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Contemporary Issues in Computer Technology
(NCICT-2022)**
May 28 & 29, 2022

DOIs:10.2019/IJEDI/NCICT-2022



Organized by
Department of Computer Science & Engineering
Jaipur Engineering College and Research Centre, Jaipur-India

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IN ASSOCIATION WITH IQAC & RESEARCH CELL & RESEARCH CULTURE SOCIETY

(Conference Special Issue)

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**Two Day National Conference on
“Contemporary Issues in Computer Technology”**

Organized by

**Department of Computer Science & Engineering
Jaipur Engineering College and Research Centre, Jaipur-India
May 28 & 29, 2022**

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About JECRC Foundation

The National Society for Education Research and Development was setup and registered in the year 1999 in Jaipur with the major objective of providing quality education and research environment in Rajasthan. Keeping this objective in view the pioneers in the field of education implanted JECRC Foundation in the year 2000. With the remarkable success the foundation achieved within a short span of time, today it has two institutions that conducts UG, PG and PhD programs in several disciplines duly approved by the UGC and AICTE, Government of India with the student strength exceeding 10000. The Foundation has an active collaboration with several industries. Our alumni have been placed in industries of repute and have also been pursuing higher studies abroad at prestigious universities. The foundation has the legacy of nurturing the essence of growth in education with the prime focus being holistic development of the students, thus becoming the most preferred choice for students with a variety of academic pursuits.

About CSE Department

The Department of Computer Science & Engineering was established in 2001. The Department aims at developing the technical skills among students. To accomplish this many events have been organized like Hackathons, Ideathons, and many different seminars and workshops to enhance the skills and overall personality of students. To enhance the entrepreneurship skills and research skills, the Department has established excellence in teaching and learning. Department not only focuses on technical skill but also provides different educational opportunities and support groups which help in creating technical as well as non-technical awareness. The fundamental aim of Department is to provide students opportunity at every pace.



Vision of the Institute

To become a renowned center of outcome based learning, and work towards academic, professional, cultural and social enrichment of the lives of individuals and communities.

Mission of the Institute

- Focus on evaluation of learning outcomes and motivate students to inculcate research aptitude by project based learning.
- Identify, based on informed perception of Indian, regional and global needs, areas of focus and provide platform to gain knowledge and solutions.
- Offer opportunities for interaction between academia and industry.
- Develop human potential to its fullest extent so that intellectually capable and imaginatively gifted leaders can emerge in a range of professions.

Vision of the Department

To become renowned Centre of excellence in computer science and engineering and make competent engineers & professionals with high ethical values prepared for lifelong learning.

Mission of the Department

- To impart outcome based education for emerging technologies in the field of computer science and engineering.
- To provide opportunities for interaction between academia and industry.
- To provide platform for lifelong learning by accepting the change in technologies
- To develop aptitude of fulfilling social responsibilities.

About Conference (National Conference on Contemporary Issues in Computer Technology)

NCICT is a national conference to be held in JECRC. It aims at bringing together students, scholars, researchers, academicians and industry persons to deliberate on contemporary issues concern to computer world and research aspects of emerging technologies and applications. NCICT-2022 is organized with a vision to address various issues to promote the development of smart resolution in future. It is expected that researchers will bring new prospects for collaboration across disciplines and gain ideas facilitating novel concepts. The first NCICT-2019 stood as a premier conference, organized by the Department of Computer Science & Engineering on March 16, 2019 at JECRC, Jaipur. NCICT-2022 is keeping the legacy continue on May 28 & 29, 2022 at JECRC, Jaipur.

Objective of Conference

- To focus on emerging technologies and developments in the area of Computer Engineering and Technology.
- To provide platform to students, scholars, academicians and industry persons to converse and share the ideas.
- To meet and discuss the practical solutions, scientific results and methods in solving various problems with people who are actively involved in emerging research fields.

Conference Tracks

- Artificial Intelligence and Machine Learning
- Internet of Things
- Big Data and Data Analytics
- Software Engineering
- Block Chain
- Wireless and Spectrum Technologies
- Soft Computing
- Cyber and Information Security
- Hardware and Network Engineering

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JAIPUR ENGINEERING COLLEGE
AND RESEARCH CENTRE

Jaipur Engineering College & Research Centre

Department of Computer Science and Engineering

4th National Conference on Contemporary
Issues in Computer Technology (NCICT-2022)

May 28-29, 2022



Sh. Arpit Agarwal
Director , JECRC



Sh. Sanjay Sharma
Chief Guest & Keynote Speaker
Technical Director (Scientist 'E')
NIC, Raj.asthan High Court



Prof.(Dr.) V.K. Chandna
Principal, JECRC



Dr. Sanjay Gaur
HoD, CSE & Convener



Dr. Vijeta Kumawat
Organizing Secretary



Ms. Astha Joshi
Organizing Secretary



Director's Message

Welcome to all the editors, contributor and authors of “Contemporary Issues in Computer Technology”, the special issues of NCICT-2022 with IJEDI as a piece of research journal. The overwhelming response to the contributors were acknowledged in very positive manner and its shows that new age is very much eager to work with technical literature. The rising researcher and scholar from various institutions and in-house participants motivate us to improve ourselves.

We are currently in the era of computer science and engineering revolution, spearheaded by recent developments in computer engineering and associated sciences, providing sustainable solutions to various issues in different areas including machine learning and data science. The deliberations in different tracks of the conference will highlight the current developments in the field of computer science and engineering.

I extend my best wishes for the editorial team of the special issue of International Journal of Engineering and Design Innovations and I am also confident on the editorial team of the same that they accomplished it in very efficient way. At last I hope this technological literature interaction will be a source of inspiration to upcoming educationists, technocrats and stakeholders.

Shri Arpit Agrawal



Principal's message

It is gratifying to note that the Department of Computer Science and Engineering of JECRC are publishing selected papers of 4th National Conference on “Contemporary Issues in Computer Technology” NCICT-2022 as the special research journal issue with International Journal of Engineering and Design Innovations.

Nowadays, publishing such kind of special issues in the shape of research journal publications provides a platform where the researchers and students can expose their ideas of research and exploring technological literature. They may also be able to listen and get aware from the recent trends. This special issue also helpful in the direction of enhancing technical and written communication skill along with project based learning.

I am confident that the special issue of IJEDI as “Contemporary Issues in Computer Technology” shall benefit all the participants towards finding the solutions of their research problems.

I convey my best wishes to the editorial team of International Journal of Engineering and Design Innovations, team of ‘NCICT-2022’, authors and contributors.

Prof. (Dr.) V. K. Chandna



Head of Department Message

It is a great opportunity for me that department of computer science and engineering is publishing selected papers of 4th National Conference on Contemporary Issues in Computer Technology as special issue of International Journal of Engineering and Design Innovations. It is indeed a great pleasure to write a few words on this occasion. This is time to meet the thoughts of others in the technological amalgamation. This publication aims to bringing technological literature in the proper shape so it can be utilize for future reference. It is also a repository of novel thoughts of new researcher, academicians in the domain of computer science and engineering.

The theme of the proceedings addresses the contemporary issues in the domain of computer technology along with latest trends in information technology worldwide.

Here I am delighted that the series of conference on contemporary issues in computer technology has successfully completed its three folds and entered into fourth one, it's all due to the valuable efforts of faculty members of computer science and engineering department.

I express my sincere thanks to the college management for their consistent and unending support. I also extend my gratitude to Shri Arpit Agarwal, Director Jaipur Engineering College & Research Centre and Prof. (Dr.) V. K. Chandna, Principal, for his endless mentoring and untiring efforts to motivate the team members.

I am also grateful to all authors, contributors and editorial team for accomplishing the task as a technological repository which become a beautiful page of journey book of JECRC Foundation.

Dr. Sanjay Gour

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EMERGING DATA ANALYTICS SCENARIO FOR BUSINESS INTELLIGENCE

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Abstract: *Nowadays things and thoughts are passing through the rapid change scenario, the entire technical world now following decision technology. The decision technology is directly associated with the data analytics. The data analytics is associated with various domain where diversified tools and technologies are used to find out the consequences in the favour of better decision. The race of finding better decision, impacted on the technological advanced tools to make them too advance and creating pressure to provide one screen as well as one interface solution which is also known as smart screen presentation. Although this is not possible at all due to variety of business work and nature of data and report representation. In such scenario, there is possibility to optimise the solution as per requirement of the business. The tools may be customise enough to fulfil the data requirements as per the need of time, it may be predictive or prescriptive both. The present paper is an attempt to present scenario of the data analytics, which may support the development of the business intelligence with existing technologies.*

Key Words: *Data Analytics, Business, Intelligence, decision, technical, smart.*

INTRODUCTION:

These days' belongings and contemplations are going through the fast change situation, the whole specialized world presently following choice innovation. The choice innovation is straightforwardly connected with the data analytics. The data analytics is related with different space where expanded tools and advances are utilized to figure out the results in the blessing of better choice. The sprint of tracking down better choice, influenced on the high-level software tools to make them excessively advance and furthermore making strain to give one screen as well as one point of interaction arrangement that is otherwise called brilliant screen show. Albeit this is unimaginable by any stretch of the imagination because of assortment of business work and nature of data and report portrayal. In such situation, there is plausibility to streamline the arrangement according to necessity of the business. The tools might be tweak to the point of satisfying the data necessities according to the need of time, it could be predictive or prescriptive both.

