY AND METHODS

- Machine learning
- BI tools

BUSINESS VALUE GAINED

- Predict the sales
- Understand the state of supply chain

1. Collect item data from different points of the supply chain.
2. Train models to predict the item's location in the supply chain.
3. Report the status in easy-to-understand form and notify stakeholdersabout actions needed on demand
4. Predict the sales and optimize the manufacturing processbased on items in the pipeline.

4. Automated accounting -

SOLUTION AND APPLICATION TARGET

- Automation of labour-intensive accounting tasks (e.g. manual inspection, invoice classification)

MAIN DATA SOURCES

- Accounting data (e.g. invoices,purchase orders)

TECHNOLOGY AND METHODS

- Basket analysis, association rules
- Deep learning also a possibility

BUSINESS VALUE GAINED

- Considerable decrease in manual work
- Frees time for higher-value work

1. Collect correctly classified invoices from the accounting system.
2. Enrich this data using e.g. a public business register

3. Train a machine learning model to correctly classify invoicesbased on available information.
4. Apply the model to automatically classify new invoices withoutmanual inspection.

5. Recommendation system -

SOLUTION AND APPLICATION TARGET

- Recommend next best action based onprevious interactions

MAIN DATA SOURCES

- User data (e.g. CRM)
- Interaction data (e.g. sales)
- Online data

TECHNOLOGY AND METHODS

- Machine learning
- Collaborative and content filtering
- Rule mining / basket analysis

BUSINESS VALUE GAINED

- Increased revenue via cross-selling
- Better customer engagement

1. Obtain a set of data, preferably vast, on e.g. customer purchasesand/or ratings for products.
2. Analyze the data in order to detect similarities/ associationsbetween products and/or customers (e.g. what movies are favouredby different users).
3. Using similarities/associations, build a recommendation algorithmor a model that provides one or more recommendation(s) based oninput data (e.g. if a user likes romance and comedy films, recommendmovies from those genres instead of horror films).
4. For a new customer, use the algorithm to recommend new productsbased on customer profile or other purchases.

6. Predictive maintenance -

SOLUTION AND APPLICATION TARGET

- Outage prevention by using artificial intelligenceto predict maintenance needs

MAIN DATA SOURCES

- Sensor data
- Consumption data

- Maintenance logs

TECHNOLOGY AND METHODS

- Signal processing
- Time series analysis
- Anomaly detection
- Change point detection

BUSINESS VALUE GAINED

- Decreased maintenance costs
- Higher availability

1. Obtain usage data from the device for training; if data before/during malfunctioningis available, training likely becomes easier. Such data might be e.g.device temperature measurements, enriched with the consumption data.
2. Process the measurement data into a more informative representation (aggregations,frequency domain transforms, time series models, etc.)
3. Train a model (or several models) to detect anomalies, changing trends, orOtherwisedifferent behavior in the data. Maintenance log data can be used for evaluation.
4. Fine-tune the model(s) according to the business needs: is it more important tohave a robust model with no false positive alerts, or to detect all possiblemalfunctioning, even if it would mean false alerts?
5. Apply the model for the data obtained from the device; if required, integratewith other systems that will produce alerts when the model suggests to.

Section VIII - Best Practices of AI in business -

1) BEGIN SMALL, DELIVER TO END USERS RIGHT FROM THE BEGINNING - Usually an agile, iterative project model fits well with the explorative and experimentalnature of applying science to business.

2) ITERATE FROM "PLAN A" TO A "PLAN THAT WORKS" - Prepare to rephrase and revalidate, to get the best model and accuracy forscaling to production.

3) COOPERATE - THINK OUTSIDE THE BOX WITH A MULTITALENTED TEAM - developing business worthy AI solutions requires a wide range of know-how from business domain, technology and analytics methods

Conclusion -

From the study of artificial intelligence scope in business model, we can conclude that using many AI techniques, humans can make their task easier in daily life by process automation etc. If AI is seen to contribute to business success via enabling a better understanding of customers, along with a more rapid response to their needs, then its uptake within the world of work is likely to continue. In the future, many tasks will have the opportunity of input from AI. However, rather than replacing humans, it is the combination of AI and humans that is likely to bring the greatest benefits to the working world. Therefore, we might conclude that it will be how AI 'interacts' with humans that will influence its role in the future world of work. If human values are carefully articulated and embedded into AI systems then socially unacceptable outcomes might be prevented and we should have a bright future with AI.

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Chapter 5
Machine Learning

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Introduction -

Machine learning algorithms aim to optimize the performance of a certain task by using examples and/or past experience.[1]

The value of machine learning technology has been recognized by companies across several industries that deal with huge volumes of data. By leveraging insights obtained from this data, companies are able to work in an efficient manner to control costs as well as get an edge over their competitors.[2] This is some domains are implementing machine learning -

- Financial Services
- Marketing and Sales
- Government
- Healthcare
- Transportation
- Oil and Gas

1.1 Machine Learning Techniques -

Definition -

Machine Learning is a field of Computer Science, where new developments evolve at recent times, and also helps in automating the evaluation and processing done by mankind, thus reducing the burden on the manual human power. According to techtarget, Machine learning is a type of artificial intelligence (AI) that provides computers with the ability to learn without being explicitly programmed.[5]

Principle of Machine Learning Algorithm -

Machine learning algorithms are described as learning a target function (f) that best maps input variables (X) to an output variable (Y).

$Y = f(X)$

This is a general learning task where predictions will be done for the future (Y) by giving new examples of input variables (X). We don't know what the function (f) looks like or its form. The most common type of machine learning is to learn the mapping Y = f(X) to make predictions of Y for new X. This is called predictive modeling or predictive analytics and goal is to make the most accurate predictions possible.

Parametric and Nonparametric Algorithms -

Parametric Algorithms - Algorithms that simplify the function to a known form are called parametric machine learning algorithms.

The algorithms involve two steps -

- Select a form for the function.
- Learn the coefficients for the function from the training data.

Some examples of parametric machine learning algorithms are: Linear Regression and Logistic Regression.

Non parametric Algorithm - Algorithms that do not make strong assumptions about the form of the mapping function are called nonparametric machine learning algorithms. By not making assumptions, they are free to learn any functional form from the training data.

Non-parametric methods are often more flexible, achieve better accuracy but require a lot more data and training time.

Examples of nonparametric algorithms include: Support Vector Machines, Neural Networks and Decision Trees.

1.1.2 Types of Machine learning -

Supervised and unsupervised learning are two of the most widely accepted machine learning methods by businesses today, there are various other machine learning techniques. Following are some of the most accepted Machine Learning methods[2]

1. Supervised Learning - A learning algorithm will receive a set of input instructions along with the corresponding accurate outcomes. The learning algorithm will then compare the actual outcome with the accurate outcome and flag an error, if there is any discrepancy. Using different methods, such as regression, classification, gradient boosting, and prediction, supervised learning uses different patterns to proactively predict the values of a label on extra unlabeled data. This method is commonly used in areas

where historical data is used to predict events that are likely to occur in the future.

For instance, anticipate when a credit card transaction is likely to be fraudulent or predict which insurance customers are likely to file their claims.

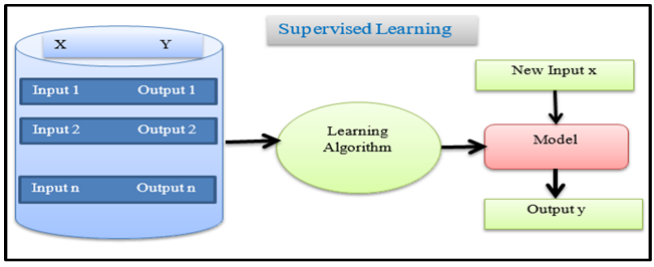


Figure 1 - Supervised Learning

2. Unsupervised Learning - This method of ML finds its application in areas where data has no historical labels. Here, the system will not be provided with the "right answer" and the algorithm should identify what is being shown. The main aim here is to analyze the data and identify a pattern and structure within the available data set. Transactional data serves as a good source of data set for unsupervised learning.

For instance, this type of learning identifies customer segments with similar attributes and then lets the business treat them similarly in marketing campaigns. Similarly, it can also identify attributes that differentiate customer segments from one another. Either ways, it is about identifying a similar structure in the available data set. Besides, these algorithms can also identify outliers in the available data sets.

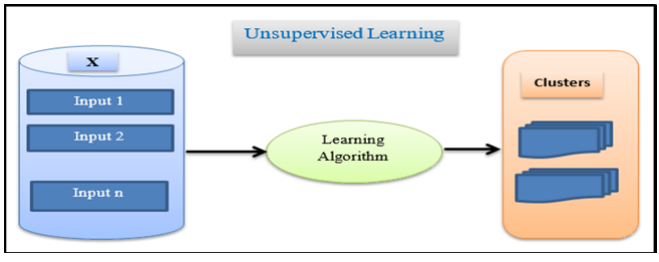


Figure 4 - Unsupervised Learning

3. Semi-supervised Learning - This kind of learning is used and applied to the same kind of scenarios where supervised

learning is applicable. However, one must note that this technique uses both unlabeled and labeled data for training. Ideally, a small set of labeled data, along with a large volume of unlabeled data is used, as it takes less time, money and efforts to acquire unlabeled data. This type of machine learning is often used with methods, such as regression, classification and prediction. Companies that usually find it challenging to meet the high costs associated with the labeled training process opt for semi-supervised learning.

4. Reinforcement Learning - This is mainly used in navigation, robotics and gaming. Actions that yield the best rewards are identified by algorithms that use trial and error methods. There are three major components in reinforcement learning, namely, the agent, the actions and the environment. The agent in this case is the decision maker, the actions are what an agent does, and the environment is anything that an agent interacts with. The main aim in this kind of learning is to select the actions that maximize the reward, within a specified time. By following a good policy, the agent can achieve the goal faster.

Hence, the primary idea of reinforcement learning is to identify the best policy or the method that helps businesses in achieving the goals faster. While humans can create a few good models in a week, machine learning is capable of developing thousands of such models in a week.

1.2 Stages of Development of system -

1.2.1 Data preprocessing - In any Machine Learning process, Data Preprocessing is that step in which the data gets transformed, or Encoded, to bring it to such a state that now the machine can easily parse it. In other words, the features of the data can now be easily interpreted by the algorithm.[6]

Steps involved in data preprocessing[7]:

1. Data Cleaning - The data can have many irrelevant and missing parts. To handle this part, data cleaning is done. It involves handling missing data, noisy data etc.

a. Missing Data - This situation arises when some data is missing in the data. It can be handled in various ways. Some of them are:

1. **Ignore the tuples -** This approach is suitable only when the dataset we have is quite large and multiple values are missing within a tuple.

2. **Fill the Missing values -** There are various ways to do this task. You can choose to fill the missing values manually, by attribute mean or the most probable value.

b. Noisy Data - Noisy data is a meaningless data that can't be interpreted by machines. It can be generated due to faulty data collection, data entry errors etc. It can be handled in following ways :

1. **Binning Method -** This method works on sorted data in order to smooth it. The whole data is divided into segments of equal size and then various methods are performed to complete the task. Each segment is handled separately. One can replace all data in a segment by its mean or boundary values can be used to complete the task.
2. **Regression -** Here data can be made smooth by fitting it to a regression function. The regression used may be linear (having one independent variable) or multiple (having multiple independent variables).
3. **Clustering -** This approach groups the similar data in a cluster. The outliers may be undetected or it will fall outside the clusters.

2. Data Transformation - This step is taken in order to transform the data in appropriate forms suitable for the mining process. This involves following ways:

1. **Normalization -** It is done in order to scale the data values in a specified range (-1.0 to 1.0 or 0.0 to 1.0)
2. **Attribute Selection -** In this strategy, new attributes are constructed from the given set of attributes to help the mining process.
3. **Discretization -** This is done to replace the raw values of numeric attributes by interval levels or conceptual levels.

1.2.2 Feature Extraction - Feature extraction is a process of dimensionality reduction by which an initial set of raw data is reduced to more manageable groups for processing. A characteristic of these large data sets is a large number of variables that require a lot of computing resources to process. Feature extraction is the name for methods that select and /or combine variables into features, effectively reducing the amount of data that must be

processed, while still accurately and completely describing the original data set.

The process of feature extraction is useful when you need to reduce the number of resources needed for processing without losing important or relevant information. Feature extraction can also reduce the amount of redundant data for a given analysis. Also, the reduction of the data and the machine's efforts in building variable combinations (features) facilitate the speed of learning and generalization steps in the machine learning process.[8]

1.2.3 Classification -

What is classification?

Example -

1) A bank loans officer needs analysis of her data in order to learn which loan applicants are "Safe" and which are "risky" for the bank.
2) A marketing manager at All Electronics needs data analysis to help guess whether a customer with a given profile will buy a new computer.
3) A medical researcher wants to analyze breast cancer data in order to predict which one of three specific treatments a patient should receive.[15]

In each of these examples, the data analysis task is classification, where a model or classifier is constructed to predict categorical labels, such as "safe" or "risky" for the loan application data; "yes" or "no" for the marketing data; or "treatment A," "treatment B," or "treatment C" for the medical data.

These categories can be represented by discrete values, where the ordering among values has no meaning. For example, the values 1, 2, and 3 may be used to represent treatments A, B,and C, where there is no ordering implied among this group of treatment.

Applications of classification techniques - Image and pattern recognition medical diagnosis, loan approval, detecting faults in industry applications and classifying financial market trends.

Some classifications techniques are as follows -

1) Random Forest (RF) - Random forest is a supervised learning algorithm which is used for both classification as well as regression. But however, it is mainly used for classification problems. As we know that a forest is made up of trees and more trees means more robust forest. Similarly, random forest algorithm

creates decision trees on data samples and then gets the prediction from each of them and finally selects the best solution by means of voting. It is an ensemble method which is better than a single decision tree because it reduces the over-fitting by averaging the result.[14]

We can understand the working of Random Forest algorithm with the help of following steps -

- **Step 1 -** First, start with the selection of random samples from a given dataset.
- **Step 2 -** Next, this algorithm will construct a decision tree for every sample. Then it will get the prediction result from every decision tree.
- **Step 3 -** In this step, voting will be performed for every predicted result.
- **Step 4 -** At last, select the most voted prediction result as the final prediction result. Pros

The following are the advantages of Random Forest algorithm -

- It overcomes the problem of overfitting by averaging or combining the results of different decision trees.
- Random forests work well for a large range of data items than a single decision tree does.
- Random forest has less variance then single decision tree.
- Random forests are very flexible and possess very high accuracy.
- Scaling of data does not require in random forest algorithm. It maintains good accuracy even after providing data without scaling.
- Random Forest algorithms maintains good accuracy even a large proportion of the data is missing.

Cons - The following are the disadvantages of Random Forest algorithm -

- Complexity is the main disadvantage of Random forest algorithms.
- Construction of Random forests are much harder and time-consuming than decision trees.
- More computational resources are required to implement Random Forest algorithm.

- It is less intuitive in case when we have a large collection of decision trees.
- The prediction process using random forests is very time-consuming in comparison with other algorithm.[14]

2) Support Vector Machine (SVM) - SVM constructs a hyper plane or set of hyper planes in a high- or infinite dimensional space, which can be used for classification, regression, or other tasks. Intuitively, a good separation is achieved by the hyper plane that has the 3 largest distance to the nearest training-data point of any class, since in general the larger the margin the lower the generalization error of the classifier. The computational load should be sensible, the mappings are used by the SVM scheme to ensure the dot products will be computed in terms of the variable in the original scope, for that a kernel function k(x,y) selected to get the optimal computational time. The higher-dimensional space in the hyper planes is distinct as the set of points whose dot product with a vector in that space is constant. These vectors in the hyper planes defining the hyper planes can be chosen to be linear combinations with parameters of images of feature vectors that occur in the database.