Over the course of the last ten years, business intelligence has been upset in change quick way, it is seen that the data detonated and turned out to be huge data. The entire situation is changed and twirl around the data analytics. The other change is that we as a whole accessed the cloud. The customary bookkeeping sheets to complete assumed a lower priority in relation to noteworthy and sagacious data visualizations and become intelligent business dashboards. Comparative the ascent of self-administration analytics democratized the data item chain. In the middle between them unexpectedly progressed analytics wasn't only for the experts, the job of such analytics become more critical. Presently in the year 2022, Business Intelligence tools and procedures will turn out to be progressively altered. The businesses of all sizes are done inquiring as to whether they need expanded admittance to business intelligence analytics, yet what is the best answer for their particular business. Indeed, even the organizations are done contemplating whether data visualizations further develop investigations yet what is the most ideal way to recount every data-story, particularly with the assistance of present day business intelligence dashboard programming. So it is found that the running year will be the time of data security and data discovery: spotless and secure data joined with a straightforward and strong show. It will likewise be an extended period of cooperative business intelligence and artificial intelligence.

ANALYTICS AND BUSINESS INTELLIGENCE TRENDS:

Over the past decade, business intelligence has been revolutionized in vary rapid manner, it is observed that the data exploded and became big data. The entire scenario is changed and spin around the data analytics. The other change

is that we all gained access to the cloud. The ordinary spreadsheets to finish took a backseat to actionable and insightful data visualizations and become interactive business dashboards. Similar the rise of self-service analytics democratized the data product chain. In between them suddenly advanced analytics wasn't just for the analysts, the role of such analytics become more significant. Now in the year 2022, Business Intelligence tools and strategies will become increasingly customized. The businesses of all sizes are no longer asking if they need increased access to business intelligence analytics, but what is the best solution for their specific business. Even the companies are no longer wondering if data visualizations improve analyses but what is the best way to tell each data-story, especially with the help of modern business intelligence dashboard software. Therefore, it is found that the running year will be the year of data security and data discovery: clean and secure data combined with a simple and powerful presentation. It will also be a year of collaborative business intelligence and artificial intelligence.

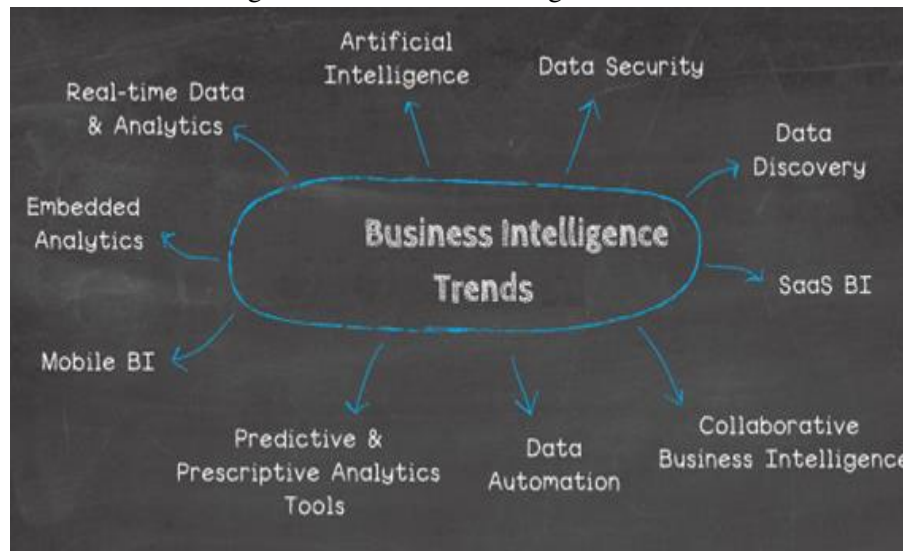


Figure-1: Business Intelligence Trends

TRENDS IN BUSINESS INTELLIGENCE:

There are numbers of trends which are now in the vicinity of business intelligence development, in the present scenario some of the leading trends are discussed here which gives an inside for the same.

ARTIFICIAL INTELLIGENCE:

Artificial intelligence (AI) is the science meaning to cause machines to execute what is typically finished by complex human intelligence. Artificial intelligence and machine learning are upsetting the manner in which we collaborate with our analytics and data the executives while increase in security measures should be considered. The truth of the matter is that it is and will influence our lives, regardless of whether we like it. Businesses are developing from static, detached reports of things that have previously happened to proactive analytics with dashboards that assist businesses with seeing what's going on at each second and give cautions when something isn't the way it ought to be. Measures, for example, an AI calculation in view of the most progressive neural networks gives high precision in peculiarity recognition as it gains from verifiable patterns and examples. Like that, any startling occasion will be promptly enlisted and the system will tell the client.

Artificial intelligence has on offer in BI arrangements is the up-scaled experiences capacity. It fundamentally completely investigations of your dataset consequently without requiring a work on your end. You essentially pick the data source, you need to dissect and the attribute / variable that the calculation ought to zero in on. Then, at that point, estimations will be run and returned to you with development, patterns, figure, esteem driver, key portions connections, peculiarities, and imagine a scenario where investigation.

That is an inconceivable time gain, as what is generally taken care of by a data researcher will be performed by a device, furnishing business clients with admittance to great experiences and a superior comprehension of their data, even without areas of strength for a foundation.

DATA SECURITY:

Security is a big chapter that is always associated with the IT development and role of security become more significant with the growth of cyber world. From the table-1, we can see growth in the security world.



Worldwide Security Spending by Segment, 2019-2020 (Millions of U.S. Dollars)

Market	2019	2020	Growth (%)
Application Security	3,095	3,287	6.2
Cloud Security	439	585	33.3
Data Security	2,662	2,852	7.2
Identity Access Management	9,837	10,409	5.8
Infrastructure Protection	16,520	17,483	5.8
Integrated Risk Management	4,555	4,731	3.8
Network Security Equipment	13,387	11,694	-12.6
Other Information Security Software	2,206	2,273	3.1
Security Services	61,979	64,270	3.7
Consumer Security Software	6,254	6,235	-0.3
Total	120,934	123,818	2.4

Due to rounding, some figures may not add up precisely to the totals shown.

Source: Gartner (June 2020)

Here the Gartner underlines the principal drivers to worldwide security spending. This is essentially blend of privacy guidelines, and need to address advanced business gambles, which basically center around building discovery and reaction abilities. Since data breaks have been routinely in the information, humming businesses, and average clients, the interest for security items and administrations is reasonable.

DATA DISCOVERY/VISUALIZATION:

Data visualization has developed into a cutting edge answer for present and connect with various illustrations on a solitary screen, whether it's centered around creating deals diagrams, or complete intelligent reports. The fact of the matter is that data discovery is an interaction that empowers chiefs to uncover experiences and by utilizing visualizations, groups get the opportunity to recognize patterns and significant exceptions in no time. Since humans process visual data better, the data discovery pattern will track down increase as quite possibly the main BI pattern in 2022.

SAAS BUSINESS INTELLIGENCE:

The fate of business analytics lays in the likelihood to play out own examination, with tools that are available, regardless of the area, and can acclimate to current and future working circumstances. Numerous businesses have gone to SaaS business intelligence to acquire adaptability and access the data on the cloud, from any gadget. Such advancements, that empower data development and access from different spots will keep on ascending as one of the main business intelligence patterns in 2021. SaaS is turning into a dearest companion to remote and different groups that need arrangements that will assist them with upgrading their business processes and guarantee there are no bottlenecks by working from a distance.

PREDICTIVE AND PRESCRIPTIVE ANALYTICS TOOLS:

Business analytics of tomorrow is centered around the future and attempts to address the inquiries: 1) what will occur? Also, 2) How might we at any point get it going?

Predictive analytics is the act of extricating data from existing data puts together to figure future probabilities. It's an augmentation of data mining which alludes just to past data. Predictive analytics incorporates assessed future data. Predictive analytics demonstrates what could occur in the future with a satisfactory degree of unwavering quality, including a couple of elective situations and hazard evaluation. Among various predictive analytics techniques, two are very well known among data researchers: artificial neural networks (ANN) and autoregressive integrated moving average (ARIMA).

Applied to business, predictive analytics is utilized to break down current data and verifiable realities to all the more likely grasp clients, items, and accomplices and to recognize possible dangers and open doors for an organization. The predictive models, by and by, utilize numerical models to anticipate future happenings, all in all, estimate engines.



Real-time Data and Analytics

Real-time admittance to data has turned into a standard in regular daily existence. In the businesses including the general work like latest data, charts, and measurements that have characterized a portion of the methodologies. The real time investigation empowered businesses to keep steady over changes and adjust to tremendous difficulties. Also, executing live dashboards will assist organizations with promptly getting to important data in regards to their business and respond on the off chance that any potential issues emerge. Cutting-edge data is turning out to be a higher priority than any time in recent memory, and since the world has changed, organizations need to adjust too. High stuff for data access is turning into the standard and is one reason why a few organizations can get by, and others not.

COLLABORATIVE BUSINESS INTELLIGENCE:

Collaborating or Cooperative BI is a blend of coordinated effort tools, including virtual entertainment and other 2.0 technologies, with online BI tools. This is created in a setting of upgraded cooperation tending to the new difficulties the most optimized plan of outbreak business gives, where more examinations are finished. These BI tools make sharing simpler in creating computerized reports that can be planned at explicit times and to explicit individuals. Collaborative data, data upgrade, and cooperative navigation are the vital focal point of new BI arrangements. Be that as it may, cooperative BI doesn't just stay around certain reports' trades or updates. It needs to follow the different advancement of gatherings, calls, messages trades, and thoughts assortment. Later experiences anticipate that collaborative business intelligence will turn out to be more associated with more noteworthy systems and bigger arrangements of clients. The group's exhibition will be impacted, and the dynamic cycle will flourish in this new idea.

MOBILE BI:

A couple of years prior, mobile BI was viewed as an enormous whirl in the BI and analytics local area. The market infiltration is as yet developing, and BI arrangements is choice inside their product like present day mobile dashboards. Yet, not simply merchants, organizations will likewise execute mobile arrangements and effectively use them since it will furnish them with various advantages: getting to your data whenever, and any put - while riding on a train or loosening up on an ocean side. Actual presence at an office site is less vital every year and this is unquestionably influencing the BI business also. Mobile BI empowers organizations to approach their data additionally in real-time, guaranteeing quicker responses to any business events and giving more opportunity to clients that are as of now not in the workplace but rather need to get to basic business data in a hurry.

DATA AUTOMATION:

Business intelligence subjects wouldn't be finished without data analysis automation. Somewhat recently, we saw such a lot of data created, put away, and prepared to handle that organizations and associations were truly searching for current data automation answers for tackle enormous volumes of data that has been gathered. Business intelligence has gotten numerous automation techniques in the year 2021, we will see considerably more. Well established hindrances between data researchers and business clients are overall gradually blended into an all in one resource for any data prerequisite an organization could have - from gathering, breaking down, checking, and providing details regarding discoveries. A situation could incorporate keen revealing - predictive analytics and computerized reports increment the business clients' capacities to robotize data all alone, without the assistance of the IT division. Then again, data researchers actually will oversee complex examination where manual prearranging and coding is vital.

EMBEDDED ANALYTICS:

Businesses have perceived the capability of implanting different BI arrangements or reports into their own application and hence further developing their dynamic cycles and expanding efficiency. Previously choked by spread sheet / accounting sheets, organizations have realized how using embedded BI empowers them to offer higher benefit inside their own applications. Whether you want to make a report or send different dashboards to clients, embedded analytics is turning into a norm in business tasks, and we will see that most extreme organizations embracing it. Offices and company proprietors are searching for proficient answers for present their data without the need to assemble their own product. By basically white naming the picked application, associations can accomplish a cleaned show and revealing which they can propose to customers. This is one of the patterns in analytics that can be carried out promptly since numerous sellers currently offer this open door and guarantee that the application works consistently and absent a lot of intricacy.

CONCLUSION:

The trends are depending on the need and development according to need and its supportive segments. In the era of information technology advancement, nowadays the business intelligence in prime requirement to increase the



profit as well as stability of the business unit. The competitive environment can be penetrated by the utilization better technological advancement with right direction. To achieve the right direction there is need to run according to current business trends and future technological acceptance readiness. The present paper gives a positive sites of the currents business intelligence trends in very clear manner. The paper also gives ample amount on knowledge regarding business intelligence along with data analytics in very precise manner.

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THE GREEN COMPUTING OUTLOOK FOR EMERGING IT INDUSTRIES

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Abstract: *The green computing technology is one of the technology associated technology which is applicable at industries, offices as well as domestic places also. As this technology is associated with the computer devices and related network, thus there is wide scope of green computing. The green technology is one of the important concern from the environment control scenario. So we can say that green technology is use to decrease the contaminated constituents which are hazardous for the environment. The green technology is very significant because at the moment each and every thing is dependent on the information technology. The information technology advancement also has an adverse side that is directly cause of environment pollution and radiation. The generated heat, radiation, electromagnetic field effect and e-wasting factors are directly associated with environment pollution. Thus green technology is merger with stream line information technology. The present paper is an attempt to give an insight of green technology in the context of modern industrializations.*

Key Words: *Green Computing, technology, radiation, environment, pollution.*

INTRODUCTION:

This is the age of information technology and the terminology “Green Computing” is basically associated with the action along with the practices of designing IT enable paraphernalia. The green computing is also related form safe disposal of e-wests with proficiently along with less impact on the environment. The purpose of green computing are moderately comparable to green chemistry which are to decrease the utilization of hazardous materials, exploit energy competence throughout the product period, and indorse the recyclability or biodegradability of non-operational products and e-waste.

GREEN COMPUTING CLASSIFICATION:

In the very basic from we can classify the green computing with two major factors. The first factor is “Green-IT” which means a well-disciplined IT and the second factor is denoted by “IT-for Green” which is directly mean to utilization of information technology in a resourceful manner. As we know that an Information technology based unit contain various hazardous things like emission pollutant gases, e-west, electromagnetic fields, radiations and other related.

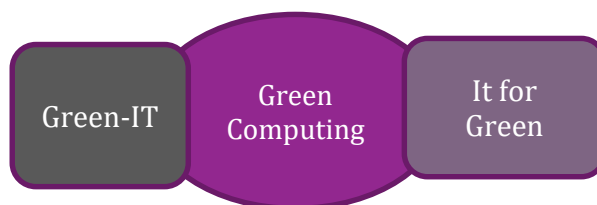


Figure-1: Green computing classification

The paramount and furthestmost decisive research on computing displays that Carbon Dioxide (Co2) and other gas releases are the reason for the worldwide climate change and it is directly act of environmental damage. The other

factor and hazardous activities make it one of the dangerous for the human being. Therefore, it found that go green is the paramount and leading requirements of the contemporary era which may play vital role to reduction in the overall energy consumption of computation, storage and communications.

GREEN COMPUTING TECHNOLOGIES:

As per the identified core green computing technologies by the GCI, following are the name of the same: Green Data Center, Virtualization, Cloud Computing, Power Optimization and Grid Computing.

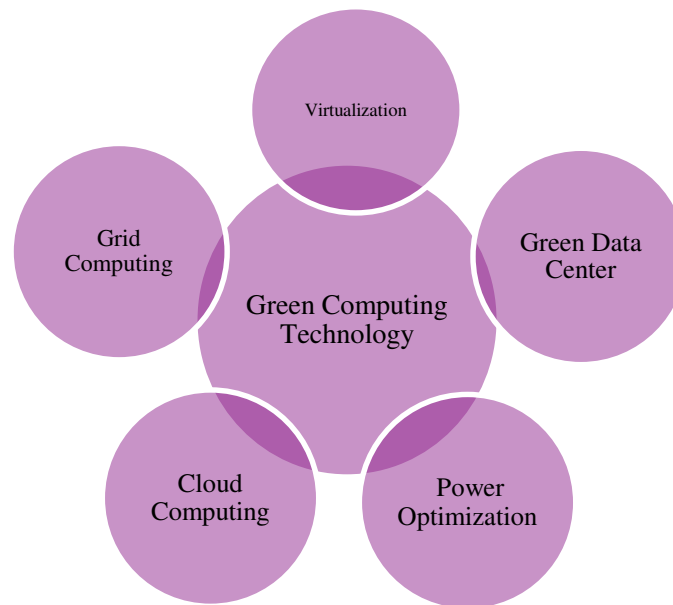


Figure-2: Green computing technologies

To overcome the hazardous effect, the green computing organizations are now start working with green computer (PC), such personal computers are inexpensive, non-toxic and work with ultra-low wattage. It also takes accountability of their obsolete products by proposing a computer salvaging facilities. The green computing may be develop numerous solutions that propose various assistances by line up the entire IT procedures and carry out with the main ideologies of sustainability, which are to reduce, reuse, and recycle; and discovery of innovative conducts to utilize modern information technology in the business processes to bring sustainability welfares across the organizations and elsewhere [2].

GREEN CLOUD COMPUTING:

The green cloud computing is comes in the existence to provide strength to green computing. Cloud computing has recognized themselves as an empowering technology for manifold IT service station. The upsurge in the amount of cloud-based IT amenities and applications generates the requirements about the founding of data centers which comprises numbers of web servers, network devices with huge storage.

The cloud data centers (CDC) deliver a variety of facilities from high degree computing to extensive data analytics to the end customers. The enormous gage of cloud data hubs that are structure at manifold topographical sites to facilitate disseminated customers which means that they contribute quarter part to the entire IT energy share [11]. Furthermore, the IT facilities are ever-changing from solo server actions to rack-mounted blade servers. The rack-mounted server structures upshot in advanced electronic solidities, greater energy ingesting, and hotness indulgence [2].

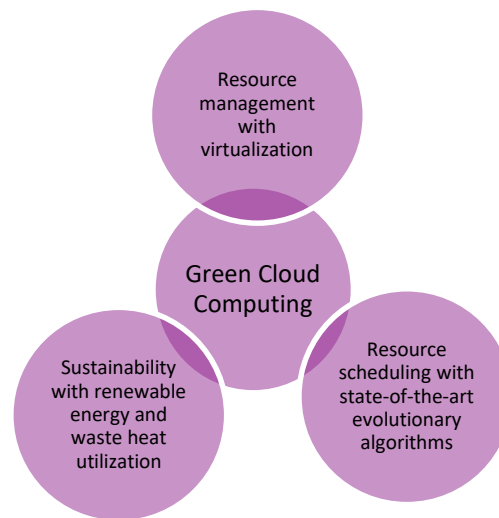


Figure-3: Green cloud computing technologies

For instance a consequence, together direct and indirect cooling energy requires growth in cloud data centers. The approaches to “green” cloud data center maneuvers may be generally categorized into three classes: (1) resource management with virtualization, (2) sustainability with renewable energy and waste heat utilization, (3) and resource scheduling with state-of-the-art evolutionary algorithms [9].

GREEN MOBILE COMPUTING:

This is the era of mobile computing. The smartphones of current generations are armed with big storage capability and high computational power which enable it to achieve high degree operations. The partiality of smartphone handlers has pointed the reliance on desktop servers to achieve computing responsibilities. By way of the consequence, the resource necessities of the smartphone applications also amplified [8].

The contemporary high class media-rich smartphone operations are rapidly activate sensors, like GPS, accelerometer, and wireless radios to deliver perspective facilities. According to outcome, the computation, communication, and energy charge of smartphones expressively upsurge. So in order to grip the energy-consequences trade-off, energy-efficient scheme intentions are essential to meet the necessities of current smartphone. Furthermore, energy approximation approaches supports to advise the energy-efficient project of smartphone operations and system constituents. The energy approximation gives assistances to recognize the rogue applications inside a smartphone [1].