With this choice of a hyper plane, the points in the feature space that are mapped into the hyperplane are defined by the relation. The equation of the output from a linear SVM is

$u = w . x – b$

Where w is the normal vector of the hyper plane, and x is the input vector.[5]

SVM is a machine learning (Supervised learning) technique. Which is nonlinear in nature, and it is used for classification as well as regression problems. There are other nonlinear techniques like artificial neural networks, CART etc. Linear classification is somehow easy to implement as compared to nonlinear classification. Because in linear technique we can find decision boundaries and support vectors easily. Whereas in nonlinear technique it is hard to find the straight line of the decision boundary and support vectors. So to handle this issue we use the hyper plane.[10]

3) Linear Regression Algorithm - Linear regression is one of the most well-known and well-understood algorithms in statistics and machine learning.

Predictive modeling is primarily concerned with minimiz-

ing the error of a model or making the most accurate predictions possible.

The representation of linear regression is an equation that describes a line that best fits the relationship between the input variables (x) and the output variables (y), by finding specific weightings for the input variables called coefficients (B).

For example:

y = B0 + B1 * x

We will predict y given the input x and the goal of the linear regression learning algorithm is to find the values for the coefficients B0 and B1.

4) Neural Network - Defination1: A neural network is a directed graph F=(V,A) with vertices V=(1,2,…n) and arcs A={ (i ,j) | i<=1 j<=n } with the following restrictions:

V is partitioned into a set of input nodes V1, hidden nodes VH, and output nodes V0.

The vertices are also partitioned into layer {1…k} with all input nodes in layer 1 and output nodes in layer k. All hidden nodes are in layers 2 to k-1 which are called hidden layers.

Any arc (i, j) must have node i in layer h-1 and node j in layer h.

Arc (i, j) is labeled with a function fi.

Node i is labeled with a function fi.[15]

Definition: 2

A neural network model is a computational model consisting of three parts:

Neural network graph that defines the data structure of the neural network.

Learning algorithm that indicates how learning takes place.

Recall techniques that determine how information is obtained from the network.

Applications of NN -

Artificial NNs can be classified based on the type of connectivity and learning.

The basic types of connectivity are feed forward where connections are only to layers later in the structure.

While NN may be feedback where some links are back to earlier layers.

Learning can be either supervised or unsupervised.

Activation functions - The output of each node I in the NN is based on the definition of a function fi activation function, associated with it. An activation function is sometimes called a processing element function. The function is applied to the set of inputs coming in on the input arcs.

There have been many proposals for activation functions, including threshold, sigmoid, symmetric sigmoid and Gaussian.

An activation function may also be called a firing rule relating it back to the to the working of the human brain.

NN have been used in pattern recognition, speech recognition and synthesis, medical applications, fault detections problem diagnosis, robot control and computer vision.

In business NNs have been used to "advise" booking of airlines seats to increase portability.[15]

5) Decision Tree Induction - It is most widely used techniques for classification. Its accuracy is very efficient as compared to other competitive techniques. The learned classification model is represented as a tree, called a decision tree.

The value of x/y is, in fact, the confidence (conf) value used in association rule mining, and x is the support count. This suggests that a decision tree can be converted to a set of if-then rules.

The objective of association rule mining is to find all rules subject to some minimum support and minimum confidence constraints.

Definition - A decision tree is a tree where the root and each internal node is labeled with a question. The arcs emanating from each node represent each possible answer to the associated question. Each leaf node represents a prediction of a situation to the problem under consideration.

Definition - A decision tree model is a computational model consisting of three parts.

A decision tree as defined in above definition

An algorithm to create the tree.

An algorithm that applies the tree to data and solves the problem under consideration.[15]

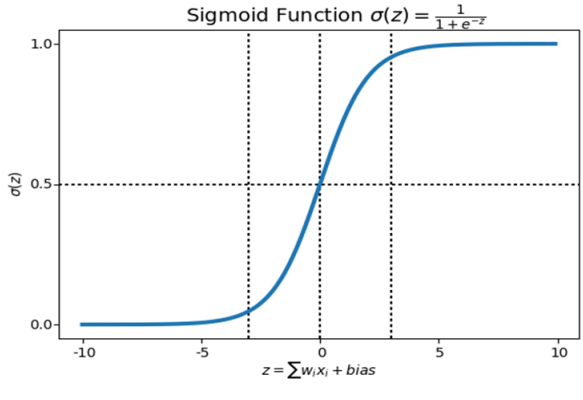
6) Logistic Regression - Methods involving regression are essential to any data analysis models which attempt to describe the association between a response variable and any number of predictor variables. Situations involving discrete variables con-

stantly arise. Logistic regression analysis extends the techniques of multiple regression analysis to investigate and inquire situations in which the outcome is categorical, which is, taking on multiple values.[11] This is a very basic branch of data science. Although the name suggests a regression technique, logistic regression is a statistical classification model which deals with categorical dependent variables. To make an optimal decision, we need to assess the utility function, which implies that we need to account for the uncertainty in the outcome, i.e. a probability. Logistic regression is emphatically not a classification algorithm on its own. It is only a classification algorithm in combination with a decision rule that makes dichotomous the predicted probabilities of the outcome.[11]

Logistic Regression is a Machine Learning algorithm which is used for classification problems, it is a predictive analysis algorithm and based on the concept of probability. We can call a Logistic Regression a Linear Regression model but the Logistic Regression uses a more complex cost function, this cost function can be defined as the 'Sigmoid function' or also known as the 'logistic function'[12]

What is the Sigmoid Function?

In order to map predicted values to probabilities, we use the sigmoid function. The function maps any real value into another value between 0 and 1. In machine learning, we use sigmoid to map predictions to probabilities.[12]



7) Genetic algorithm - Genetic algorithms are examples of evolutionary computing methods and are optimization type algorithms. Given a population of potential problem solutions

evolutionary computing expends this population with new and potentially better solution.[15]

Definition 1 - Given an alphabet A, an individual or chromosome is a sting I=I1, I2, .In. each character in the string Ij is called a gene. The values that each character can have are called alleles. A population P is a set of individuals.

Definition 2 - A genetic algorithm is a computational, Model consisting of five parts:

Starting set of individuals, P.

Crossover technique.

Mutation algorithm.

Fitness function.

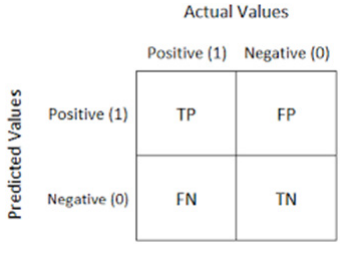
Algorithm that applies the crossover and mutation techniques to P interactively using the fitness function to determine the best individuals in P to keep. The algorithm replaces a predefined number of individuals from the population with each iteration and terminates when some threshold is met.

Genetic algorithms have been used to solve most data mining problems including classification, clustering and generating association rules.

Applications - It includes scheduling, robotics economics, biology, and pattern recognition.[15]

1.2.4 Performance and evaluation:

1. Confusion Matrix - Confusion Matrix gives us a matrix as output and describes the complete performance of the model.[13]



2. Accuracy - Accuracy in classification problems is the number of correct predictions made by the model over all kinds of predictions made.

$$\text{Accuracy} = \frac{TP + TN}{TP + FP + FN + TN}$$

3. Precision - Precision quantifies the number of positive class predictions that actually belong to the positive class.

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

4. Recall - Recall quantifies the number of positive class predictions made out of all positive examples in the dataset.

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

5. F1-Score - F-Measure provides a single score that balances both the concerns of precision and recall in one number.

$$\text{F1-Score} = \frac{2 * Precision * Recall}{Precision + Recall}$$

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Chapter 6
Machine Learning Applications in Business

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Abstract -

Machine learning (ML) extracts meaningful insights from raw data to quickly solve complex, data-rich business problems. Machine learning in business helps in enhancing business scalability and improving business operations for companies across the globe. Artificial intelligence tools and numerous ML algorithms have gained tremendous popularity in the business analytics community. ML algorithms learn from the data iteratively and allow computers to find different types of hidden insights without being explicitly programmed to do so. ML is evolving at such a rapid rate and is mainly being driven by new computing technologies.

In this chapter explains what is business? What are the needs of business? And How ML is useful in business? In this chapter explains the features of ML. Therefore, organizations can now benefit by understanding how businesses can use machine learning and implement the same in their own processes.

Keywords: Machine Learning (ML), Business, Business Needs, Use of ML in business.

7.1 Introduction -

Machine learning, by its definition, is a field of computer science that evolved from studying pattern recognition and computational learning theory in artificial intelligence. It is the learning and building of algorithms that can learn from and make predictions on data sets. These procedures operate by construction of a model from example inputs in order to make data-driven predictions or choices.

Machine learning involves two types of tasks:

- **Supervised machine learning -** The program is "trained" on a pre-defined set of "training examples",

which then facilitate its ability to reach an accurate conclusion when given new data.

- **Unsupervised machine learning -** The program is given a bunch of data and must find patterns and relationships therein.

A business is defined as an organization or enterprising entity engaged in commercial, industrial, or professional activities. Businesses can be for-profit entities or non-profit organizations that operate to fulfill a charitable mission or further a social cause.

7.2 Business Needs - Business needs are the gap between the current state of a business and its objectives. Needs are the basic drivers of change in an organization that are identified as requirements and implemented by hiring people, implementing projects, transforming operations and purchasing goods. The following are the common types of business needs.

Fig. 7.1 Types of Business Needs

- **Talent -** Individuals with the ability to achieve the objectives of a firm. For instance a design director who can develop products that sales well.
- **Infrastructure -** Foundational services such as network and computing.
- **Facilities -** Facilities such as offices, factories, warehouses, data centers, retail locations and product showrooms.
- **Processes -** Business Processes such as order fulfillment.
- **Standard & Practices -** A consistent way of doing things as defined by principles, policies, procedures

and standards.

- **Systems -** Software that automates works.
- **Applications -** Software that people use as a tool to improve productivity.
- **Knowledge -** Known-how and different kinds of information, for example, situational awareness.
- **Data -** Data that is intended to be utilized by machine. For instance, a billing database that is used to generate customer invoices each month.
- **Machines -** Physical machine that perform work.
- **Tools -** Physical tools that individuals use to perform work such as a mobile device or sledge.
- **Capabilities -** Business capabilities such as the ability to recruit talent and issue checks.
- **Structures -** Organizational structures such as departments and teams with their own objectives and capabilities.
- **Relationships -** Relationships with stakeholders such as investors, partners, customers, employees, regulators and communities.
- **Organizational Culture -** The standards, propensities and estimations of a firm. For instance business may need to change its way of life to be progressively inventive and tolerating of progress.
- **Intellectual Property -** Important information that is claimed by a firm including competitive innovations and licenses.
- **Product and Services -** The worth that a firm ideas to clients.
- **Customer Experience -** The experience that a firm ideas to clients. For instance a business that requirements to improve the cordiality and tirelessness of its call community benefits so as to address poor customer loyalty.

7.3 The Ways in Which Machine Learning Can Help Our Business - Machine learning (ML) extracts meaningful insights from raw data to quickly solve complex, data-rich business problems. ML algorithms learn from the data iteratively and allow computers to find different types of hidden insights without being explicitly programmed to do so. ML is evolving at such a rapid

rate and is mainly being driven by new computing technologies.

Machine learning in business helps in enhancing business scalability and improving business operations for companies across the globe. Artificial intelligence tools and numerous ML algorithms have gained tremendous popularity in the business analytics community. Factors such as growing volumes, easy availability of data, cheaper and faster computational processing, and affordable data storage have led to a massive machine learning boom. Therefore, organizations can now benefit by understanding how businesses can use machine learning and implement the same in their own processes.

7.3.1 Use of ML in Plastic Business - In the past decade, it was seen that the organizations that effectively utilize big data grew 50% faster as compared to non-users. This has prompted a pattern of expanded utilization of big data in the manufacturing sector as well.Converting big data into meaningful insights has become possible because of growing artificial intelligence (AI) capabilities, in particular, Machine Learning (ML).

ML is a specialized branch of AI in which the machines learn from its environment or the data sets given. Machine learning algorithms are employed in tasks where designing static instructions is difficult or even infeasible, such as finding patterns and anomalies, making predictions from large complex data sets.

In most recent couple of years, big tech giants, for example, Google, Amazon, and Face book have built up their own ML stages. In any case, the ML is that its application isn't constrained to the tech industry.ML applications can benefit manufacturing, specifically, plastic industry, also.

The requirement for injection molded plastic is expanding because of its utilization in a wide assortment of ventures, for example, automobile, manufacturing, electronics & consumer goods, building & construction, and healthcare. As the plastic business extends, the need to use accessible assets in an ideal manner is expanding. This results in the growing need of incorporating ML in plastic industry.

The plastic injection molding process has various factors, for example, pressure, injection speed, barrel temperature, and so on that direct the final quality of the product. So as to have a high-quality product, it is critical to keep the entire arrangement

of factors at an ideal level. In any case, absence of reliable connections between the procedure parameters makes streamlining through conventional mathematical modeling an extremely challenging problem. Along these lines, the traditional approach is to utilize physically preconfigured segregation parameters dependent on inflexible edge levels. An innovative approach that is part of the Industry 4.0 transformation exploits machine-learning algorithms and provides a new regulation tool that allows optimizing the whole set of parameters in real-time.

Unlike conventional parameter adjusting based on operator's experience, machine learning doesn't rely on domain expertise. The main source of knowledge about process properties is the authentic information, recorded by sensors from the particular molding equipment. Machine learning needs sets of intermediate readings from sensors along the process together with parameters of the final product. After processing thousands of such sets machine learning learns complex dependencies between intermediate parameters and quality of the product. In other words, the system builds required prediction mathematical model by itself. This is called training of machine learning model.

After the machine learning model is trained, it can process live data from the sensors and predict the final quality of the plastic part. The precision of this expectation relies upon various factors, such as quality and volumes of training data, level data preparation and cleansing, chosen machine learning algorithms, the experience of data scientists and so on.

This new type of understanding can be used in two different ways: the first, if a machine-learning model predicts poor final quality, a manufacturer can stop further processing a particular batch at an early stage and save energy, material and time accordingly. The second, machine learning model provides an operator with extra exact knowledge into the procedure, which permits further optimization of the molding process parameters.

In order to implement machine learning solutions, an organization needs to establish a full data science project that includes a number of essential steps, starting from exploring opportunities and ending with building maintenance routine for the deployed machine-learning model.

Data acquisition and cleansing is one of the most important

and also time-consuming phases of data science project. Many independent parameters can be included into a dataset for plastic injection molding process model training. Here are the most important of them: Cycle time, Material blend, Injection time, Barrel temperature, Injection velocity, Pressure, Screw speed, Coolant temperature.

A general rule for initial data acquisition indicates that the more diverse data you have in hands, the more accurate model you can build. The manufacturer needs to keep a history of raw data from sensors and telemetry from tens of thousands of pressure cycles and within single injection cycle signals from sensors needs to be recorded with sufficient sampling rate.

Most of the time, data acquired from real-world equipment isn't usable with no guarantees. For example a broken sensor returns a constant value of 1500C temperature or doesn't return anything for some time until it gets replaced. The task for a data scientist is to resolve issues such as missing values, incorrect values, constants, noise, and duplicates prior to building machine learning model.