GREEN INTERNET OF THINGS:

As we know that this is also time of Internet of Things and it also one of the supportive section to green computing. The IoT is one more developing technology which enables communication of data between numerous electronic gadgets deprived of human and computer intervention. The green Internet of Things is an establishment of actions accepted by the IoT in the arrangement of software and hardware productivity approaches. The green IoT intentions to attain energy competence via the lessening of the greenhouse consequence in the existing facilities and applications.

Furthermore, to decrease the influence on the atmosphere, Green IoT centered on the subjects of green constructions, green redesign, and green recycling or disposal [10]. The real deployment of IoT is achieved through the association of empowering technologies, communication policies, and protocols.

GREEN BIG DATA ANALYTICS:

Big data familiarizes the epoch of data with novel dares such as petabyte scale structured and unstructured data sets which are increasing at an uncontrollable rate and have varied formats. The rapid data access and correctness of exploration from a pool of big data are the key encounters to exploit value for conclusion which is accomplished in the big data analytics [4]. As per the old-style data administration schemes the competence to knob big data storage and analytics desires and therefore NoSQL approach is paying to deliver appropriate answers for appropriate data recovery and well-organized data processing. The procedure of greening is vital for big data as analytics on marvelous extent of data sets needs great computing power, ascendable and effectual storage space, great handiness of memory, along with the high communication media [5]. So, green big data analytics needs competence in resource utilization, energy consumption, and infrastructure scalability.

CONCLUSION:

As per the data available in the modern age about green computing, it is find that this is one of the parallel trend with computer technology which gives a positive support to enhance the technology with environment enrichment. This technology can be merge with any approach and trends of computer, information technology and network technology. This is very much helpful to reduce the global warming and provide better solution to reuse the reduce the pollutant segment of information technology. So green computing is one of important aspect to enrich the utilization of computer associated technologies.

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SEARCH ENGINE FACTOR ASSOCIATION WITH VIRTUAL MARKETING

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Abstract: *There is lot of factors that are associated with the search engine optimization and the scenario of the factors get changes according to need also. In the present study three factors taken in the consideration and assessing their associations. These factors are customer need for searching, customer choice about product and virtual marketing activities. Although these are very common, factor, which creates logical ground for the search, engine optimization as well as search engine marketing. This paper is an attempt to understand the reality behind this as search engine optimization works by influences the purchasing habits of the customer.*

Key Words: *search engine, influences, choice, need, statistical, virtual marketing.*

INTRODUCTION:

The search engine marketing is not a new word in the modern marketing scenario. The contemporary digital marketing world which is also recognized as the world of virtual marketing. In this scenario searching of any kind of product and service information is very easy by the help of search engine. This is one of the essential belongings which are related with the search engine optimization. The search engine optimization plays significant part to high-tech the advertisement and make it visible to the user during the searching. So, if information is available on the early page of searching consequence then this may accept that search engine optimization approaches are influencing the thinking process of the user. But to utilize the search engine optimization some factors are very important which are also very common factors, these factors are customer choice, need and virtual marketing in orientation of imprint of search engine optimization.

In general, the Search engine optimizations as fundamentally delivers a pathway by which a user can make his searching very fast and efficient and as we know that searching of any product and services are always connected from the choice of user as well as from the need of the user. The present study as a case study is an attempt to understand the reality behind this as search engine optimization works by influences the purchasing habits of the customer.

OBJECTIVE:

The objective of the projected study is associated from the various factors as choice of user, need of use and virtual marketing. These factors are assessed in the environment of search engine optimization. These factors with search engine optimization develops the given objective:

- 1) Evaluating the effect of search engine optimization.
- 2) Evaluate the association among choice of user, need of user and virtual marketing.

HYPOTHESIS:

Testing of hypothesis about affiliation among various factors such as user choice, user need and virtual marketing. The virtual marketing scenario directly and indirectly depend on the need and choice of the user. The projected hypothesis is an attempt to assess the bonding between customer choice, need and virtual marketing scenario. The hypothesis outlined as given below:



Null Hypothesis:

H₀: There is noteworthy association among customer choice, need and virtual marketing.

Alternate Hypothesis:

H₁: There is no noteworthy association among customer choice, need and virtual marketing.

To assess the supposition, we are considering three question which are indirectly interrelated with the supposition and factors as choice, need and virtual marketing. Consequently, to evaluate the hypothesis, the opinion of the user and expert were collected on the basis of three representative questions of the factors as mentioned in the hypothesis. These questions are as follows:

1. Are you always purchase as per your choice with online marketing?
2. Are your marketing / purchasing being need base through online platform.
3. Are you always preferring virtual / online mode for essential and normal purchasing?

These questions incorporate replies which demonstrations the association among these questions or it's contrary. At this time questions are also preserved as the variables for the test of hypothesis.

As data collected in the form of opinion, these opinions are gathered on the five-point scale. To evaluate the data here some statistical test is need to apply. As there are three variables / questions which we have to evaluate for similarity or also we can say that for the worth and correlation among them. In such orientation, we are applying one-way ANOVA "Analysis of variance" test. The consequences are depicted by tables given below.

SUMMARY

Groups	Count	Sum	Average	Variance
Question 1	300	1157.00	3.86	0.61
Question 2	300	1143.00	3.81	0.57
Question 3	300	1136.00	3.79	0.64

ANOVA

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	0.762	2	0.3811	0.629	0.5333	3.006
Within Groups	543.353	897	0.6057			
Total	544.12	899				

Table-1: ANOVA to evaluate association among customer choice, need and virtual marketing.

To evaluate the anticipated hypothesis, we had been gathered opinion of user by considering questions which were connected from customer choice of purchasing and need of customer to purchase from the virtual market.

DATA ANALYSIS:

The figure of gathered responses of users were 300 for each questions, thus the total of responses were (300*3=900). Seeing the sample size, and number of questions, it was noted that one-way ANOVA test is the proper test to inspect the hypothesis.

After applying the said test it is very much clear that the F value of the analysis is 0.629 which is less than the F critical / tabulated value.

In the statistical and expression it can be put as: $F_{(observed)} \leq F_{(Tabulated / Critical)}$.

Consequently $F_{(observed)} < F_{(Tabulated / Critical)} = F(0.629) < F(3.006)$. Therefore, hypothesis is acknowledged here as F observed value is lesser than the F tabulated value.

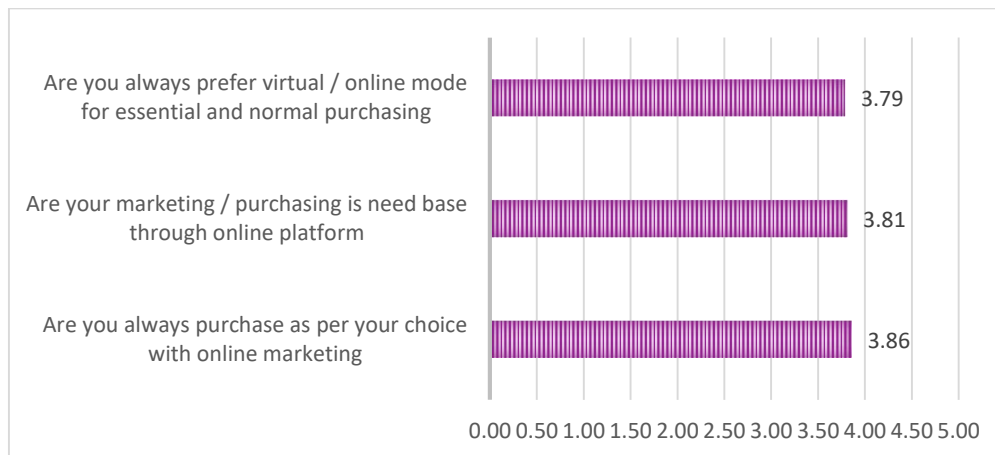


Figure – 1: Association among customer choice, need and virtual marketing

Interpretation from the measure of central tendency depicts that there is no key difference in the representative value of variables. As per table and figure 1 it is committed that there is strong association among customer choice, need and virtual marketing in reference of impression of search engine optimization.

CONCLUSION:

As per the consequences received from the test analysis of variance and measurement of central tendency, it is noted that there is strong association among the factors customer choice, need and virtual marketing in reference of impression of search engine optimization. Search engine optimizations basically provides a pathway by which a user can make his searching very fast and efficient and as we know that searching of any product and services are always connected from the choice of user as well as from the need of the user. These all activities are performed on the computer screen which is one of the form of the virtual world. This is proved by the statistical tests. In the daily life there is lot of factor which are supported by the virtual marketing including availability of product, one click detail, pricing comparisons, discount, offers and home delivery. So as the conclusion it is find that search engine optimization has a significant influence on the consumers' online purchase decision".

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CYBER CRIME COGNIZANCE IN REFERENCE INVESTIGATION AGENCIES

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Abstract: *Cybercrime is one of the most highlighted crime activities, which take a higher degree of crime with the growth of internet and social media. The reason behind the growth of cybercrime is directly associated with the negligence of such type of crime by the investing agencies. There is lot of reason behind it, one of the most important reason is that there is no special task force to solve the cybercrime cases as it is hi-tech range of crime and we need special expert force or investing agencies. The present study is an attempt to find out a single question answer about the competencies of the cybercrime investing agencies and ratio of cybercrime in the marked vicinity.*

Key Words: *cybercrime, trends, security, social media, investigation, agencies.*

INTRODUCTION:

At the present time we know that in the contemporary world the majority of activities related to routine life is associated with internet. The internet facilities are directly connected from the cybercrime. Due to use of internet, the opposing consequence reflects on the security of personnel information. The increase in the cybercrime is now going very common activities. The key reason behind it is to failure of investing agencies of cybercrime in the nation as well as worldwide.