Next, the mathematical model of the molding process is being built. To the date, there is a quite extensive list of algorithms for building a machine-learning model: logistic regression, decision tree, support vector machines, artificial neural networks. Data researcher chooses the most appropriate one for each particular case or uses even a combination of several algorithms. After the model is build and tested software engineers deploy it on a runtime platform. There are a number of ways of quick integration of machine learning system into existing processes without developing the complex application.

Another implementation of machine learning technology, which has gained a significant attention of the entire manufacturing industry, is predictive maintenance systems. Downtime reduction – this is an outcome of predictive abilities of ML algorithms. Many manufacturing units run 24 hours for 365 days of the year. When the equipment breaks down, the resulting downtime leads to decreased production and a waste of raw materials. This can be prevented by conducting predictive maintenance, which raises an early warning for critical failures to avoid downtime.Data, required for building predictive maintenance system, can be divided into

two main groups: first, parameters of machine health status that reflect degradation and second, failure history that allow machine mark a number of patterns as alarming.

Plastic industry is adopting ML. Business leaders in the plastic industry have realized that ML offers a real opportunity to reduce the costs and also improve the overall quality of their production.

7.3.2 Business Benefits of ML - ML helps in extracting meaningful information from a huge set of raw data. If implemented in the right manner, ML can serve as a solution to a variety of business complexities problems, and predict complex customer behaviors. Some of the key ways in which ML can help your business are listed here -

1. Customer Lifetime Value Prediction - Customer lifetime value prediction and customer segmentation are some of the major challenges faced by the marketers today. Companies have access to huge amount of data, which can be effectively used to derive meaningful business insights. ML and data mining can help businesses predict customer behaviors, purchasing patterns, and help in sending best possible offers to individual customers, based on their browsing and purchase histories.

2. Predictive Maintenance - Manufacturing firms regularly follow preventive and corrective maintenance practices, which are often expensive and inefficient. However, with the advent of ML, companies in this sector can make use of ML to discover meaningful insights and patterns hidden in their factory data. This is known as predictive maintenance and it helps in reducing the risks associated with unexpected failures and eliminates unnecessary expenses. ML architecture can be built using historical data, workflow visualization tool, flexible analysis environment, and the feedback loop.

3. Eliminates Manual Data Entry - Duplicate and inaccurate data are some of the biggest problems faced by the businesses today. Predictive modeling algorithms and ML can significantly avoid any errors caused by manual data entry. ML programs make these processes better by using the discovered data. Therefore, the employees can utilize the same time for carrying out tasks that add value to the business.

4. Detecting Spam - Machine learning in detecting spam

has been in use for quite some time. Previously, email service providers made use of pre-existing, rule-based techniques to filter out spam. However, spam filters are now creating new rules by using neural networks detect spam and phishing messages.

5. Product Recommendations - Unsupervised learning helps in developing product-based recommendation systems. Most of the e-commerce websites today are making use of machine learning for making product recommendations. Here, the ML algorithms use customer's purchase history and match it with the large product inventory to identify hidden patterns and group similar products together. These products are then suggested to customers, thereby motivating product purchase.

6. Financial Analysis - With large volumes of quantitative and accurate historical data, ML can now be used in financial analysis. ML is already being used in finance for portfolio management, algorithmic trading, loan underwriting, and fraud detection. However, future applications of ML in finance will include Chat bots and other conversational interfaces for security, customer service, and sentiment analysis.

7. Image Recognition - Image Recognition also, known as computer vision, it has the capability to produce numeric and symbolic information from images and other high-dimensional data. It involves data mining, ML, pattern recognition, and database knowledge discovery. ML in image recognition is an important aspect and is used by companies in different industries including healthcare, automobiles, etc.

8. Medical Diagnosis - ML in medical diagnosis has helped several healthcare organizations to improve the patient's health and reduce healthcare costs, using superior diagnostic tools and effective treatment plans. It is now used in healthcare to make almost perfect diagnosis, predict readmissions, recommend medicines, and identify high-risk patients. These predictions and insights are drawn using patient records and data sets along with the symptoms exhibited by the patient.

9. Improving Cyber Security - ML can be used to increase the security of an organization as cyber security is one of the major problems solved by machine learning. Here, ML allows new-generation providers to build newer technologies, to track data and apply pattern recognition to identify anomalies. This can

help risk management detect fraudulent transactions in real-time so they can be prevented. This type of "algorithmic security" can also be applied for detecting fraud, leveraging AI to quickly and accurately pinpoint threats so they can be addressed before they are able to do damage.

10. Increasing Customer Satisfaction - ML can help in improving customer loyalty and also ensure superior customer experience. This is achieved by using the previous call records for analyzing the customer behavior and based on that the client requirement will be correctly assigned to the most suitable customer service executive. This drastically reduces the cost and the amount of time invested in managing customer relationship. For this reason, major organizations use predictive algorithms to provide their customers with suggestions of products they enjoy.

7.4 Conclusion -

To use of Machine Learning (ML) can serve as a solution to a variety of business complexities problems, and predict complex customer behaviors and many other things. This chapter introduced the ML & business, needs of business and some of the key ways in which ML can help your business are discussed. The case study of plastic industry is also discussed which gives the full idea how ML can help in any business. To grow our business we have to use proper ML techniques.Business leaders have to realize that ML offers a real opportunity to reduce the costs and also improve the overall quality of their production and business.

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Chapter 7
Data Science and Business Analytics

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Data science is a science of data to extract knowledge from data. This includes the collection, preservation, preparation, analysis and management of large amount of information. Business Analytics is the statistical study of different business data. It is a process that includes the statistical techniques which involve measures of central tendency, graphs etc. It also includes managing information system software like data mining and sorting routines. With data science different latest data technology are used to solve different business problems.

Data science is an integrative field that uses different algorithms and processes to extract insights from the large amount of data. There are different tools and software like MATLAB, BigML, Excel, Tableau, Jupyter etc. are used in data science to handle the large amount of business data i.e it analyses data for actionable insights. Means Data science can be used in commercial and non-commercial sites. Commonly used languages in data science like R, Python, SQL etc.

Data scientists are used Big data Analysis and Block Chain Management techniques to manage their business data. This book chapter includes the

1) Reviews of Data Science
2) Evolution of Data Science
3) Explanation of Business Analytics.
4) How Data Science is used in Business Analytics
5) Different platforms are used for Analysis of data
6) Different technologies are used to analyze the large amount of data
7) Big Data in Business in Hadoop (to sort the massive amount of data)

8) Blockchain Management to authenticate and track data at every point on a chain. Blockchain records and validates data
9) Applications of Data Science in business Analytics.
10) Case Studies in Data Science

Furthermore book chapter will summarize all contents.

Data Science - As the business is in new era has large amount of data i.e. big data, it required to analyse, store and manipulates the data. It was a main challenge in today's business to sort out the big data according to uses requirements. In todays world, Hadoop like different frameworks are used to solve the problem of storage of big data but for secure processing of data the Data Science in involved.

Data science is an interdisciplinary field focused on extracting knowledge from data sets, which are typically large. The field encompasses analysis, preparing data for analysis, and presenting findings to inform high-level decisions in an organization.[3] It includes different functions from computer science, mathematics, statistics, information visualization, graphic design, and business.[3] These common disciplines of data science is shown diagrammatically in fig. 1. Data Science is a blend of various tools, algorithms, and machine learning principles with the goal to discover hidden patterns from the raw data.[4]

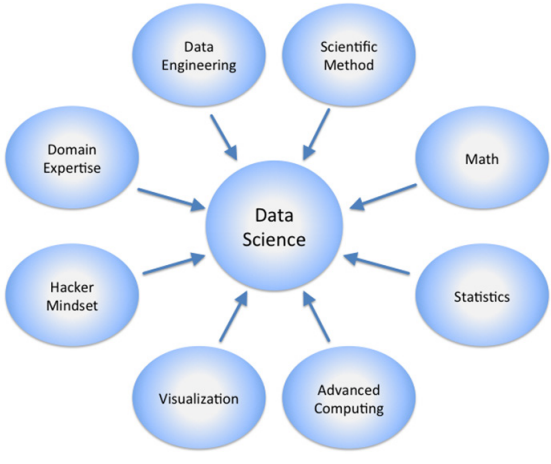


Fig. 1 Common Disciplines under Data Science

The three main sections are there in data science are arranging, bundling and conveying information.[2] In arranging, It is untouched data that scientists cannot analyze straight away. This data can come from surveys, or through the more popular automatic data collection paradigm, like cookies on a website. Arranging data by category or labelling data points to the correct data type. For example, numerical, or categorical.[5]

The second section Bundling of data is follows arranging data. Bundling data includes consistently controlling and joining the fundamental information into another representation and bundle, which is opposite of sorting out data.[2]

In last section i.e conveying data means to transform the mathematical or statistical conclusions drawn from the big data into a form that can be easily understood and interpreted by those in need of it.[2] Means Data science can empower the beginners to convert it in to expert.

Before data science comes in analytics, it must look at the pattern behaviors of past data, analyse that data and then forecasting the results. Business intelligence can apply the data science on business to calculate the business performance. The business intelligence analysts create dashboards and reports, accompanied by graphs, diagrams, maps, and other comparable visualizations to present the findings relevant to the current business objectives.[5]

Data Science is a more forward-looking approach, an exploratory way with the focus on analyzing the past or current data and predicting the future outcomes with the aim of making informed decisions. It answers the open-ended questions as to "what" and "how" events occur.[4]

Data science is a field with different disciplines hence the practitioner of data science must be able to have knowledge of different fields. That practitioner is commonly known as Data scientists. They are breaking down big data into usable information and creating software and algorithms that help companies and organizations determine optimal operations.[9]

Following fig.2 shows that the skills set that must be acquired by the whom want to be a data scientist.

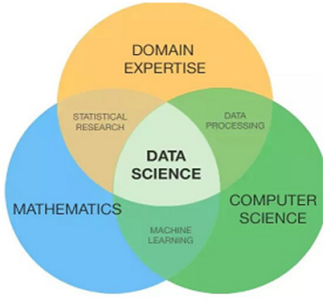


Fig. 2 Skill sets acquired by Data Scientist

In the past years, Data Science has grown to include businesses and organizations world-wide. It is now being used by governments, geneticists, engineers, and even astronomers.[14] During its evolution, Data Science's use of Big Data was not simply a "scaling up" of the data, but included shifting to new systems for processing data and the ways data gets studied and analyzed.[15]

Data Science has become an important part of business and academic research. Technically, this includes machine translation, robotics, speech recognition, the digital economy, and search engines. In terms of research areas, Data Science has expanded to include the biological sciences, health care, medical informatics, the humanities, and social sciences. Data Science now influences economics, governments, and business and finance.[14]

Evolution of Data Science - In 1962, John Tukey explained a field that he called "data analysis," which resembles modern data science.[6]

In 1974, the proper naming convention of Data Science has been tracked by Peter Naur. He took survey on subject "Concise Survey of Computer Methods" using term data science.[14]

1977 The International Association for Statistical Computing (IASC) is established as a Section of the ISI. "It is the mission of the IASC to link traditional statistical methodology, modern computer technology, and the knowledge of domain experts in order to convert data into information and knowledge."[15]

In 1990, popular terms for the process of finding patterns in datasets included "knowledge discovery" and "data mining."

In 1992 statistics symposium at the University of Montpellier II acknowledged the emergence of a new discipline focused on

data of various origins and forms, combining established concepts and principles of statistics and data analysis with computing.[8, 9]

In 1996, the International Federation of Classification Societies became the first conference to specifically feature data science as a topic.

In 1997, C.F. Jeff Wu suggested that statistics should be renamed data science. He reasoned that a new name would help statistics such as being synonymous with accounting, or limited to describing data.[10]

In 1998, Chikio Hayashi argued for data science as a new, interdisciplinary concept, with three aspects: data design, collection, and analysis.[11]

In a 2001, William S. Cleveland advocated an expansion of statistics beyond theory into technical areas; because this would significantly change the field, it warranted a new name.[12]

In 2002, the Committee on Data for Science and Technology launched Data Science Journal.

In 2003, Columbia University launched The Journal of Data Science.[12]

In 2014, the American Statistical Association's Section on Statistical Learning and Data Mining changed its name to the Section on Statistical Learning and Data Science, reflecting the ascendant popularity of data science.[13]

In 2015, using Deep Learning techniques, Google's speech recognition, Google Voice, experienced a dramatic performance jump of 49 percent.[14]

One result of the Data Science revolution has been a gradual shift to writing more and more conservative programming. It has been discovered Data Scientists can put too much time and energy into developing unnecessarily complex algorithms, when simpler ones work more effectively.[14]

Business Analytics - Business analytics is the statistical study of structured business data. Business analytics is used to take data-driven insights to support decision-making i.e. geneate knowlege and intellegence to apply the decision making processes to support strategic objectives of organization, little research exists regarding the mechanism through which business analytics can be used to improve decision-making effectiveness at the organizational level.[17] It helps organization to provide timely information

over the competition, it also helps in business growth, innovations and optimizing business processes. Business analytics refers to "the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions"[18]

Business Analytics (BA) and Business Intelligence (BI) are used synonymously, they are some different. While Business Intelligence focuses on gathering data from multiple sources and processing it for analyzation, Business Analytics analyzes all the relevant information provided by BI to foster data-driven decisions.[19] In growing IT industries all the computer data, important data and valuable statistical analysis are combined to make the analytics.

3.1 Applications of Business Analytics[20] -

- **Finance -** Business Analytics is important to the finance sector. Data Scientists are in high demand in investment banking, portfolio management, financial planning, budgeting, forecasting, etc.
- Marketing - Studying buying patterns of consumer behavior, analyzing trends, help in identifying the target audience, employing advertising techniques that can appeal to the consumers, forecast supply requirements, etc.
- **HR Professionals -** HR professionals can make use of data to find information about educational background of high performing candidates, employee attrition rate, number of years of service of employees, age, gender, etc.
- **CRM -** Business Analytics helps one analyze the key performance indicators, which further helps in decision making and make strategies to boost the relationship with the consumers.
- **Manufacturing -** Business Analytics can help you in supply chain management, inventory management, measure performance of targets, risk mitigation plans, improve efficiency in the basis of product data, etc.
- **Credit Card Companies -** Credit card transactions of a customer can determine many factors: financial health, life style, preferences of purchases, behavioral trends,

etc.

3.2 Business Analytics Tools[19] - There are some tools are available in the market for simplifying complex data analyses and making Big Data insights viable for both small and medium-sized industries. Tools like Silence, Clear Analytics, Pentaho BI, Micostrategy, QlikView etc. These tools can provide accurate and timely predictions about the market conditions while at the same time they streamline marketing strategies for the best outcomes. Business analytics tools are make tracking and monitoring business processes extremely efficient by allowing industries to handle most complex business operations.

3.3 Challenges with Business Analytics[21] - Following are some challenges faces in business analytics,

A greater potential for privacy invasion

Greater financial exposure in fast-moving markets

Greater potential for mistaking noise for true insight

A greater risk of spending lots of money and time chasing poorly defined problems or opportunities.

Executive Ownership-Business Analytics requires buy-in from senior leadership and a clear corporate strategy for integrating predictive models

IT Involvement-Technology infrastructure and tools must be able to handle the data and Business Analytics processes

Available Production Data vs. Cleansed Modeling Data – Watch for technology infrastructure that restrict available data for historical modeling, and know the difference between historical data for model development and real-time data in production

How data science used in Business Analytics - Use of data science in business analytics create mature framework that encompasses intuitive dashboards, mobile analytics, what-if planning, etc. For example big data management in large multistory malls. It uses different algorithms, techniques to apply on structured and unstructured data.