The existing study attempts to reconnoiter the fact of cybercrime which is associated from the controlling of such activities which is investigation and technical knowledge for the investigation. This reason is also one of the significant segments which toss well-lit on how to overcome from the circumstances and work with secure cyber system.

OBJECTIVE:

The objective of the study is to find out the role of investing agencies to control the cybercrime. As it is well known fact that at the moment in the nation there is lake of competent cybercrime experts ae well as technology awareness among the experts posted in the investing agencies. So objective of the study is framed as: "To find out the capabilities of cybercrime investigation agencies to reduce the cybercrime." Above stated objectives will be considered to guide the research in right direction and to generate the meaningful conclusions which define core relation with the investigation and technical knowledge in respect of cyber crime.

HYPOTHESIS:

The supposition or hypothesis is the declaration which is given as wished-for research work to be undertaken for the valuation through the technical knowledge. It is also an investigation process of agencies which plays vital role test the proposed statement. Following is the hypothesis for the proposed research work: "Upsurge of cybercrime is connected from incompetent investigation agencies" The overhead hypothesis will be verified in the incidence of primary data which will be accepted to magnet the functional and obliging inferences.

ANALYSIS OF DATA:

Assessing the supposition about connection between cyber-crime development and incapability of the investigation agencies. This is for examining the cybercrime growth due to too much delayed in the investigation due to incapability of the investigation agencies.



The hypothesis framed for the assumptions is:

Null Hypothesis:

H₀: Upsurge of cybercrime is connected from incompetent investigation agencies.

Alternate Hypothesis:

H₁: Upsurge of cybercrime is not connected from incompetent investigation agencies

In the course of discovery of solution for the above stated hypothesis, the opinion was gathered from the respondents about the cyber-crime development and deferred in the investigation due to incompetence of the investigation agencies. Consequently, the opinion was collected through the questionnaire in which question is linked with cyber-crime development and non-completion of the investigation due to a smaller amount of capability and incompetence of the investigation agencies and linked departments. Therefore, the questions which are taken here as the variable for the hypothesis test are as given below:

- Are you admitting that cyber-crime activities are increasing rapidly and no proper act is formed to stop it effectively?
- Are you convinced that incapability of the investigation agencies plays supportive role in the growth of cybercrime?

As per the present segment of evaluation, the opinion of responders is recognized for both the variable which are above states and are representative to receive the opinion. The variables are hooding the opinion values on the five-point rating scale about cybercrime activity development and incompetence of the investigation agencies along with other responsible departments.

DATA ANALYSIS:

In order to test the proposed hypothesis, we take both the variable as stated above with hypothesis. As the final figure there are sum of 300 samples in each variable. To find out either growth in cyber-crime activities has a significant influence from the delayed in the investigation due to hopelessness of the investigation agencies, the regression analysis test among both the variable is the best suitable which gives a view of correlation among them. The analysis of correlation the opinions for both the variables /samples is given below:

<i>Regression Statistics</i>	
Multiple R	0.861
R Square	0.741
Adjusted R Square	0.740
Standard Error	0.460
<i>Observations</i>	<i>300</i>

Table 1: Regression Statistics between Cyber Crime development and Incompetence of the Investigation Agencies

According to values in the table, the regression statistics from the analysis of variables it is observed that the value of R acknowledged from the investigation depicts that the degree of relationship or correlation among both of the variable is very positive. Consequently, the high positive value confirms that development of cybercrime is strongly correlated from deferred in investigation due to incompetence of the investigation agencies. Here as per the table 1 R and R square, both are identical positive, which provides an indication that there is positive correlation among the variables and relationship. This is also noted that values of “R” are identical nearer to the arithmetical 1 (one). According to the values, it should be describe that relationship is linear (“a normal fit”). Therefore, interpreting to Regression



examination it can be describe that development in the cybercrime activities is toughly correlated with deferred in proper action and timely action by competent authority. Thus cyber forensic part should be upsurge to resolve the cases by the help of system generated electronic evidence and taken it as solid evidence to solve the cases with high-class talented cyber team / agencies.

CONCLUSION:

According data assessed by the statistical test, the proposed null hypothesis accepted and alternate hypothesis are rejected. Therefore, from the assessment it is very much clear that upsurge of cybercrime is connected from incompetent investigation agencies. In such reference, there is need to improve the capability of cybercrime investigation agencies and there is need to upgrade the facilities of the same. There is need to resolve the cases by the help of system generated electronic evidence and taken it as solid evidence to solve the cases with high-class talented cyber agencies.

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A PROSPECTION OF TRADITIONAL AND CLOUD BASED ERP ADOPTION

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Abstract: Nowadays the advancements in the technology provides a better and efficient way to implement the advancements in the tasks. As this is age of information technology the entire manual works are now shifted towards the software supports services, thus the need for individual platforms decreases. With the support of cloud-based services the entire information technology world including software, infrastructure as well as storage are now available on the internet. This revolution provides a better service to the persons who are not able to invest a huge or not able to invest immediate. In this reference, the services, which are accountable in the management information services and enterprises resource planning, are crucial one, as they required a big setup in all aspects. The present trends are motivated toward the cloud based software or software as a service, in such orientation the enterprise resource planning are also make available by the cloud companies. By means of cloud based ERP in spite of old-style ERP is not consuming much investment but there are lot of the other technical factors associated here for complete implementation. This paper is an attempt to discuss all the related issues and supporting technologies.

Key Words: Cloud Computing, MIS, ERP, Storage, Resources, Investments, Technology, Infrastructure.

INTRODUCTION:

According to contemporary industrial automation and automation adoption, the entire doings of the organizations are nowadays depending on the enterprise resource planning (ERP) system. The prevailing drifts are persuaded the usages of cloud based software as a service, in that reference the enterprise resource planning services are also delivered by the cloud companies. Utilization of cloud based ERP regardless of old-fashioned ERP is not having much change as per operational point of view but there are lot of the other technical factors are connected here for comprehensive implementation. Such factors are find out the welfares and disadvantages in the respects of data security, cost, user-friendliness, and availability of cloud based enterprise resource planning software. In the present era data are key strength of the entire industry in the age of information technology and utilizing cloud based ERP provides us misfortune free software services in low cost, but then again the possession of the data will be doubtful issue. Also the operations like data manipulation, backup and customization of software along with the desire services is again the issue. Thus there is need to better understand the technological advances in the direction to recognize the causes behind this and find out the picture of software as a service in cloud computing with special reference of one of the most important software service that is enterprise resource planning system software.

PROBLEM FRAMEWORK:

There are lots of problems associated with the cloud based ERP and management information systems which may be classified in various categories like, storage access, availability, manipulation and limitation of time bases accessibilities. Similarly, the storage of data is one of the foremost problem in the phase of multimedia grounded smartphone and social media. In the present-day cohort where data base of ERP were moved in the direction of the cloud based computing and automation. This is now distinguished that our data is safe on the cloud and it is not accessible normally. But then again till date this is an immense question related with cloud computing amenities that what about safety and security of availability of data along with accessibility of data in the personal hard disk.



There is always need of internet services and association of cloud provider company. Besides this what will have happened when the agreement of cloud company will have perished, it is a key issue. The key problems are connected with cybercrime and malicious access. These are somewhere a big threat with cloud and it is more crucial due not having own hard-disk backup. In such arrangements users are completely dependent on the cloud providers company. In the background of cloud computing as spare of old-style ERP is a big test of trust on technology and overcoming from the threatening of data security and availability.

TRADITIONAL ERP OUTLOOK:

If we are talking about the traditional infrastructure for ERP this is just like a data centre. This traditional data centre comprises number of hardware including desktop computer, network devices, remote servers which are tightly connected with network as well as network operating systems. In such arrangements, the server is stereotypically installed on the locations, and delivers altogether workforces using the hardware, access to the business's stored data and applications. Productions and trades with this information technology model must obtaining supplementary hardware and its renovations in order to gage up their storage and facilities to backing additional users. The compulsory software renovations are also mandatory with outmoded information technology infrastructure to guarantee the fail-safe organizations are in place to in case the failure happens. Intended for numerous companies with ERP and data centres, an in-house electronic Data processing department is required to install and uphold the hardware. Despite this on the other side, customary ERP substructures are well thought out to be the furthestmost secure data presenting solutions and permits us to uphold complete control on the company's applications and data on the local server. They are a customised, dedicated system ideal for organisations that need to run many different types of applications.

CLOUD BASED ERP:

Now the cloud is the novel frontline of organization computing and delivery of software and applications, this is also quickly surpassing the traditional in-house arrangement as a cost-effective, trustworthy and scalable solution. Though, numerous organizations that have manufactured their own vigorous data centers and outmoded IT substructure quiet rely deeply on this model for safety and managerial motives. In the contrast selecting an ERP model for the organizations is a very significant conclusion. Each company wants a secure storage cosmos, there data and applications may be effortlessly retrieved and consecutively costs are kept to a tiniest. Also the thought migrating data from outmoded ERP substructure to cloud based podiums, read on to discover the alterations between the two, to improved comprehend the welfares of such a move.

CLOUD VS TRADITIONAL ERP:

The cloud computing is far-off abstract just like a virtual hosting solution. In its place of being reachable via physical hardware, the entire network, servers and software are hosted by the in cloud, off premises. This is basically a real-time computer-generated atmosphere hosted among numerous different servers at the similar time. Consequently, rather than capitalizing cash into buying physical servers in-house, we can provide rent to the data storage space through the cloud service providers on an additional cost effective pay-per-use basis. The key variances among cloud and traditional ERP hosting are:

- **Resilience and Elasticity**

In the cloud information and applications are consistently dispersed across the entire servers, and these interconnected to work as one. Consequently, if any server get fails, no data is misplaced and interruption is circumvented. Meanwhile cloud also provides additional storage space and server resources, together with better computing power. It means software and applications will be performing quicker. In the outmoded ERP systems these functions are not so resilient and not gives assurance the consistently great performance of the server. Even the traditional ERP have inadequate capacity and are vulnerable to interruption, which can greatly hinder workplace productivity.

- **Flexibility and Scalability**

The cloud hosting provides an improved level of flexibility and scalability in contrast to traditional ERP as well as data centres. The cloud provides on-demand unlimited virtual space along with more secure server resources. The cloud servers have capacity to scale up or down the facilities as per the traffic. The cloud also provides full control to install any software as per need of user with authorization. This offers additional flexibility to the organization to grow

properly. With outmoded ERP infrastructure, we can only utilise the resources which are already available within. We have to purchase new storage devices when we require additional storage then provided similarly require more man power or trained man power to handle the same. Also need to pay for software licences and have these manually uploaded. This was too much costly and tedious affair to handle.

- **Automation**

The main difference amid cloud computing and traditional ERP infrastructure is about how both are managed. The cloud hosting is managed through the service provider company who takes cares the entire essentials like hardware, software and security measures and keeps the system run smoothly. The Outmoded ERP need substantial administration in-house, this is costly and time consuming affair. The completely trained ERP personnel needed to guarantee the regular monitoring and maintenance of the servers as well as the network associated.

- **Running Costs**

The cloud computing is cost effective than the traditional ERP infrastructure by means of payment for the data storage services. Thus with the cloud services, we only pay for what we used. Besides, the reduced probability of interruption means enhanced workplace performance and increased profits in the long run. With outmoded ERP infrastructure, we need to buying equipment and extra server space to the organization growth. If we end up paying, then we do not use the same. Moreover, the monetary and processing value of physical servers' diminutions year by year, thus the return on investment in traditional ERP is quite low.

- **Security**

The cloud computing is an exterior form of storage along with the software delivery; this can make it look less secure. Anybody with access to the server may view and usage of the stored data and applications. Selecting a cloud service provider which is totally transparent in its presenting of cloud stages and guarantees best security measures are in place is vital when transitioning to the cloud. With outmoded ERP infrastructure we are accountable for the protection data, and it is stress-free to guarantee that only approved personnel may take admittance stored applications and data. The physically linked local network, data centres may be copied by in-house, but there is need of significant amount and time to ensure the right security and data recovery systems.

CLOUD ERP ADOPTION:

Since the analysis on cloud ERP adoption based on both SMEs and large companies via the amalgamation of the experiential findings from the IT professionals and study of the extant, applicable literature, approximately conclusions are drawn. The consequences are picturized by the figure-1 which can be concluded that the distinct features of a company like geographical dispersion of its activities, seasonality, as well as other external factors which may include country and industry where it bestirs itself may significantly influence the respective company would evaluate its potential adoption of a cloud ERP instead of a conventional one.

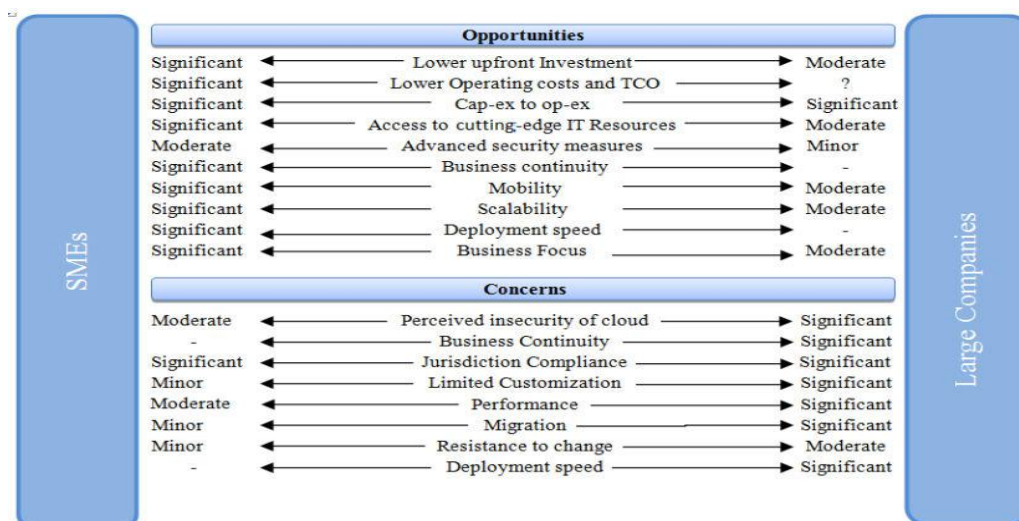


Fig. 1. Opportunities and concerns relevance in the context of company size
<https://www.leadingedgetech.co.uk/news/>



However, the analysis consequences presented clearly that small and mid-market companies can feat in a meaningfully bigger extent than large companies the occasions that cloud ERP adoption increases. At the same time, SMEs are connected to a smaller degree to the existing concerns of moving core enterprise applications to the cloud than large corporations do.

CONCLUSION :

The adoption of cloud based services for maintaining ERP system is a wise deal to save the money, resources and time along with the human hindrances. Although there are some issues related to authority about the data and services, in such sense it is obvious that on the large scale or at the international level any company will not commit such kind of mischief. Now we can believe that the terms and conditions are transparently produces by the company and it is given in the notice of user. So gradually users are utilizing the services of cloud in routine services and a big part of ERP system are now shifted towards the cloud based ERP, so the adoption of cloud based ERP in now easy to user and it is acceptable in the betterment and advancements of the services.

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A WEB BASED PLATFORM FOR WOMEN EMPOWERMENT

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Abstract: *Women empowerment has always been a major concern in our society. In this paper we have discussed a platform that aims to be a helping hand to all the women who lack in resources, support & network in order to fulfill their dreams. We aspire to eliminate all forms of violence & discrimination in women's lives by motivating them to be self-sufficient. We have a mission to help every woman break the cycle of suppression that prevents them from reaching their full potential. The Plan to do so is by providing jobopportunities to women as per their capabilities and empower them through a platform where their voices can be heard and will inspire others. We envision a world where everywoman has the strength to speak up for themselves & to earn a living on their own. We have built a web-based platform using HTML, CSS, JS, MySQL, PHP and XAMPP as a server to create a prototype keeping in mind the Model View Controller (MVC) approachwhich can be enhanced further using different frameworks.*

Keywords: *Model View Controller, XAMPP, Design thinking, Newsfeed.*

INTRODUCTION:

Women's empowerment can be defined in a variety of ways, including accepting women's views or striving to seek them, raising the statusof women through education, awareness, literacyand training [1]. Women's empowerment provides and enables women to make life- defining decisions across the various issues in society. The goal behind women's empowermentis to make all women emotionally and financialystable. With so many platforms available, women can express their thoughts and train for the required skills. “Pahal – A Platform to Empower the Women” aims to be a helping hand to all the women who lack in resources, support & network in order to fulfill their dreams [2]. This will become a factor in reducing the unemployment status of Indian women byoffering them jobs according to their capabilities. Also provide a platform to express and inspire others to be mentally relaxed [2]. With the growing popularity of the web, some new web technologies have emerged that have peppered web applications through HTML as a static programming language. Applications that use HTML-based front ends benefit from the introduction of a Web application in an organization causing a paradigm shift, because it has the potential to significantly change an organization's work practices and procedures [3]. The styling can only be done using CSS (Cascading Style Sheets) language. The new CSS version, i.e., CSS3 has amodular structure where different modules define different layout characteristics. JavaScript is the language that provides a dynamic web site which actively communicates with users. JavaScript is used in today's web applications as a client script language and on theserver side [3]. The JavaScript language supports the Model View Controller (MVC) architecture,which keeps the code readable and clearly separates the parts of the program code.

RELATED WORK:

The idea behind the new version of HTML (Hyper Text Markup Language), i.e. HTML5, andother tools presented in this document is the formal specification and definition of unifiedsolutions for technologies and features that have already been used in various hacks and plugins suggested by web developers. The applications can access these functionalities through newly defined application programminginterfaces [4]. HTML5 also introduces semanticmarkup, which may be used for marking the document structure also as its elements and data. The new HTML version imposes

a strict separation between the content of the page and its design. Styling can be done using Bootstrap Libraries which are standard CSS for HTML elements or custom CSS (Cascading Style Sheets). The new CSS version, i.e. CSS3, has a modular structure, in which different modules define different styling features [4]. Development cycles for individual modules are independent, as is support and implementation in different browsers. JavaScript is a truly dynamic programming language which, when applied to an HTML document, can provide dynamic interactivity on websites. JavaScript is in the top 5 programming languages in the world. JavaScript helps you build front-end client servers to the server side application, also now days mobile applications are build using JavaScript [5]. AJAX- Asynchronous JavaScript and XML is a new implementation of established web development technologies to achieve interactivity between users and servers over multiple background client-side server connections [5]. XAMPP is a cross-platform web server application managed by Apache. It's open source and free. The package includes the most popular web development technologies such as Apache HTTP server, MySQL database, PHP and Perl programming languages and some additional optional packages depending on the operating system on which it is used. The 'X' is read as a 'cross' which means cross-platform as it is available for more than one operating system [6]. Digitalization is probably to promote jobs in an effort to strongly rely upon complementarities among social and emotional intelligence and summary (or cognitive) competencies that may be acquired through higher training, along with creativity and crucial thinking [7]. In addition, high proficiency in digital skills will become a core requirement within the digital age. Since many women possess stronger social skills than their male peer, they could benefit from exploiting these complementarities [7]. However, the current gender disparities in higher education and digital literacy, particularly evident in emerging markets, may deprive women of these opportunities and prevent them from reaching those high-level positions in management, STEM or other professions. The entrepreneurial spirit to thrive. better in the digital age [7].