When companies analyze Big Data, they are using Business Analytics to get the insights required for making better business decisions and strategic moves.

Different technologies are used to analyze the large amount of data - Some collection of data sets are large and complex that it is difficult to process using traditional applications/

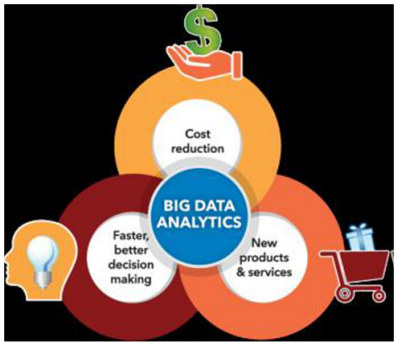
tools. It is the data exceeding Terabytes in size. According to the survey in Sept. 2017[22], there are 10 key technologies are used to handle the large amount of data i.e. Big Data.

1) Predictive Analytics
2) NoSQL Databases
3) Knowledge Discovery Tools
4) Stream Analytics
5) In-memory Data Fabric
6) Distributed Storage
7) Data Virtualization
8) Data Integration
9) Data Preprocessing
10) Data Quality

Big Data Analysis in Business i.e Hadoop (which sorts the massive amount of data) - The big data analytics technology is a combination of several techniques and processing methods. Big Data Technology can be defined as a Software-Utility that is designed to Analyse, Process and Extract the information from an extremely complex and large data sets. Different technology for holding, analyzing data is available at least cost but industries are taking data in order to use it in new levels, using information technology to shore accurate, stable business experimentation that direct decision makers and to examine outputs, business models, and regeneration in customer experience sometimes, the new trends help firms to make decisions in the real time.[23] These trends guide in research, invention, and business marketing. Industries from various different sectors have find complex insights of the structured data which is collected from different systems. Big data analytics need business processes to modify with the IT infrastructure of the organization data analytics influence on infrastructure components.

Hadoop is "an open source software platform that enables processing of large data sets in a distributed computing environment."[23] Big data as a high volume, high velocity, and high variety of raw information needs a cost-effective and innovative information analysis technique to capture insights for decision making.[24] Following fig shows the importance of big data analytics in business. Some researchers in their survey of 50 businesses they understand how the big data used in their business. From

figure the researcher found the values like Cost reduction in which Cloud based and Hadoop like technologies are used to apply significant cost. Second value Faster better decision making in which it combines the ability to analyze new sources of data and last is new product and services in which it gives power to give customer they want.



Using Big Data tools and software enables an organization to process extremely large volumes of data that a business has collected to determine which data is relevant and can be analyzed to drive better business decisions in the future.[25]

Big Data Technology is mainly classified into two types:

1. Operational Big Data Technologies
2. Analytical Big Data Technologies

Hadoop is basically an open-source software framework written in Java language so that it can work with a parts of data sets. It allows distributed processing of large data sets across clusters of computers.[25] It is designed to scale up from single servers to thousands of machines. This is 100% open source framework and runs on commodity hardware in an existing data center. Furthermore, it can run on a cloud infrastructure. Hadoop consists of four parts.[26]

Hadoop Distributed File System - Commonly known as HDFS, it is a distributed file system compatible with very high scale bandwidth.

MapReduce - A programming model for processing big data.

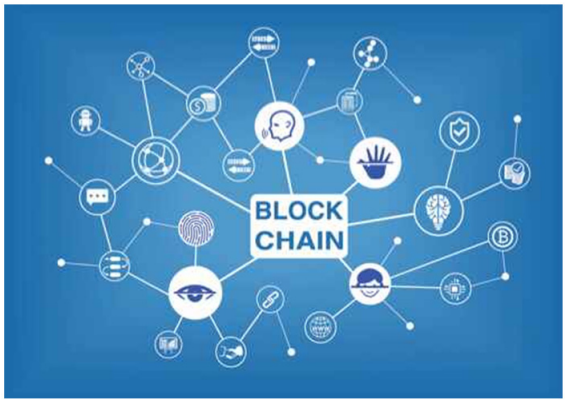
YARN - It is a platform used for managing and scheduling Hadoop's resources in Hadoop infrastructure.

Libraries - To help other modules to work with Hadoop.[26]

Features -

1. Authentication improvements when using HTTP proxy server
2. Specification for Hadoop Compatible Filesystem effort
3. Support for POSIX-style filesystem extended attributes
4. It offers robust ecosystem that is well suited to meet the analytical needs of developer
5. It brings Flexibility In Data Processing
6. It allows for faster data Processing

7) Blockchain Management - Blockchain Management is about to authenticate and track data at every point on a chain. Blockchain records and validates data. Means in simple terms it is a series of record of data that is handled or managed by group of computers. Each record is time stamped and linked to previous one.[27] Blockchain, sometimes referred to as Distributed Ledger Technology (DLT), makes the history of any digital asset unalterable and transparent through the use of decentralization and cryptographic hashing.[28]



Blockchain works on three important concepts i.e Blocks, nodes and miners.[28]

Blocks - In each chain consists of multiple blocks and each block has three basic elements which are data, nonce and hash. Data is present in block, nonce is 32 bit number which is automatically and randomly generate when block is created and hash is 256 bit number connected to the nonce i.e. it is extremly small.

When the first block of a chain is created, a nonce generate the cryptographic hash. The data in the block is considered signed and forever tied to the nonce and hash unless it is mined.[28]

Nodes - Decentralization is the important concept in blockchain management. Means no one can own the chain. Each can be connected to the chain via nodes. Node is one of the electronic device which maintains the blockchain and network functioning.

Miners - Mining process is used in blockchain in which miners are creates a new block on the chain. Some kind of special Software are used by miner to solve the complex math problem of finding a nonce that generates an accepted hash. When a block is successfully mined, the change is accepted by all of the nodes on the network and the miner is rewarded financially[28].

7.1 There are at least four types of blockchain networks - public blockchains, private blockchains, consortium blockchains and hybrid blockchains.[29,Wiki]

7.1.1 Public blockchains - There is no restrictions on public blockchain. Any validator can send transaction to blockchain who have simple internet connection.

7.1.2 Private blockchains - A private blockchain is permissioned. Any one can not join it unless invited by the network administrators. Participant and validator access is restricted.

7.1.3 Hybrid blockchains - A hybrid blockchain has a combination of centralized and decentralized features. The exact workings of the chain can vary based on which portions of centralization decentralization are used.

7.2 Advantages -

1. Distributed - Blockchain data is stores on thousands of devices on distributed network. Each node on the network is highly replicate and store a copy of the database. Hence data is highly resistant from malware attacks.

2. Stability - Once ths data is stored on blockchain then it is very difficult to remove and change the contents of the data. Due to this it is very useful to store financial records or any other data where audits are required.

3. Zero Percentage of Fraud - Blockchain is an open source, therefore each and every transaction is public hence there is no chances of fraud.

4. Instant Transactions - The bank transaction is 10 percent faster than usual one for digital currencies. These transactions are completed in few seconds.

7.3 Disadvantages -

1. Extremely Volatile

2. Problem for Not Tech Savvy - Using blockchain for storing virtual currencies are a big problem for peoples who are not so techno savvy. Such a storage are easy for peoples who are known of technology.

3. Storage - Blockchain ledgers can grow very large over time. The current growth in blockchain size creates a problem for storage. It required more GB size storage.

7.4 Applications of blockchain managment[30] -

1. Secure sharing of medical data
2. Music royalties tracking
3. Cross-border payments
4. Real-time IoT operating systems
5. Personal identity security
6. Anti-money laundering tracking system
7. Supply chain and logistics monitoring
8. Voting mechanism
9. Advertising insights
10. Original content creation
11. Cryptocurrency exchange
12. Real estate processing platform

8) Applications of Data Science in business - Today's businesses have become data-centric. This means that the businesses of the world utilize data to make decisions and grow their industry in the direction that the data provides.[31]

We have much more application regarding the same as follows:

1. Business Intelligence for Making Smarter Decisions
2. Making Better Products
3. Managing Businesses Efficiently
4. Predictive Analytics to Predict Outcomes
5. Leveraging Data for Business Decisions
6. Assessing Business Decisions
7. Automating Recruitment Processes

9) Case Studies in Data Science -

9.1 Case Study -

Walmart-Leveraging Data to Make Business Better31 - Walmart is the world's largest retailer. It is one of the many major industries that is leveraging Big Data to make the business

more efficient. Walmart handles a plethora of customer data. It tracks and monitors various factors that might affect the sales at Walmart stores.

Some of the ways in which Walmart is using data science are -

1. Walmart is using data science to make store checkouts more efficient. There are certain times of the day where the checkouts can become crowdy. This makes it difficult for Walmart employees to manage customers during rush hours. However, with the help of predictive analytics, Walmart can analyze data and determine the best form of checkout for each store, that is, self-checkout and facilitated checkout.
2. Walmart is using real-time analytics to analyze the purchasing patterns of the customers. This allows them to stock up on products that are in demand and also the products which will be in future demand based on several factors.
3. Walmart is managing supply chain and logistics with the help of data science. It manages its inventory and analyzes the rate of its depletion, thereby taking the necessary steps to mitigate it through efficient logistics. Walmart also analyzes the transportation lanes for the company's trucks to follow. It specifies an optimized route using data science, thereby reducing the cost and time.
4. Walmart is personalizing the shopping experience by analyzing the preferences and behavior of the customers. Using data science, it tracks the purchasing patterns of the customers and recommends them further products and discounts to improve their shopping experience.

9.2 Case Study -

Data Science in Education[31] - Data Science has also changed the way in which students interact with teachers and evaluate their performance. Instructors can use data science to analyze the feedback received from the students and use it to improve their teaching. Data Science can be used to create predictive modeling that can predict the drop-out rate of students based on their performance and inform the instructors to take necessary precautions.

IBM analytics has created a project for schools to evaluate

student's performance based on their performance. Universities are using data to avoid retention supplement the performance of their students. For example, the University of Florida makes use of IBM Cognos Analytics to keep track of student performance and make necessary predictions. Also, MOOCs and online education platforms are using data science to keep track of the students, to automate the assignment evaluation and to better the course based on student feedback.

9.3 Case Study32 -

Netflix: Using Big Data to Drive Big Engagement - One of the best ways to explain the benefits of data science to people who don't quite grasp the industry is by using Netflix-focused examples. Yes, Netflix is the largest internet-television network in the world. But what most people don't realize is that, at its core, Netflix is a customer-focused, data-driven business. Founded in 1997 as a mail-order DVD company, it now boasts more than 53 million members in approximately 50 countries.

If you watch The Fast and The Furious on Friday night, Netflix will likely serve up a Mark Wahlberg movie among your personalized recommendations for Saturday night. This is due to data science. But did you know that the company also uses its data insights to inform the way it buys, licenses, and creates new content? House of Cards and Orange is the New Black are two examples of how the company leveraged big data to understand its subscribers and cater to their needs. The company's most-watched shows are generated from recommendations, which in turn foster consumer engagement and loyalty. This is why the company is constantly working on its recommendation engines.

The Netflix story is a perfect case study for those who require engaged audiences in order to survive.

9.4 Case Study -

Intelligent cross-selling and upselling in Retail Industry[31] -

In the retail industry, cross-selling and upselling is practiced by all companies in order to improve their revenue. Cross-selling is the practice to recommend complementary products to customers for their buying. While upselling is the practice to give customers an option to buy a high-end product which is better than the one they are considering.

Using Data Science in retail can help increase profits without

running A/B tests. With data science, we can make personalized offers to different customer segments and gain more profits.

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Chapter 1
Business Intelligence

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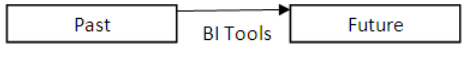
Abstract -

Business Intelligence is a decision support systems or technology that is used by the managers and analysts of the organization. There has been lots of advancement in the field of technology and services in recent years. Large amount of data are acquired from various transactions in different formats from customers, employees online from websites, blogs etc. and offline too. Business Intelligence (BI) helps business owners/officials to make important decisions based on data or more precisely facts. It is a method to make the right information available at the right time to the right people.BI is a set of processes, tools, technologies and methodologies that combine data from various data sources and make the single source of data available at right time so that timely, better informed and strategic decisions can be made. BI also provides different tools to quickly analyse the consolidated information in a variety of data presenting tools. The chapter includes introduction, functionality, characteristics, benefits, components and various tools of business intelligence.

Introduction -

Business Intelligence (BI) helps you to analyse the past and come up with the strategies to improve the feature.



Let us understand how BI helps in improving the future from the past.

When companies perform their day-to-day operations either using IT Systems like ERP software or some other applications or when they perform manual operations, gaps are generated. We can call it a raw data. Most of this data is residing in databases, some of

this data could be outside IT System as well. This raw data needs to be analysed and we need to extract meaningful information from this data and the objective is that the company could make more profits and could be more stable in future. Making future decisions directly from this raw data is nearly impossible. It has to be converted into meaningful information.

Typical objective of a company would include more stability and more profit in the future. More profits could mean increase in revenue or reduction in cost or expenses.

Thus in short, BI helps you analyse your past and come up with the strategies for future. Hence, your past is stored in the form of this raw data. It needs to be analysed and the future would be the strategies you make to come up with more profit and stability. So, you can base your planning on meaningful information not as the raw data directly and it is the BI that converts the raw data into the meaningful information.

It is the management of the company who look at this information and they take actions based on this information. And these are the set of actions you can also call as strategies. These strategies would result in a better future. So, we understand the role of BI. It is playing the role of helping the company analysing their past and take actions that will result into a better future.

What is BI?

The term BI is mainly used for an approach and that could be a technological approach or a business process approach. Though this umbrella term includes anything that you are doing to convert the raw data into meaningful information. Typically, you will be using some kind of BI software or tool or application that would assist you to perform this conversion of raw data into information. But this term may also include some processes that you have to go through, some business procedures that you have to go through to reach this objective.

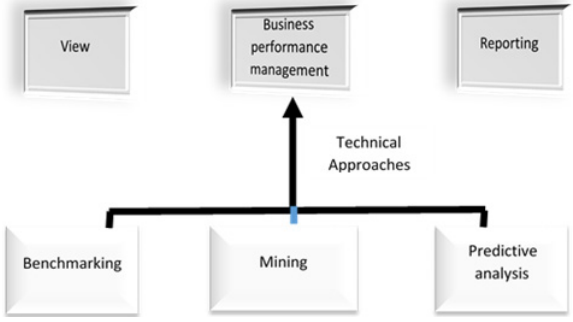
The objective of the company is to make profit but the climate in which the company is operating is changing with time, and so these business procedures. As the business approach and technological approach would include both the things, those are also changing with time. In terms of BI, a company would be re-evaluating their BI approach every now and then, just to make sure it is at par with the business climate and it would be evolving with

time. That's is why the objectives of most of the BI technology project is to provide a certain amount of value within a pre-defined period of time.

Thus the term Business Intelligence (BI) encompasses all the methods, technologies and tools that companies can use to process the data they handle. Once collected, these data become information and knowledge in order to make better decisions and track how those decisions have affected the company's results.

Functionality of BI in Technological approach -

When we say that the BI converts the raw data which represents our past into meaningful information so that we can explore the future. Thus this is the meaningful information that is obtained with the help of BI tool. It gives the business views, business performance management, querying andreporting.



When we talk about business view, we are talking about past views, present views and predictive views.