METHODOLOGY:

A. Applying the design thinking framework

We used design thinking to solve this problem because it is based on the concept and the process that seeks to solve complex problems in a user-friendly way. The main focus of design thinking process is to provide:

- Technically feasible: They can be developed into functional products or processes [8].
- Economically viable: The business can afford to implement them [8].
- Desirable for the user: They meet a real human need [8].

The different stages of design thinking process according to our project are:

- Empathize- We tried to know about the various problems faced by women in our region by speaking to about 30 women in our neighborhood and discussing their problems with them. The most common obstacle for them was managing these platforms, so we tried to build this platform in a way that it could work. Our end users also include people willing to help these women or work with the government to have a bigger impact.
- Defining the problem- We found that the main problem is that these women have certain skills that are sufficient to get into a job or make themselves economically stable but they are unaware of the jobs that require those skills. Additionally, there are some smaller organizations that have requirements for applicants who possess these skills. These organizations are also willing to provide them with opportunities.
- Ideate- We decided to fill this knowledge gap by offering job opportunities from small business owners or organizations to women. Additionally, allowing them to interact with the organization directly and having a team in the background who can work for these women to update their requirements and profile regularly.

B. Proposed web based platform

We aim to build a website that can become a helping hand to all the women who lack in resources, support & network in order to fulfill their dreams. We provide features like blogging, Applying for jobs, training, direct communication with organization and much more. We are using XAMPP as a local server, PHP for backend, MySQL as Database, HTML and CSS for a handy framework for a prototype and JS to make the website dynamic [9].

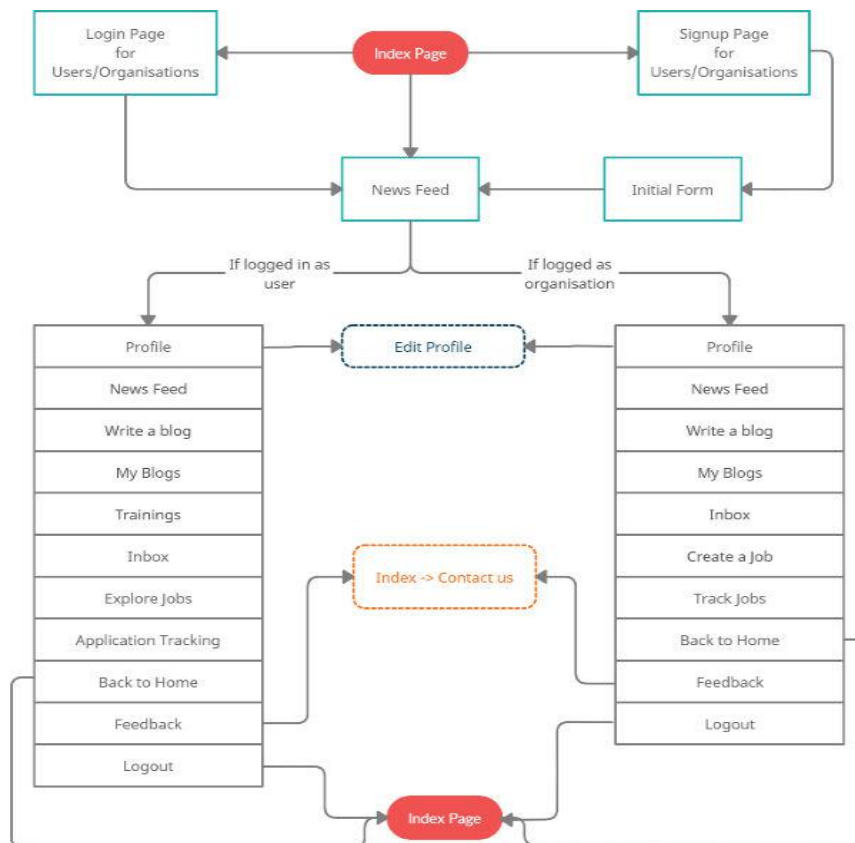


Fig 1: Sitemap

From the above Figure 1 we can understand how different web pages are connected with each other. Both end users (women and organization) after successful login/signup can read/write blogs that will be listed in their newsfeed in real time to create awareness among the readers.

Our Website Comprises of:

- Home page to introduce to our platform
- Login and Signup pages
- User Panel –
 - o To Create Profile, Display Profile, Edit Profile.
 - o To see News feed.
 - o To write blogs and also see your own blogs.
 - o Apply for jobs and tracking.
- Organization Panel –
 - o To Create Profile, Display Profile, Edit Profile.
 - o To see News feed.
 - o To write blogs and also see your own blogs.
 - o To post jobs and track the status

Homepage contains all the basic details of our platform such as Mission, Vision, Plan, Basic Services which we will be providing to the users and Contact details. Newsletter subscription is also added on it. Along with this it has a signup button for new users and login button for already existing users. A Nav bar to navigate to various sections of the page and also to newsfeed. Homepage is also embedded with a toggle button to switch between languages.

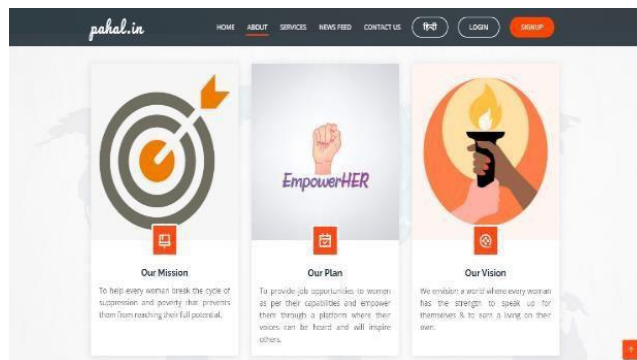


Fig 2: About us section in English

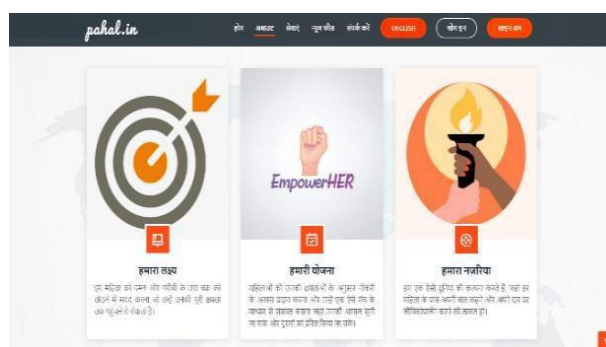


Fig 3: About us section in Hindi

In the navigation bar there is a toggle button which is used to switch between Hindi and English, this feature is introduced in the project to remove the language barrier to operate the website. We have used JavaScript in the backend to achieve this functionality. Below is the code snippet which we have used.

```
function changeLang() {
    var langbutton = document.getElementById('language-change');
    if (langbutton.innerHTML === "हिन्दी") {
        langbutton.innerHTML = "English";
        const collectionEng = document.getElementsByClassName('lang-eng-show');
        while (collectionEng.length > 0) {
            collectionEng[0].className = 'lang-eng-hide';
        }
        const collectionHin = document.getElementsByClassName('lang-hin-hide');
        while (collectionHin.length > 0) {
            collectionHin[0].className = 'lang-hin-show';
        }
    } else {
        langbutton.innerHTML = "हिन्दी";
        const collectionEng = document.getElementsByClassName('lang-eng-hide');
        while (collectionEng.length > 0) {
            collectionEng[0].className = 'lang-eng-show';
        }
        const collectionHin = document.getElementsByClassName('lang-hin-show');
        while (collectionHin.length > 0) {
            collectionHin[0].className = 'lang-hin-hide'
        }
    }
}
```

Fig 4: Code snippet to change language

If any new user wants to be a part of the “Pahal” family then she can register herself to our platform. This page consists of two different panels, one for users who want to seek job opportunities and another one is for organizations to recruit candidates according to their demands. Users can easily sign up by filling out some basic details and after this user will be automatically redirected to our homepage. The signup page and login page are embedded with real time validations using JavaScript for all the fields so that users can get Error, Warning and Tick icons according to the situation and users can hover over them to see details.

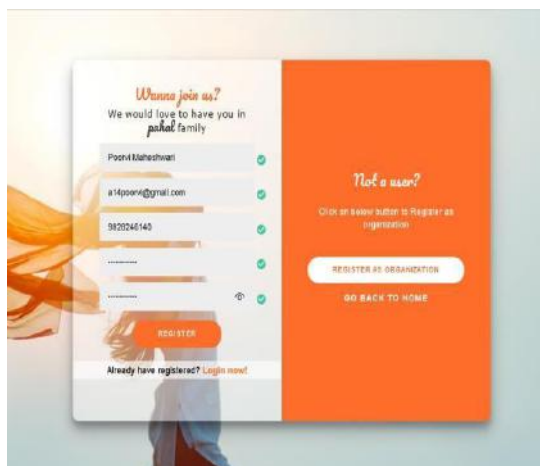


Fig 5: Sign-up page

While filling up the signup form, we just have collected the basic details of the user so now the user can update his profile through this profile

section. We have just made individual forms for all the sections of our profile like for basic details, education, experience and skills so that the user can easily update her profile whenever required. Using this information we create a resume-like document for them which can help them to get a job.