BI software is capable of predicting the future based on the plans that exist in the past.

Mainly the business performance management is implemented around the Key Performance Indicators (KPI). KPIs are mainly the ratios of one entity over the other entity that indicates the health of the company. For example, a very common KPI is accounts payable turnover, accounts receivable turnover, etc. So, these ratios indicate heath of the company from certain angle and management wants to track KPIs one period over to the others. So, this way they can see which direction the company is going. BI software helps to do that. Reporting functionality is provided by the BI software that includes online reports (also known as enquires or online queries) and also batch reports(queries submitted together

and then you can work out to finish it and look at the output).

In order to operate this functionality of BI software, management relies on certain technical approaches such as bench marking, data mining, predictive analysis, etc. You should be able to distinguish between the functionality that BI software is offering (like the views, reports and KPIs, etc.) and where the approach is taking to offer that functionality. The bench marking basically is the concept of comparing your numbers with the industry numbers. BI software are capable of performing this. The bench marking concept is built into the KPIs, the reuse and holding & mining. Data mining is the concept where you look at this past data and you try to determine patterns and trends that is called mining.

Predictive analysis is when you try to predict the future obviously on the trends. So, all these features are built into the BI software. Actually, all this resides within the guts of BI software. But the functionality that is offering to you would mainly come in the shape of views, performance indicators and reporting.

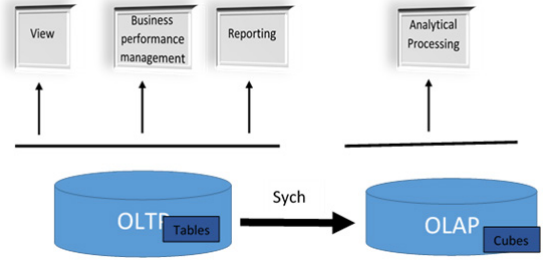
Online Transaction Processing -

The data comes from online transaction processing system. The Online Transaction Processing (OLTP) systemis an IT solution that you have implemented.If you are using ERP software which is a special breed of software that is implemented through the company,it has modules that are integrated and it gives you a complete picture just because of all the modules are integrated. You might not be using ERP, you might be using different software in each of your department.Whatever the case is,this database is representing your transactional information. So, it has all the transactions that are taking place in your company, your journals and invoices and other transactions.

The purpose of OLTP system is to capture the transactions very fast that are happening on the day to day basis. The users of the OLTP system are clerks and the people from end users, data entry people. Management is not really interested in day-to-day transactions. They are more interested in running the tests on the past. So, management needs to have access to the systems that are geared towards performing querying and reporting rather than accessing the transactions fast. So, a separate system exists in most of the big companies and they call it a warehouse or OLAP (Online Analytical Processing) system. The data is extracted

from all the OLTP systems. Companies may have multiple OLTP systems. It's extracted from and copied over to the system. This happens periodically. The way data is stored in OLAP system is very different than it is stored in OLTP system. OLTP system has two dimensional storage tables and it has rows and columns as its dimension, while OLAP system has cubes for storage which makes it a three-dimensional storage. OLAP is geared towards running heavy duty reports and usually these databases are different too. They are not the same databases as OLTP. When reports are run against warehouse system, the concept is called analytical processing. Management may want to slice and dice on information from different angles though they are doing analytical processes.

By definition, analytical processing that is happening against the warehouses row fall under the umbrella of BI. But when we use the term on day-to-day bases, we may refer it from BI to real time BI. Real time BI is something coming out of the OLTP system. This intelligence is built into most modern ERP software. So, the real time BI software would mean even though the system is OLTP system,itis tuned for capturing the transactions, rather than forming reports and queries but still BI is available to the business users. Clerks might want to see how many invoices are outstanding right on the screen of invoice entry. So, this kind of intelligence that is given to the business users right on the screen that they use on daily basis directly from OLTP systems without going into OLTP system. This is called as real time BI.



OLTP and OLAP data which is stored in tables and cubes respectively is structured data. Structured data means the data is stored in pre-defined objects and you know the applications of these objects. For example, rows and columns values types are

known. There is a lot of unstructured data that is getting generated recently because of so many sensors coming up, GPS unitssoftware and so on. Most of the data is unstructured and not been stored in OLTP systems as in OLAP system. Example would be log files, multimedia, videos, photos, social media, chats, emails, etc. Most of the companies are making decisions based on only 10% of their data. So, BI software is going against only 10% of the data. The rest of the data (i.e. 90% of the data) is right now not captured and not analysed. So obviously that is where the companies would be doing in near future. Big data analytics would be used to analyse unstructured data.

History of Business Intelligence -

In 1958, IBM Researcher Hans Peter Luhn published "A Business Intelligence System." Hans is later named as the Father of Business Intelligence.

Later in 1970's the first few BI vendors pop up with tools that are meant to help in accessing and organizing data.

First Generation of BI (1990s) - much time nearly weeks were taken using information technology for creating highly formatted reports. Some of the companies embedded BI tools for crystal reports using application programming interfaces. This took much time and high cost. Lot of company resources were utilized which could have invested for other activities in business. During the first generation of BI, businesses simply could not make picture reactive decisions like they can today.

Second Generation of BI (2000s) - During this generation standardized data warehouses were developed. With the help of web technologies drag-drop reports and dashboard building tools were developed.There was no need of IT professionals for the business analysis. Analysts were able to perform business analysis on their own using these BI tools. As dashboards grew in popularity, users were able to quickly investigate the data to help make better-informed business decisions across a variety of domains. Now the problem was just to collect and get the data.

Third Generation of BI (Current generation) - today multi-structured data sets are needed to be analysed. Businesses may be drowning in data, but many are now recognizing the newfound responsibility of using data to create more value, whether it is to keep costs down, drive additional sales, engage customers more

fully or improve process efficiency. Doing so is not actually as difficult as you might imagine. Achieving success in this BI generation requires two key steps -

1. Applying just the right amount of data, in the right visualized format, and within the proper setting (context) of the application the business user relies on each day.
2. The employee must possess a degree of analytical skills so that data-driven decision-making starts to become natural.

Next Generation of BI -

In 2017, augmented analytics - the ability to automate insights using machine learning and natural language generation - is predicted as the future of data and analytics by Gartner. Mobile analytics market expected to grow very high.

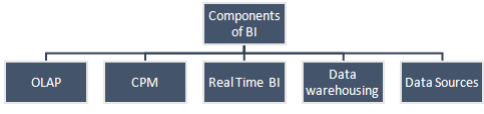
Advantages of Business Intelligence -

1. **Understand the behaviour of the customer -** With the help of BI the buying trends of the customer can be found out, the analysis of the buying behaviour of the customer is useful for creating more products that satisfy the customer. Thus this leads the prediction of the products that may be liked by customers. It helps to improve the sales and thus increases the profit. This also helps in retaining the customers.
2. **Identifies problem quickly -** Usually managers analyse the data and find out the performance level of the business activities. Using BI software the performance levels in different areas could be easily found. The data to be analysed is very huge in volume. With the help of BI tools and professionals the processes become faster and cheaper.
3. **Accurate Analysis -** With Business Intelligence, real time and accurate data is available. Thus it becomes easy to forecast and removes the possibility of guess work.
4. **Helps in making quick decisions -** Using BI we can get speedy answers to your business questions. You can make quicker decisions based on these responses without having to go through long reports and lose valuable time.

5. **Understand business' past, present and future -** With the help of BI your business stats can be known for a given period. This stats could be used during the competition and customer behaviour study can help you better plan your business future.
6. **Improves overall efficiency -** With the help of BI data and information could be easily shared among various departments. This results in time and cost saving. It improves the organization's overall efficiency and helps complete projects in comparatively less time. So, BI can be used to save both time and efforts and to increase productivity.

Components of Business Intelligence -

The five primary components of BI include: Online Analytical Processing, Corporate performance management, real time BI, Data warehousing and Data Sources.



1. **Online Analytical Processing (OLAP) -** The use of OLAP is that it analyses multi-dimensional information to assist with complex calculations, trend analysis, and data modeling. The user gets the facility of analysing the data in multiple dimensions which could be easy to understand and help in better and quick decisions making. OLAP helps to achieve different information at one place for better understanding of the scenario.
   What makes OLAP software different from other analytics tools is the ability to store information in a multidimensional database structure. Dimensions to use are locations, periods, employees, products, accounts, etc.
2. **Advanced Analytics or Corporate Performance Management -** Corporate Performance Management (CPM) encompasses methods, metrics, activities, and systems, which are used to monitor and manage the business performance of a company. CPM software processes the focused information to turn it into

operational plans.

This set of tools allows business leaders to look at the statistics of certain products or services. For instance, a fast food chain may analyze the sale of certain items and make local, regional and national modifications on menu board offerings as a result. The data could also be used to predict in which markets a new product may have the best success.

3. **Real-Time Business Intelligence -** In today's society the need of real time business is growing faster. This needs live data that is the current data. This component of BI helps company to create quick responses to real-time trends over email, apps, messengers, etc.with the help of real time business intelligence data can be sorted and analysed which is used to take decisions For example, a marketing person can use data to design a limited-time specials such as a coupon for hot soup on a cold day. CEO's may be interested in tracking the time of day and location of customers as they interact with a website so marketing can offer special promotions in real-time while the client is engaged on the website..
4. **Data Warehousing -** Data warehousing allows the business person to examine sub units that could help to take decisions. The data can be stored in different ways which is useful for analysis. With the help of such analysis strategies can be formulated. Data is fetched continuously in data warehouse which is then processed and made available for the end users to make important decisions. Data warehouses are created to help perform an analysis of a large volume of data. Its goal is to receive and process information in the shortest period of time possible.

Data Sources -

This component of BI is involved in the stored operational data of the company.BI analysts create data tools that allow data to be put into spreadsheets, pie charts, tables or graphs that can be used for a variety of business purposes. Data sources help companies to take strategic decisions based on the facts which can provide holistic view for the company.Operational data sources

take advantage of ERP, CRM, e-commerce Apps etc.

Business Intelligence Tools -

The most common tools include business and data analytics, predictive analytics, cloud technology, mobile BI, Big Data consultation and visual analytics which help the business to take right decisions.Business intelligence uses all the available tools, technologies, and practices to collect, present, and analyze business-related information.

1. **SAP Business Intelligence -** SAP Business Intelligence offers many functionalities in single platform, it provides advanced analytics solutions including real-time BI predictive analytics, machine learning, and planning & analysis. The Business Intelligence platform offers reporting & analysis, data visualisation & analytics applications, office integration and mobile analytics.
2. **SAS Business Intelligence -** SAS provides advanced predictive analytics and business intelligence platform. It is self-service tool that allows to leverage data and metrics to make informed decisions about their business. Many customisation options are available in its APIs. SAS ensures high-level data integration and advanced analytics & reporting.
3. **Qlik Sense -** This tools is easy and popular due to the user interface thatuses touchscreen method. In this tool users add their experience to the data and by using snapshots and highlights making the right analysis and decisions has become a lot easier.
4. **Zoho Analytics -** This BI tool has the facility of auto data synchronization which can be scheduled according to requirement for a specific period. You can easily build

a connector by using the integration API's. Blend and merge data from different sources and create meaningful reports. Personalized reports and dashboards ca be created easily with the help of editor.

5. **Sisense -** This is a user-friendly tool. It allows the people within your organisation to manage large and complex datasets, analyse and visualise this data.Data sources could be Adwords, Google Analytics and Salesforce. Data is processed quite quickly compared to other tools.
6. **Microsoft Power BI -** Microsoft Power BI is a web-based business analytics tool that can be accessed from anywhere. It allows users to identify trends in real-time and has brand new connectors that allow you to up your game in campaigns. This software also allows users to integrate their apps and deliver reports and real-time dashboards.
7. **Tableau -** This is a free BI tool for personal use. Tableau is a Business Intelligence software for data discovery and data visualisation. Tableau supports multiple data sources such as MS Excel, Oracle, MS SQL, Google Analytics and SalesForce. Tableau also offers three standalone products: Tableau Desktop, Tableau Server and Tableau Online.
8. **Oracle BI -** This technology gives users pretty much all BI capabilities, such as dashboards, proactive intelligence, alerts, ad hoc, and more. Oracle is also great for companies who need to analyse large data volumes as it is a very robust solution. This BI tool is utilized for whole organization.
10. **IBM Cognos Analytics -** Cognos Analytics is an AI-fueled business intelligence platform that supports the entire analytics cycle from discovery to operationalization.You can visualize, analyze and share actionable insights about your data with your colleagues. A great benefit of AI is that you are able to discover hidden patterns, because the data is being interpreted and presented to you in a visualized report.

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Chapter 12
Digital Transformation: Beyond Digitalization

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Introduction -

Digital change is a radical change in the economy and society that has happened over a period of nearly 50 years. It began in the early 1990s with the spread of the Internet and the emergence of services such as AOL and Compuserve. Digitalization was encouraged by the increase in Internet connections at the end of the 1990s and the first hype around the turn of the millennium. It was further flashed by the high-speed Internet and mobile data access. In the future, an even faster mobile Internet (5G) combined with technologies of the Internet of Things and AI will make applications such as the increased use of robotics possible. Digitalization will radically change the future of the economy. In the future, digitalization will create new challenges for schools and education, training and further education, public administration and associations. It is the responsibility of the industry, associations and politics to prepare society for the changes that can be expected in the future from digitalization. (online)This chapter focuses on the basic concepts of digitalization, digitalization and digital transformation.

Objectives - After completing this chapter students will be able to understand the

- Concept of digitization
- Concept of digitalization
- Concept of digital transformation
- HowDigitalization is quite distinct from digital transformation ?
- Impact of digitalization on the future of different industries.
- New challenges of Digitalization

Concept of Digitization - Digitization essentially refers to taking analog information and encoding it into zeroes and ones so that computers can store, process, and transmit such information. According to Gartner's IT Glossary, "Digitization is the process of changing from analog to digital form" – a definition few would disagree with.There are many examples of digitization in enterprises today, as there have been for many decades. Converting handwritten or typewritten text into digital form is an example of digitization, as is converting the music from an LP or video off of a VHS tape.Digitisation enables to create business value, which needs data. (Bloomberg, 2018)

Examples -

- Scanning a paper document and saving it on computer's hard drive as a digital document, like PDF.
- Going from notes on paper to typing them up in an Excel spreadsheet.
- Converting from analog VHS cassettes to CD, DVD or Blu-Ray discs containing digital data.(Bloomberg, 2018) (Hapon, 2018)

Concept of Digitalization - Digitization' and 'digitalization' are two conceptual terms that are closely associated and often used interchangeably in a broad range of literature," explain J. Scott Brennen, Doctoral Candidate in Communication, and Daniel Kreiss, Associate Professor, both at the University of North Carolina School of Media and Journalism.Gartner also weighs in on this term. "Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities," according to Gartner's glossary. "It is the process of moving to a digital business." "Digitalization, according to Gartner, Inc., is the process of employing digital technologies and information to transform business operations," according to the report Digitalization and the American Workforce by Mark Muro. (Bloomberg, 2018)

Examples -

- Uploading a PDF document from a computer's hard drive to the cloud and sharing it with many people to analyze the data;
- Converting an Excel spreadsheet to a Google Sheet stored in the cloud. The platform provides a structured

environment where the documents can be shared among several users. Still, a Google Sheet itself requires human interaction to keep it up to date.

- Uploading digital movies from CD, DVD or Blu-Ray discs to online services. People can download or rent them. (Hapon, 2018)

Concept of Digital Transformation - Digital transformation is the transformation of business activities, processes, products, and models to fully influence the opportunities of digital technologies. The main goal is to improve efficiency, manage risk or discover new monetization opportunities. Digital transformation is doing things in a new (digital) way.

Examples -

- Reading the data from an online PDF or moving the data from a Google Sheet into an app or system that will analyze the data. The goal is to provide us with insights to offer new products or improve customer service. This process doesn't need a lot of human interaction because is automated. As a result, it enhances efficiency, reduces costs, and may lead to increased sales.
- Streaming movies online. Collecting data from clients to analyze it, preparing individual recommendations, offers, and advertisements. (Hapon, 2018)

How Digitalization is quite distinct from Digital Transformation? - An organization might undertake a series of digitalization projects, ranging from automating processes to retraining workers to use computers. Digital transformation, in contrast, is not something that enterprises can implement as projects. Digital transformation initiatives will typically include several digitalization projects, but executives that believe that there is nothing more to digital transformation than digitalization are making a profound strategic mistake. In the final analysis, therefore, we digitize information, we digitalize processes and roles that make up the operations of a business, and we digitally transform the business and its strategy. Each one is necessary but not sufficient for the next, and most importantly, digitization and digitalization are essentially about technology, but digital transformation is not. Digital transformation is about the customer.(Bloomberg, 2018)

Impact of Digitalization on the future of the different

industries -

- Digitalization will drastically change the future of the automotive industry through new mobility concepts. From autonomous driving to existing sharing models and completely new concepts such as the rental of electric scooters, digitalization will allow new models of usage in the future.
- Digitalization influences the future of the financial industry. Technologies such as the blockchain enable new forms of corporate financing and participation in addition to the applications frequently discussed in the press such as the virtual currency Bitcoin. Today, for example, company investments are made possible via so-called ICOs (Initial Coin Offerings) or STOs (Security Token Offerings). These forms are only possible through digital technologies, which will continue to spread in the future.
- Digitalization is changing the future of traditional professions. In the future, physicians will be supported more and more by applications of e-health, especially in diagnostics. Services in the legal sector (today primarily provided by lawyers) will be supplemented or replaced by digital services from the Legal Tech sector.

New challenges of Digitalization - In the future, digitalization will create new challenges for schools and education, training and further education, public administration and associations. It is the responsibility of industry, associations and politics to prepare society for the changes that can be expected in the future from digitalization.Digitalization makes it necessary for companies to focus their actions on the development of digital innovations in order to be successful in digital change.

Typical fields of action are -

- Establish a culture of innovation that promotes the development of digital processes and procedures and makes it possible to develop digital services and digital business models.
- Development of digital innovation strategies, i.e. an action plan for the company's handling of digitalization.
- Training of employees to prepare them for the challeng-

es of the digital age and to enable them to take part in digital change.

- Alignment of a company's marketing and sales activities to digitalization. Companies have to deal with this question: How do we want to reach our customers tomorrow? What role do trends such as content marketing and sales automation play? How do we deal with the ever more individual needs of our customers?
- Development of digital procedures and processes: Saying goodbye to paper files by introducing processes and procedures in the company, some of which have to be radically rethought as a result of digitalization
- Dealing with data that arises within the company, in connection with the activities of a company or with customers. New service and business models can be developed from data.

Digitalization changes economy and society
(Photo: iStockphoto)

Summary - Thus Digitalization confronts companies with the challenge of permanently changing and adapting. Competitive advantages from the past only exist to a limited extent.Customers today are already much better informed than at times when the Internet was only just becoming widespread. New technologies such as artificial intelligence and the blockchain will continue to radically change business models and companies until 2040. Thus, digitalization in the company is can be a topic for top management. The Analyticsinnovation software helps companies to drive digital change. Within a company, different innovation networks can be founded and managed, which systematically advance digitalization within the company.

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Chapter 13
People Analytics for Effective People Management

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Of all the departments in an organization, the Human Resource department has the least popular reputation. HR is often regarded as old-fashioned as lot of the work in HR is based on 'gut feeling'. HR is rigid as it still believes doing things in a particular way as it was always done in the past. Neither does HR have the repute of bringing in the big bucks nor the repute of playing number games like sales. Further, HR also struggles to compute and quantify its success, as marketing and finance do.To ensure the overall success it is necessary for the organizations to establish an effective management of human resources also. Effective people management is an essential quality for the present day leaders who wish to improve and prepare employees for success.

People Management defined - People management is defined as a set of practices that encompass the endtoend processes of talent acquisition, talent optimization, and talent retention while providing continuous support and guidance for the employees in an organization. Thereby, it is the process of training, motivating and directing employees in order to optimize workplace productivity and promote professional growth and covers all aspects of how people work, behave, engage and grow at work. Mangers, team leaders and department heads use people management to oversee workflow and boost employee performance every day. The tasks supporting the key pillars of people management include employer branding, recruitment, compensation, performance management, organization development, safety, wellness, benefits, employee motivation engagement, communication, administration, and training.

Effective people management is indispensable for the success of the organization. Exploring the skills that make up people

management can help to discoverone's strengths and identify areas for improvement. It is useful in many ways such as:

- Handling interpersonal conflicts. Leaders play an important role in resolving conflicts. Effective people management mediates conflicts in a way that promotes collaboration and respect.
- Guiding employee training. A leader is responsible for orienting new employees and coaching current employees on modernized processes. Elements of people management can provide constructive feedback and counsel employees so they can succeed in their positions.
- Managing deadlines. Assigning tasks and setting realistic goals is a very important for leaders. Effective people management can help in evaluatingthe resources of the team and set realistic deadlines for them.
- Creating company culture. Workplace environment is positively affected by the position of a leader. A leader's people management responsibilities can be used to build empathy with employees.

Key Components of People Management - There are five key components of people management known as 5 C's which are important to retain best talent in the organizations.

1. Create - Creating the right team structure involves setting up processes, boundaries and a robust framework of functioning and planning. This also helps in projecting the success of the organization. Therefore people management would begin with talent acquisition, choosing the right recruitment platforms, creating an employer brand that the candidates trust and want to work with and providing an engaging candidate experience followed by training and helping them evolve in their skill sets to suit the changing needs of the business. Investing in employee's development also builds more loyalty and commitment.

2. Comprehend - Effective people management involves understanding the people, their personalities, motivations as well as their personal and career goals. It is important to comprehend that people are different and have different traits and skill predispositions and it is the people who make up the organization. Therefore empathy, active listening, and a people approach lead to a deeper mutual understanding of individuals and their groups.

The age old technique of management by wandering around has been replaced over the years by spending actual time with people which always leads to deeper insights.

3. Communicate - Communication is important enough to control how people feel at work and about work and therefore it is an important key criterion for effective people management. Open channels of communication and feedback results in effective management of people. The plan and culture of communication prevalent in an organization is a key element for the employees to perceive the greater picture of the organization. Organizations today need to ensure that they are providing their employees with the right channels of communication and feedback so that they can communicate effectively.

4. Collaborate - Managing people processes involve acknowledging that work cannot happen is silos as both success and failure are team work. With the wide array of collaboration tools that are available today, organizations and managers can ensure that sharing and delegation can lead to the best results. In order to add value to the work processes and the lives of employees, individuals need to be assigned responsibilities. This will also multiply the effectiveness of the team. Working with other components at workplace will help employees realize the roles that others play for the organization.

5. Confront - People are different and in order to gain respect, loyalty, and commitment from the people within the organization, people management needs to focus on optimizing these differences. Therefore confront means to face, acknowledge and tackle these differences positively. With diversity in thought, working preferences and actions, people perceive same things differently and engage with different issues which frequently leads to conflict that may be either overt or covert. The conflict may lead to either negativity or strengthen the team hence resolving this conflict is an important part of people management.The choice for either is with the leader.

People Management Skills - People management requires several soft skills that can better help to interact with the employees and perform organizational tasks.The key people management skills that can truly support the team and lead them to succeed are:

- Trust building: Building strong trust is an essential

people management skill for team building. The skill of being able to build trust canpromote a culture of honesty and transparency.

- Empathy: Empathy is an important skill for leaders. It is the ability to be able to put oneself in another person's shoes and to see the world from their perspectives. Active listening leads to greater empathy.
- Motivation mapping: A people manager needs to be an effective motivator and understand the individual drivers of motivation.This skill is the result of keen understanding of emotions of self and that of others to be able to take better decisions, and creating stronger bonds.
- Appreciating: An important aspect of managing people is praising and rewarding themfor a job well executed. The process of appreciation goes a long way in creating a culture of gratitude at work.
- Knowledgeseeking: Knowledge is power in a world where data rules, hence having access to the precise data is vital for effective people management. How to apply data and build a knowledge and information base enables deeper understanding of people and processes.

Some other important skills to incorporate into workplaceinclude:

- Empowering employees
- Active listening
- Conflict resolution
- Flexibility
- Patience
- Clear communication
- Trust
- Organization

The solution to effective people management is HR analytics which changes the image of HR. A lot of the above mentioned challenges can be resolved by making HR more datadriven and analytical savvy. We all know HR departments have a tradition of collecting huge amounts of HR data. Unfortunately, this data often remains unused as leader managersare unaware of how to make use this data. Many of the unanswerable questions in HR can be

solved and answered by making use of this vast data. Answering to many questions can be tricky for HR professionals especially if they don't have a detailed data for it. HR professionals can combine different data sources like Human Resource Management System (HRIS) and Performance Management System to solve many issues in HR. All they need to do is extensively analyze the available data of their human capital and make informed decisions. As soon as organizations start to analyze their people problems by using the collected data, they are engaged in active HR analytics.

Data as HR's Most Important Asset - Today the Human Resources team has access to various important data about the employees like recruitment data, career progression data, training data, absenteeism figures, productivity data, personal development reviews, competency profiles and staff satisfaction data. Along with the array of these traditional HR data, organizations can now gather more data like scanning social media data and analyzing the content of emails to measure the sentiments of the employees.

Making use of HR data is extremely valuable. However, it can be legally and ethically challenging. Perhaps HR data happens to be the biggest asset that the HR team has as it improves the quality of decision making, optimize the processes, add on value to the company and above all the biggest advantage lies in making the employees happier.

In earlier days HR data was collected in plenty but it went unused. The data collected was only put into charts and tables. Today the organizations have realized the importance of HR data and hence they are either beginning to make use of big data in HR or increase the use of it in day to day working. In this era of big data and analytics organizations have started spiraling their data into insights and thus have become successful in predicting many features of employees like when employees are likely to leave, where to recruit the most suitable candidates from, how to identify and attract those desired candidates, and how to keep them happy once they become employees of the organization. All this has given rise to a buzz phrase 'intelligent HR'.

Intelligent HR is data-driven HR - HR is traditionally seen as people-orientated, and not very much about numbers and data. The reason is despite having access to affluent data, too many HR teams spend the majority of their time on admin tasks

or legal issues like unwieldy staff appraisals, day to day minute details of recruitment, wasteful expensive activities like annual staff satisfaction surveys etc. All these activities take up their time that could be better utilized elsewhere. HR data is very valuable. In spite of data playing a crucial role in some functions of HR department it is not used in a smart way that's most relevant to the business in question. In the present era we have access to unique and valuable HR metrics that can deliver business critical insights, can be measured and also have a significant impact on the organization's performance. This is where the idea of data-driven HR comes from which can facilitate the HR teams to make use of data in making improved HR decisions, understand and evaluate properly the business impact of people, improve the role of leader in people related matters, improve upon to make more effective the HR processes and procedures and finally improving upon the overall wellbeing of the organizational employees. Implementing all these can impact an organization in achieving its strategic goals.

The HR and people management is undergoing a data fueled revolution with the growing awareness of the data driven HR team which has gained a momentum now. Thus, the HR aspect of business which was said to be very traditional and rigid, which revolved around only on softer elements like people, culture, learning and development, and employee engagement is now becoming increasingly driven by hard numbers and data analysis.

Definition of HR analytics - HR analytics is the application of statistics, modeling, and analysis of employeerelated factors to improve business outcomes.HR analytics is also often referred to as:

- People analytics
- Talent analytics
- Workforce analytics

Both the terms HR analytics and people analytics are used interchangeably and have become popular in the recent times. HR analytics is comprised of a broader scope of data, while people analytics and talent analytics refer to data points which are specific to people and their behavior. Some also prefer the term workforce analytics because of the growing tendency to automate tasks with robots, which may be considered part of the workforce. HR analytics enables HR professionals to make datadriven decisions so that

they can attract, manage, and retain employees, which will improve ROI. It also aids in making quality decisions thereby creating better work environments and increasing employee productivity. HR specialists collect data points from the organizational sources like:

- Employee surveys
- Telemetric Data
- Attendance records
- Multi-rater reviews
- Salary and promotion history
- Employee work history
- Demographic data
- Personality/temperament data
- Recruitment process
- Employee databases

HR specialists must align HR data and initiatives to the organization's strategic goals. HR initiatives like shared workspaces, company events, collaborative tools, and employee challenges can be implemented in order to increase the number of innovative ideas, if a company wants to improve collaboration across departments. HR analytics can be utilized to examine correlations between initiatives and strategic goals in order to determine how successful the initiatives are.

In order to gain actionable insights HR analysts feed workforce data into sophisticated data models, algorithms, and tools after the data is gathered.These tools provide insights in the form of dashboards, visualizations, and reports. An ongoing process should be carried on to ensure continuous improvement which includes:

- Benchmark analysis
- Data gathering
- Data cleansing
- Analysis
- Evaluate goals and KPIs
- Create action plan based on analysis
- Execute on plan
- Streamline process

The types of HR analytics that every Human Resource manager should know

Employees are assets of any organization. The success of the organization depends upon the capabilities of their employ-

ees. Therefore any organizations that can attract the right human resources, manage talent acquisition, and utilize their resources in an optimum way is sure to succeed in long term.

1. Employee Churn analytics: - This kind of workforce analytics measures employee churn or turnover. Huge investments are incurred by the organizations when it comes to human resources. Hiring employees, training them and then integrating them into the organization costs lot of time and money. Thereby, estimating how many people are leaving your organization on a monthly or annual basis can tell you a lot about the health of your workforce. A low churn indicates a healthy culture in the organization while a high churn needs attention of the HR team. Descriptive and predictive churn data both are important for employee churn analytics.

2. Capability analytics - The success of any organization depends on the level of expertise and the skill of the workforce. Capability analytics is a talent management process that allows you to identify the capabilities or core competencies of your workforce that you want and need in your organization. These capabilities also include the ability to develop and maintain relationships. Once you know what those capabilities are, you can set them as a benchmark and compare them with the capabilities of your workforce and measure for any gaps.

3. Competency acquisition analytics - Acquisition and management of talent is a critical factor for the growth of the organization. Hence, talent of the people in the organisation matters a lot. Competency acquisition analytics is the process of assessing how your organization acquires the desired competencies. For this at the very outset you need to identify the core competencies that your organization will require at present as well as in the future. Then you need to evaluate the current levels of the identified competencies in the organization so that the gaps can be identified. This helps to monitor how these competencies can be developed in house or by recruiting candidates externally with those competencies.

4. Organizational Culture analytics - Simply stated, organizational culture depicts the way the things are done around in the organization. It is often referred to as the collective unspoken rules, systems, and patterns of human behavior in organization. However, culture is very difficult to change. Organizational culture

analytics is a process of assessing and understanding the culture at your workplace. Knowing the culture of your organization can help you to evaluate and keep a track of the changes that you observe. Tracking culture changes helps you to identify the early signs of culture getting toxic.

5. Capacity analytics - Capacity of the workforce affects the revenue generation of the organization. The goal of capacity analytics is to find out the operational efficiency of its workforce. It aims to analyze the time spent by people in profitable work in the organization. It also helps to identify the people who are very casual about their tasks and spend more of their productive time in meetings and discussions. The analysis of such behaviors is called as capacity analytics and it helps in deciding how much capacity the people as individuals have to grow.

6.Leadership analytics - "A group of donkeys led by a lion can defeat a group of lions led by a donkey." Such is the power of a good leadership. Poor leadership costs money, time and employee churn. It becomes extremely difficult for such organizations to retain its employees and perform at its full potential. Leadership analytics examines and reveals various facets of leadership performance at a workplace to findout what is good and bad. Data about leadership performance can be collected through surveys, polls, focus groups, employee interviews or ethnography. There is a probability that employees may not feel safe and confident talking about their leader hence it is always advisable to make the data collection anonymous.

7. Employee performance analytics - In order to survive and thrive, organizations need high performing and capable employees. Employee performance analytics strive to assess individual employee performance. The resulting insights help in identifying who is performing well and who further need some additional training and support to increase their acumen. There are many innovative ways of collecting and analyzing performance of the employees, from crowd sourced performance assessments to big data analytics. It is possible to analyze the performance of the employees more holistically with modern data capture techniques.

8. Recruitment channel analytics - Employees are the greatest cost as well as greatest opportunity for all organizations. Recruitment channel analytics is the process of finding out from

where does the best employees come from and also identifying the most effective channels of recruitment. Recruitment channel analytics consist of historical assessment of employee value using KPI's such as human capital value added and return per employee. Surveys and entry interviews are also useful sources of data.

Benefits of HR Analytics - HR analytics need to move from an operational partner to a more strategic center of excellence. Organizations have now come to realize that its success is dependent upon people and that HR analytics can light the way from intangible theory based decisions to real ROI through the following:

- Better hiring practices
- Decreased retention
- Task automation
- Process improvement
- Improved employee experience
- More productive workforce
- Improved workforce planning through informed talent development

HR Analytics: A Brief History Industrial Revolution (1760 to 1913) - The Industrial Revolution brought profound changes to the global economic scenario, and HR analytics emerged as efforts to enhance production. Frederick Winslow Taylor developed a scientific management methodology which consisted of four principles:

1. Using methods which are based on a scientific study of the tasks
2. Scientific selection, training and development of each employee
3. Instructing and supervising each employee and providing performance feedback
4. Applying scientific management principles through division of work

The first known usages of HR analytics were to improve worker's conditions by increasing the production. Production was analyzed by the minute for each task of every employee.

World Wars I and II (1913 to 1945) - The First World War manifested an increase in the recruitment of women so as to fill the positions of those men who had been sent to war. This shift in workforce demographics led to progression in worker retention,

recruitment, as well as attendance of the work force. Elton Mayo who researched workers at a Philadelphia textile mill found that the repetitive nature of the work caused more rates of mental abnormalities amongst the employees and that a period of intermittent rest would not only reduce thisdeformities but can also control the turnover rate.

Post-World Wars (1946 to 1990) - This was the period when unions came into existence. Therefore, the organizations were instigatedto hire full time HR personnel. Along with management practices, Social Science and Organizational Behavior were also merged. Jac Fitz End wrote how to measure Human Resources Management in 1984 and became the leading authority on HR analytics.

Modern Era (1991-Present) - By the end of the twentieth century, the widespread adoption of the Internet and the emergence of Web changed the game and rate of adoption for HR analytics. Thedata became more easily shared and the computing power also increased. 71% of organizations relate people analytics as highest priority for their success. New technologies such as AI, machine learning, and visualization tools are aiding the organizations in the systematic adoption of HR analytics.

Applications of Data Analytics in People Management - For building a successful business the most treasured asset within the organization are the people. Human resource management departments are increasingly looking to data analytics for updating their key people decisions. With the progress and growth of AI and machine learning, HR professionals now have more data available to help them update these decisions. Although tech driven intelligence and data analytics plays an important part in the hiring process for many organizations, a growing number of them are increasingly applying sophisticated HR metrics to make data driven people decisions that will impact employees throughout their career journey within the organization.

Earlier promotions, salary rates, attrition and retention, and training and development in the organizations were exclusively determined through human feedback and review. But now the organizations are increasingly making use of data driven decisions informed by artificial intelligence powered analytics for the same. A key value differentiator of these AIderived metrics is that they

can be gathered and analyzed in real time to help support in the moment of important decisions.

The following are the five ways that HR and talent management teams are applying data analytics in order to develop employee development and produce high performing organizations.

1. Measuring Performance - Organizations can use analytics tools to establish employee performance benchmarks, and then train the existing and incoming employees to understand those qualities and their effects. Measuring performance helps the individuals to boost their professional performance as well as their wellness and energy. Organizations can make use of the data gathered from top performing individual employees and teams and set standard benchmarks for other individuals and groups in the organization to follow.

2. Informing Promotion and Salary Decisions - A major setback for many of the highperforming employees is watching underperforming peers receiving promotions. Among various factors, the main reason for this can be human bias and nepotism. Adopting a databased approach can help leaders in understanding the frequency at which employees are receiving promotions and raises and the key factors driving these decisions. Assembling and using many types and sources of data and using it to train artificial intelligence algorithms can support managers in making lessbiased decisions.

3. Understanding attrition and increasing retention - Performance based analytics can also be used to forecast the employees that are more inclined to leave the organization. It can also reveal the factors contributing to attrition. Application of data analytics can help the organizations to understand workers at risk,as many times money may be a less motivating factor than the quality of managers and supervisors. Instead of investing money on leaving employees the company can concentrate on driving the resources into making stronger managers. Organizations can also collect data on their turnover in order to understand trends and address sudden hikes in voluntary and involuntary attrition.

4. Examining Employee Engagement - Employee engagement is a vital mark for any HR department and the data for this is usually gathered through surveys that are generally piloted by the companies to whom it is outsourced. It is generally found that many

employees dread to fill this survey forms and some don't even fill out. Hence with the intention of maintaining the ownership of their employee's data and also getting faster results, many organizations are bringing this activity inhouse. Seeing the benefits and to gain immediate data insights HR departments can make use of small surveys to regularly monitor employee engagement with the help of AI tools.

5. Measuring Employee Development and Learning Outcomes - A good training program can benefit organizations in making their workforce more productive and will also improve the rate of retention. At individual level the companies can apply predictive analytics to customize the training content that better meets employee learning styles. At an organizational level, predictive analytics can assess weak points in the training, improve the content and thus make training successful.

Adding value wherever possible - Data-driven HR emphasizes HR data and analytics upon the goal of adding value to the organization and driving performance across the organization in the smartest way possible, using all the tools at the HR team's disposal like data, sensors, analytics, machine learning, AI, and many more.

Even in this age of increasing automation, robotics and artificial intelligence people will continue to be a central driver of success hence the debate is not about saying that HR should only be about data but it is all about the changing role of HR and our growing ability to gather and analyze ever increasing volumes of data. This also increases the horizon of opportunities for the organizations and also adds more value to the organization. Thus HR data is an important asset.

Turning Data Analytics into People Analytics - Increasing skills and knowledge in data mining and management, machine learning applications and business analytics can provide HR professionals and their organizations a competitive advantage. While these intelligent data metrics certainly give HR professionals valuable knowledge, it's crucial for HR to continue to sustain the human element and their role to ensure that all these tools really add human value. One way is using the analytics beyond the five applications to inform organizational design through predictive strategy that can help guide the specifications of future positions,

help prepare workers to up their skill sets for these roles and meet the organization's needs.

Companies need to automate their HR departments. A data-rich HR department needs HR professionals who are proficient in the analytical ability to understand and harness the power behind data-driven intelligence.

The Future of HR Analytics - We are experiencing profound shifts in the field of HR, and smart organizations have realized that in order to compete and retain top talent they need to accept a data-driven culture. Data analysis is now an indispensable tool to move beyond gut feeling.Psychology is playing an even moreimperative role in HR analytics. With the aim of increasing productivity and wellbeing of employees, Industrialorganizational psychology (I-O psychology) applies psychological principles to organizations. One such common application is to match employees with the bestfit job available in the organization. Analytics is one such tool that I-O practitioners apply in makinguse of such important decisions.

Implementing analytics in the business is not an easy task. There are many problems which every Human Resource officer should keep in mind as they move to incorporate analytics and the cloud systems that support it:

1. Shift from automation to productivity
2. Acceleration of HRMS and HCM cloud solutions
3. Continuous performance management
4. Feedback, engagement, and analytics tools
5. Reinvention of corporate learning
6. The recruiting market is thriving with innovation
7. The well-being market is exploding
8. People analytics matures and grows
9. Intelligent self-service tools
10. Innovation with HR itself

Tools for HR Analytics -

- Workday
- Google Analytics
- R
- Python
- Microstrategy

Implementing HR Analytics and People Analytics in a

Company - For any organization there may come a day when an important and expert employee informs you about leaving the company in a month. HR specialists will have to open a position, screen candidates in their database that fit the job description and try their best to fill a talent gap as soon as possible. Knowing the probability of events like this would bring extra time to retain a valuable employee or search for another one. Retaining young professionals is more challenging as compared to older professionals.

The main goal of working with people is creating an environment for the employees which make them feel that their day today working is meaningful for an organization in which they want to grow and progress. Creating and maintaining a good environment comes with the understanding of the workforce quality that is by identifying the star performers and the dead woods in the organization. Further the organization should also take measures to keep the high performers motivated and simultaneously identify the reasons behind the slow performers.Workforce analytics is one of the solutions that help organizations keep up with the competition for human capital in the current economic situation. All these factors influence the organization's efficient and effective growth.

Descriptive and predictive analytics - In order to get insights about a company's workforce, the HR managers generally apply two types of analytics. One is descriptive analytics which is used to gather and analyze data that represents the current state of things or historical events. With descriptive analytics, one answers questions like "what happened?" or "what is happening?" Forecasting future outcomes, events or values based on the analysis of current and historical data is done with predictive analytics. Predictive analytics helps to answer questions like "what is likely to happen?" Predictive analytics requires numerous statistical techniques, including data mining and machine learning. Organizations are already using predictive analytics to optimize operations and to improve the employee experience. Some of the popular areas of its application are:

- Smarter recruitment and people management
- Forecasting employee turnover
- Predicting sick leaves or days off
- Workforce planning

A guide to implementing HR analytics - In order to imple-

ment people analytics in organization you need to establish and implement HR data collection and analysis with a step-by-step plan.

Step 1- Choose metrics and KPIs to monitor and predict

Step 2- Define data sources

Step 3 - Decide on a tool

Step 4- Gather a team

Step 5- Set up data infrastructure

Step 6- Build a predictive model

Step 7 - Develop UI of a solution

Step 8- Train employees on how to use the system

Challenges of HR Analytics - There are several challenges organizations need to overcome in order to gain benefits as the pathway to HR analytics is very complex.

- Finding people with the right skillset to gather, manage, and report on the data
- Data cleansing
- Data quality
- Too much data to analyze or not knowing what data is most important
- Data privacy and compliance
- Proving its worth to executive leadership
- Tying actions and insight to ROI
- Identifying the best HR technologies to keep track of the data

Summary -

HR analytics are assets to the organizations and can add incredible value to the organizations. HR Analytics does not always mean buying an expensive software and setting up a huge team or long processes. It can be initiated with tiny steps like getting involved in smalldiscussions with employees, recording their responses, adding managers in the loop, involving various functions, making a plan, sharing it with everybody, and committing to it. Sharing the data is crucial to make sure everyone knows it, understands it, and suggest ideas to improve the employee experience. Data should be used to drive various initiatives, solutions and existing problems in order to bring positive changes in the organization. HR Analytics will help to monitor and improve employee engagement, employee retention, employee wellness, employee productivity, employee experience, and work culture.

To ensure that the recommendations actually see the light of day, keep the models interpretable and analytical results explainable. This is key to win over the confidence of decision-makers. It can also help get the HR stakeholders conversant in leading the insights-driven interventions.

Chapter 14
Statistics in Business Analytics

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Abstract

Statistics is a scientific method of collection, presentation, analyzation and interpretation of data. Based on that interpretation we can take a proper decision. Statistics is used for business analytics. In this chapter we will discuss the introduction of statistics, basics of set theory, the measure of central tendency i.e. how we can calculate mean, median and mode for the raw data and measure of dispersion such as standard deviation, variance and co-variance.

1. INTRODUCTION OF STATISTICS

Statistics is a collection of methods which help us to describe, summarize, interpret, and analyze data. Drawing conclusions from data is vital in research, administration, and business.

Researchers are interested in understanding whether a medical intervention helps in reducing the burden of a disease, how personality relates to decision-making, whether a new fertilizer increases the yield of crops, how a political system affects trade policy, who is going to vote for a political party in the next election, what are the long-term changes in the population of a fish species, and many more questions.

Governments and organizations may be interested in the life expectancy of a population, the risk factors for infant mortality, and geographical differences in energy usage, migration patterns, or reasons for unemployment. In business, identifying people who may be interested in a certain product, optimizing prices, and evaluating the satisfaction of customers are possible areas of interest.

In all these examples, it is important to collect data in a way

which allows its analysis.

The representation of collected data in a data set or data matrix allows the application of a variety of statistical methods. In the first part of the book, we are going to introduce methods which help us in describing data, and the second and third parts of the book focus on inferential statistics, which means drawing conclusions from data.

Framework of statistics- A systematic framework is required to properly collect, administer, evaluate, and analyze data. Let us first look at the terminology to understand this framework.

Observations- The units on which we measure data—such as persons, cars, animals, or plants are called observations. These units/observations are represented by the Greek symbol (omega).

Collection- The collection of all units is called population and is represented by when we refer to w (small omega) ∈ (big omega), we mean a single unit out of all units, e.g. one person out of all persons of interest.

Sample- If we consider a selection of observations 1, 2. . . n then these observations are called sample. A sample is always a subset of the population, {1, 2 . . . n} ⊆.

Variables- If we have specified the population of interest for a specific research question, we can think of what is of interest about our observations. A particular feature of these observations can be collected in a statistical variable X. For example, if our observations refer to human beings, X may describe marital status, gender, age, or anything else which may relate to a person. Of course, we can be interested in many different features, each of them collected in a different variable Xi, i = 1, 2. . . p. Each observation takes a particular value for X.

- If X refers to gender, each observation, i.e. each person, has a particular value x which refers to either "male" or "female" this information is summarized in X.
- Let X be the country of origin for a car. Possible values to be taken by an observation (i.e. a car) are S = {Italy, South Korea, Germany, France, India, China, Japan, USA . . .}.
- A variable X which refers to age may take any value between 1 and 125. Each person is assigned a value x which represents the age of this person.

Type of Variables: Variables could take Qualitative or Quantitative values.

Qualitative variables are the variables which take values x that cannot be ordered in a logical or natural way. Examples of Qualitative Variables:

- The color of the eye,
- The name of a political party, and
- The type of transport used to travel to work

Quantitative variables represent measurable quantities. The values which these variables can take can be ordered in a logical and natural way. Examples of quantitative variables are

- Size of shoes,
- Price for houses,
- Number of semesters studied, and
- Weight of a person.

These are all qualitative variables.

It is common to assign numbers to qualitative variables for practical purposes in data analyses (see Sect. 1.4 for more detail). For instance, if we consider the variable "gender", then each observation can take either the "value" male or female. We may decide to assign 1 to female and 0 to male and use these numbers instead of the original categories. However, this is arbitrary, and we could have also chosen "1" for male and "0" for female, or "2" for male and "10" for female.

Discrete and Continuous Variables-

Discrete variables are variables which can only take a finite number of values. All qualitative variables are discrete, such as the color of the eye or the region of a country. But also quantitative variables can be discrete: the size of shoes or the number of semesters studied would be discrete because the number of values these variables can take is limited.

Variables which can take an infinite number of values are called continuous variables. Examples are the time it takes to travel to university, the length of an antelope, and the distance between two planets. Sometimes, it is said that continuous variables are variables which are "measured rather than counted". for instance, the height of a person may be recorded as 172 cm. However, the actual height on the measuring tape might be 172.3cm which was rounded off to 172 cm. If one had a better measuring instrument,

we may have obtained 172.342 cm.

Group Variables- If data is available in grouped form, we call the respective variable capturing this information a grouped variable. Sometimes, these variables are also known as categorical variables. This is, however, not a complete definition because categorical variables refer to any type of variable which takes a finite, possibly small, number of values. Thus, any discrete and/or nominal and/or ordinal and/or qualitative variable may be regarded as a categorical variable. Any grouped or categorical variable which can only take two values is called a binary variable.

Scales- All above examples of variables show that different variables contain different amounts of information. A useful classification of these considerations is given by the concept of the scale of a variable. The scale could be categorized as -

***Nominal scale.** The values of a nominal variable cannot be ordered. Examples are the gender of a person (male–female) or the status of an application (pending–not pending).

***Ordinal scale.** The values of an ordinal variable can be ordered. However, the differences between these values cannot be interpreted in a meaningful way. For example, the possible values of education level (none–primary education–secondary)

Data Collection

When collecting data, we may ask ourselves how to facilitate this in detail and how much data needs to be collected education–university degree) can be ordered meaningfully, but the differences between these values cannot be interpreted. Likewise, the satisfaction with a product (unsatisfied–satisfied–very satisfied) is an ordinal variable because the values

***Continuous scale.** The values of a continuous variable can be ordered. Furthermore, the differences between these values can be interpreted in a meaningful way. For instance, the height of a person refers to a continuous variable because the values can be ordered (170 cm, 171 cm, 172 cm, …), and differences between these values can be compared (the difference between 170 and 171cm is the same as the difference between 171 and 172 cm). Sometimes, the continuous scale is divided further into subscales.

***Interval scale.** Only differences between values, but not ratios, can be interpreted. An example for this scale would be temperature (measured in ◦C): the difference between −2 ◦C and

4 ◦C is 6◦C, but the ratio of 4/−2 = −2 does not mean that −4 ◦C is twice as cold as 2 ◦C.

***Ratio scale.** Both differences and ratios can be interpreted. An example is speed:60 km/h is 40 km/h more than 20 km/h. Moreover, 60 km/h is three times faster than 20 km/h because the ratio between them is 3.

***Absolute scale.** The absolute scale is the same as the ratio scale, with the exception that the values are measured in "natural" units. An example is "number of semesters studied" where no artificial unit such as km/h or ◦C is needed: the values are simply 1, 2, 3 . . . . This variable can take can be ordered, but the differences between "unsatisfied satisfied" and "satisfied–very satisfied" cannot be compared in a numerical way.

2. SET THEORY

Set: Set is collection of objects. In other words set is collection of elements. The set is represented by capital letters. For example

A= {a, b, c …}

There are some types of sets.

1. Empty set is the set which does not have any element it is also known as null set. It is denoted by ∅.

E.g. − S = {x | x ∈ N and 7 < x < 8} = ∅

2. Singleton set contains one element. It is also known as unit set. A singleton set is denoted by {s}.

Example − S = {x | x ∈ N, 7 < x < 9} = {8}

3. Finite Set is a set which contains a finite number of elements.

E.g. − S = {x | x ∈ N and 70 > x > 50}

4. Infinite Set contains infinite number of elements.

E.g − S = {x | x ∈ N and x > 10}

5. Subset A set X is a subset of set Y (written as X ⊆ Y) if every element of X is an element of set Y.

E.g. 1 − Let, X = {1, 2, 3, 4, 5, 6} and Y = {1, 2}. Here set Y is a subset of set X as all the elements of set Y is in set X. Hence, we can write Y ⊆ X.

E.g. 2 − Let, X = {1, 2, 3} and Y = {1, 2, 3}. Here set Y is a subset (Not a proper subset) of set X as all the elements of set Y is in set X. Hence, we can write Y ⊆ X.

6. Proper Subset The term "proper subset" can be defined as "subset of but not equal to". A Set X is a proper subset of set

Y (Written as X ⊂ Y) if every element of X is an element of set Y and $|X| < |Y|.

E.g. – Let, X = {1, 2, 3, 4, 5, 6} and Y = {1, 2}. Here set Y ⊂ X since all elements in X are contained in X too and X has at least one element is more than set Y.

7. Universal Set is a collection of all elements in a particular context or application. All the sets in that context or application are essentially subsets of this universal set. Universal sets are represented as U.

E.g. – We may define U as the set of all animals on earth. In this case, set of all mammals is a subset of U, set of all fishes is a subset of U, set of all insects is a subset of U, and so on.

8. Equal Set If two sets contain the same elements they are said to be equal.

E.g. – If A = { 1, 2, 6 } and B = { 6, 1, 2 }, they are equal as every element of set A is an element of set B and every element of set B is an element of set A.

9. Equivalent Set If the cardinalities of two sets are same, they are called equivalent sets.

E.g. – If A = { 1, 2, 6 } and B = { 16, 17, 22 }, they are equivalent as cardinality of A is equal to the cardinality of B. i.e. |A| = |B| = 3

10. Overlapping Set Two sets that have at least one common element are called overlapping sets.

E.g. – Let, A = { 1, 2, 6 } and B = { 6, 12, 42 }. There is a common element '6', hence these sets are overlapping sets.

11. Disjoint Set Two sets A and B are called disjoint sets if they do not have even one element in common. Therefore, disjoint sets have the following properties –

$n(A \cap B) = \emptyset$

$n(A \cup B) = n(A) + n(B)$

E.g. – Let, A = {1, 2, 6} and B = {7, 9, 14}, there is not a single common element, hence these sets are overlapping sets.

Set Operations

Set operations are perform on sets. There are four main types of operations which are as follows.

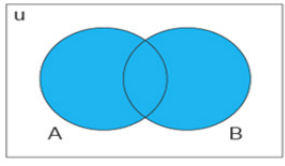
Union, Intersection, Complement and Difference of sets

1. Union of Sets

For two given sets A and B, A∪B (read as A union B) is the

set of distinct elements that belong to set A and set B or both. The number of elements in A ∪ B is given by n(A∪B) = n(A) + n(B) − n(A∩B), where n(X) is the number of elements in set X.

E.g. If A = {1, 2, 3, 4} and B = {4, 5, 6, 7}, then the union of A and B is given by A ∪ B = {1, 2, 3, 4, 5, 6, 7}.

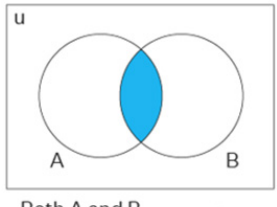


A U B

2. Intersection of Sets

For two given sets A and B, A∩B (read as A intersection B) is the set of common elements that belong to set A and B. The number of elements in A∩B is given by n(A∩B) = n(A)+n(B)−n(A∪B), where n(X) is the number of elements in set X.

E.g. If A = {1, 2, 3, 4} and B = {3, 4, 5, 7}, then the intersection of A and B is given by A ∩ B = {3, 4}.



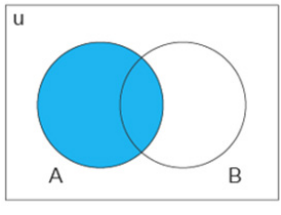
Both A and B
A intersect B

A∩B

3. Set Difference

The difference between sets implies subtracting the elements from a set. The difference between sets A and set B denoted as A − B lists all the elements that are in set A but not in set B.

E.g. If A = {1, 2, 3, 4} and B = {3, 4, 5, 7}, then the difference between sets A and B is given by A - B = {1, 2}.

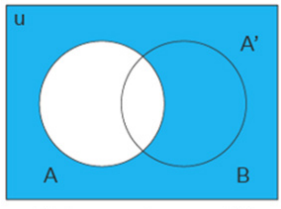


A - B

4. Complement of Sets

The complement of a set A denoted as A′ or Ac (read as A complement) is defined as the set of all the elements in the given universal set(U) that are not present in set A.

E.g. If U = {1, 2, 3, 4, 5, 6, 7, 8, 9} and A = {1, 2, 3, 4}, then the complement of set A is given by A' = {5, 6, 7, 8, 9}.



A' the complement of A

Examples of Set Operations

Example 1: In a school, every student plays either football or soccer or both. It was found that 200 students played football, 150 students played soccer and 100 students played both. Find how many students were there in the school using the set operation formula.

Solution: Let us represent the number of students who played football as n(F) and the number of students who played soccer as n(S). We have n(F) = 200, n(S) = 150 and n(F ∩ S) = 100. We know that,

$n(F \cup S) = n(F) + n(S) - n(F \cap S)$

Therefore, $n(F \cup S) = (200+150) - 100$

$n(F \cup S) = 350 - 100 = 250$

Answer: Hence the total number of students in the school is 250.

Example 2: If A = {a, b, c, d, e}, B = {a, e, i, o, u}, U = {a, b, c, d, e, f, g, h, i, j, k, l, o, u}. Perform the following operations on sets and find the solutions.

a) A ∪ B

b) A ∩ B

c) A′

d) A - B

Solution: a) A ∪ B = {a, b, c, d, e, i, o, u}

b) A ∩ B = {a, e}

c) A' = {f, g, h, i, j, k, l, o, u}

d) A - B = {b, c, d}

3. MEASURES OF CENTRAL TENDENCY

In the study of a population with respect to one in which we are interested we may get a large number of observations. It is not possible to grasp any idea about the characteristic when we look at all the observations. So it is better to get one number for one group. That number must be a good representative one for all the observations to give a clear picture of that characteristic. Such representative number can be a central value for all these observations. This central value is called a measure of central tendency. So there are some ways of calculate measure of tendency these are mean, median and mode.

Arithmetic mean is simply the mean of a variable is defined as the sum of the observations divided by the number of observations. It is denoted by the symbol $\bar{x}$. If the variable x assumes n values x1, x2 … xn then the mean is given by

$\bar{x}$= x1+ x2+ … xn/n

This formula is for the ungrouped or raw data.

Example Calculate the mean for pH levels of soil 6.8, 6.6, 5.2, 5.6, and 5.8.

$\bar{x}$=6.8+6.6+5.2+5.6+5.8/5

$\bar{x}$=30/5=6

Median it represents the mid-value of the given set of data when arranged in a particular order. The collected data should arrange in ascending or descending order, then

If the number of observations are odd then middle value is median.

If the number of observations are even then the median is the mean of middle two values.

By formula

When n is odd, Median = Md = $\left(\frac{n+1}{2}\right)^{th}$ *value*

When n is even, Average of $\left(\frac{n}{2}\right)$ *and* $\left(\frac{n}{2}+1\right)^{th}$ *value*

Example

If the weights of sorghum ear heads are 45, 60,48,100,65 gms, calculate the median

Solution

Here n = 5

First arrange it in ascending order

45, 48, 60, 65, 100

$$\text{Median} = \left(\frac{n+1}{2}\right)^{th} value$$

$$= \left(\frac{5+1}{2}\right) = 3^{rd} \ value = 60$$

Mode: It refers to that value in a distribution, which occur most frequently. It is an actual value, which has the highest concentration of items in and around it. It shows the center of concentration of the frequency in around a given value. Therefore, where the purpose is to know the point of the highest concentration it is preferred. It is, thus, a positional measure. Its importance is very great in agriculture like to find typical height of a crop variety, maximum source of irrigation in a region, maximum disease prone paddy variety. Thus the mode is an important measure in case of qualitative data.

Example Find the mode for the following seed weight 2 , 7, 10, 15, 10, 17, 8, 10, 2 gms

∴ Mode = 10

In some cases the mode may be absent while in some cases there may be more than one mode

4. SIGNIFICANCE OF STANDARD DEVIATION, VARIANCE, CO-VARIANCE

Standard Deviation is a statistic that measures the dispersion of a dataset relative to its mean and is calculated as the square root of the variance. The standard deviation is calculated as the square root of variance by determining each data point's deviation relative to the mean.

Variance is a measure of variability. It is calculated by taking the average of squared deviations from the mean. Variance tells us the degree of spread in your data set. The more spread the data, the larger the variance is in relation to the mean.

Covariance is a measure of the relationship between two random variables and to what extent, they change together. Or we can say, in other words, it defines the changes between the two

variables, such that change in one variable is equal to change in another variable.

EXAMPLE

Find the variance and standard deviation of the following scores on an exam:

92, 95, 85, 80, 75, 50

SOLUTION

First we find the mean of the data:

$$\text{Mean} = \frac{92+95+85+80+75+50}{6} = \frac{477}{6} = 79.5$$

Then we find the difference between each score and the mean (deviation).

Score	Score - Mean	Difference from mean
92	92 – 79.5	+12.5
95	95 – 79.5	+15.5
85	85 – 79.5	+5.5
80	80 – 79.5	+0.5
75	75 – 79.5	-4.5
50	50 – 79.5	-29.5

Next we square each of these differences and then sum them.

Difference	Difference Squared
+12.5	156.25
+15.5	240.25
+5.5	30.25
+0.5	0.25
-4.5	20.25
-29.5	870.25
Sum of the squares →	1317.50

The sum of the squares is 1317.50.

Next, we find the "mean" of this sum (the variance). $\frac{1317.50}{5} = 263.5$

Finally, we find the square root of this variance. $\sqrt{263.5} \approx 16.2$

So, the standard deviation of the scores is 16.2; the variance is 263.5.

Example

The table below shows the ages of 1000 golfers who played golf this week at the local golf course. Use the table to find the mean, variance, and standard deviation of the golfers who played this past week:

Age	Frequency
0-9	15
10-19	75
20-29	107
30-39	165
40-49	255
50-59	243
60-69	127
70-79	13

To be able to solve this, we expand the table for our calculations:

To be able to solve this, we expand the table for our calculations:

Age	Midpoint, x_i	Frequency, f_i	$x_i f_i$	x_i^2	$x_i^2 f_i$
0-9	5	15	75	25	375
10-19	15	75	1125	225	16875
20-29	25	107	2675	625	66875
30-39	35	165	5775	1225	202125
40-49	45	255	11475	2025	516375
50-59	55	243	13365	3025	735075
60-69	65	127	8255	4225	536575
70-79	75	13	975	5625	73125

$$\sum f_i = 1000,\ \sum x_i f_i = 43720,\ \sum x_i^2 f_i = 2147400$$

$$Mean = \frac{43720}{1000} = 43.72$$

$$Variance = \frac{2147400 - \frac{43720^2}{1000}}{1000 - 1} = 236.198$$

$$Standard\ Deviation = \sqrt{236.198} = 15.37$$

Conclusion

In this chapter we had discussed the introduction of statistics, types of variables, and types of scale which are used for data collection. In basics of set theory we had discussed what is set, types of set and operations on set. For data analysis we discussed the measure of central tendency mean, median and mode only for raw data in next chapter we will discuss measure of central tendency for discrete series as well as for continuous series. Also we discussed the measure of desperation for more variation in data. In next chapter we also discuss the measure of desperation for the discrete and continuous series.