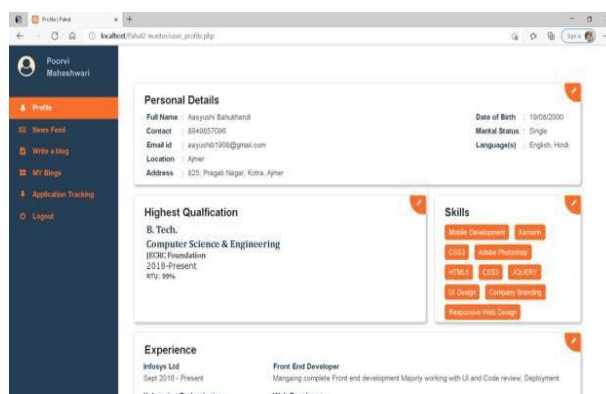


Fig 6: User Profile

We have provided users with a page to Write Blogs. This will help women to express their emotions and inspire others also, it will also help in their mental stability and peace. This page contains space to write up a new blog along with its title and thumbnail image to upload. It also has some icons to add basic functionalities such as bold, italics, underline, alignment, font style for better look. The blogs

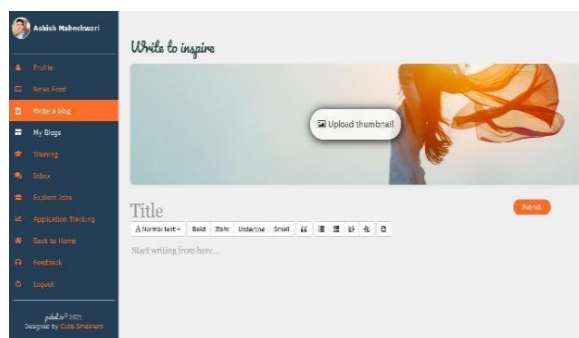


Fig 7: Blog writing page

The blogs which are posted by our users on the platform with some basic details like heading of the blog and just a short overview of it, are viewed on the newsfeed page. Users can view the detailed description of the blog by clicking on the Read More button which will redirect the user to the individual blog. A user can apply for the jobs using the Explore Jobs page from the sidebar, on that page jobs are listed and on clicking on the apply button user can apply to a particular job. They can also filter jobs according to the location and their skill set.



Fig 8: Explore Jobs Page

RESULT AND DISCUSSION:

Since We have gone through various platforms that are working for women empowerment in India but they all majorly focused on providing training and blogging platforms. Which is necessary also as it helps them to uplift and at the same time express their opinions in various fields. We further aimed to provide financial stability by providing/finding jobs for them with their existing skill set such as Stitching, Art & Craft, Cooking, Mehandi Designing, etc. So, we had built a platform to bridge the gap between such job providers and job seekers to help both simultaneously.

FUTURE SCOPE:

This prototype has presented the groundwork for preparing such a web based platform for women empowerment. Further it can be built using frameworks like Angular, React, Express JS or Node JS and for the further development of the platform we can also use MERN or MEAN as a full stack development tool. Newsfeed can be managed using a recommendation system built using Artificial Intelligence as per user's interest. Additionally, the blog can be tracked and analyzed for further actions to take. For instance if a blog indicates that there is some problem related to physical abuse the blog can be redirected to several NGOs and Nearby Government offices to provide help if needed. Further to improve the reach of the platform it can be launched in several popular regional languages also. Because most of the people we are targeting do not know Hindi or English, instead they communicate using their native regional language only.

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COMPUTERIZED PAPER EVALUATION USING NEURAL NETWORK

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Abstract: *The evaluation of examination paper is a difficult task for the examiners. It is very difficult to check the answer sheets. Also it consumes a lot of time. In the traditional way, the evaluation was basically performed using the pen and paper technique. In this way of evaluation is not as efficient as there are a number of things that might affect the unbiased checking of the answer sheets by the examiner. There are various faults that can occur in checking of answer sheets in traditional way. They include error in marks totaling and mistakes in marking. Thus there is a need for the proper checking of examination sheet because examination plays an important role in the student career as the students are judged according to their exam scores. The computerized assessment of marks has set a trend in the modern education system that evaluates the copies with fairness. This research paper predicts the problem in examination sheet evaluation using artificial neural network and back propagation algorithm. This will help in developing an efficient and better way of checking of papers.*

Keywords: *Artificial Neural Network, Computerized assessment, Back propagation algorithm.*

INTRODUCTION:

Now-a-days, evaluation of paper is done upon the answers which are written by the student in the exam. The answer sheet is then sent to the respective teachers for evaluation. This traditional technique is creating a bad impact on the student's career as it contains various demerits. This includes longer time delay, improper evaluation of papers, and appearance of answer sheets and biasness of the evaluators. One of the main points is the time delay in the evaluation process. The evaluators take a very long time to check the copies. Evaluating the sheets manually is also a burden. We know that the rise in the use of internet has revolutionized the field of education in the country. The genuine appraisal of under studies lies in the legitimate assessment of their papers. The old technique of the evaluation leaves the students at the pity of the professors. Also pupils do not get adequate prospects to showcase their understanding. As an alternative they need to vomit the junks students had learnt in their respective note-books. Due to this they lack in their creativity to a large extent. This results in wastage of a lot of money and time. The non-availability of this system also leads to a decrease in the progress of distance learning programs. We know that the rise in the use of internet has revolutionized the field of education in the country. Internet has contributed in the field of education a lot. But only when the evaluation of papers is computerized then the task of computers would be the most reliable and comprehensive. This paper addresses the ways by which these shortages in the educational system are a loof.

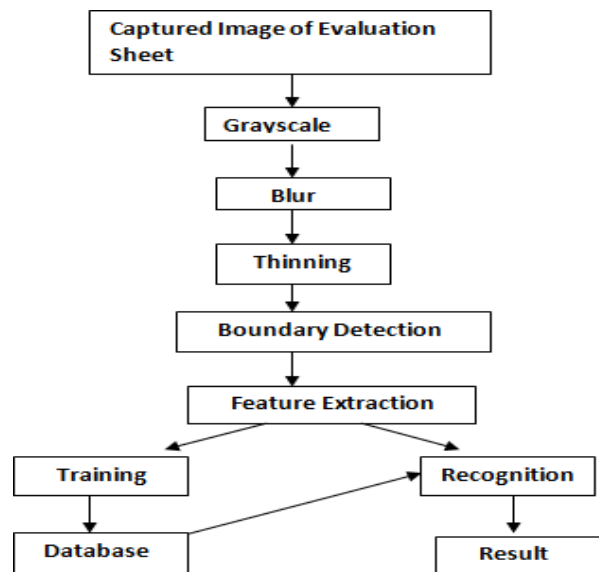


Fig:1 Flow Chart

LITERATURE REVIEW:

In this writing audit the writing accessible for the neural networks as a rule, feed forward neural organizations. (Lakshya Aggarwal, Biswa Mohan Sahoo, "Back engendering calculation for electronic paper assessment utilizing brain organization" IJSRST (2018): 719-723) specifically are momentarily talked about. The use of brain networks in the control frameworks, immediate and Indirect Adaptive Controls, shut circle and fixed gain regulator are additionally assessed (Alvaro J. Hernandez M, Dixit Abhay, Jurgen Lottes, Manuel Steger" Artificial Neural Network Based Online Network" IEEE (2018): 978-982). Significant ends are drawn and the benefits and constraint are highlighted. (Pak.J. Statist, "Statistical features extraction for Character recognition using Recurrent Neutral network" IEEE (2018): 47-53) neural networks get applications on an assortment of subjects like control frameworks, weather condition estimates, and so on. It is drawn-out work to take in the profundities of the material. To comprehend the rise of brain networks a concise history has been written. For study of the back propagation algorithm (Varun Ranganathan S. Natarajan, "A new Backpropagation Algorithm without gradient" IJSRST (2018)) what's more, brain network an itemized survey has been composed. In this review, papers on different subjects are itemized to make sense of the requirement for the proposed work (Tanupriya Chaudhary, Kartikeya Jain, Lakshya Agarwal, Ayushi Gupta, Garv Saxena, "Computerized Paper Evaluation using Neural Network" ICTUS (2017): 356-360). There are restricted quantities of books in the space of brain organizations, which are separated itself as the main expert in the beyond a decade. By displaying the neuron, brain network history can be followed back. The main model of a neuron was utilized by physiologists, McCulloch and Pitts.

The main demonstrated neuron was with one result and two information sources. In this found that with one input active, the neuron would not become active (Rosenblatt, F., 1958, "The perceptron: a probabilistic model for information storage and organization in the brain," Psychological Review, vol. 65, pp. 386- 408). Binary output was found for input were of equal weight, the output found to be zero till the inputs summed up to a threshold value (Selfridge, O. G., 1958, "Pandemonium: a paradigm for learning," Mechanization International Journal of Scientific and Research Publications, Volume 3, Issue 9, September 2013 6 ISSN 2250-3153 www.ijsrp.org of Thought Processes: Proceedings of a Symposium Held at the National Physical Laboratory, London: HMSO, pp. 513-526). The neuron developed by McCulloch and Pitts' neuron today is the logic circuit.

Neural networks track down its application in the space of control frameworks. At the point when any system is applied controls has its own exceptional arrangement of issues to address. To adjust to a bunch of determinations the presentation should be changed, is the guideline behind controls. Due to non-linearity and vulnerabilities in Neural Network the objective of the control becomes muddled. Philosophies are created to deal with vulnerabilities is attempted by Control hypothesis. At the point when there is no framework for information, brain networks tracks down its applications. Framework halfway model is accessible frequently (Minsky, M. also, S. Papert, 1979, Perceptrons, MIT Press, Cambridge, MA [7] Parker, D., 1986, "Learning Logic," Technical Report TR-86, Center for Computational Research in Economics and Management Science, MIT, Cambridge, MA), where as the system complete model is available rarely.

PRACTICAL IMPLEMENTATION

In artificial intelligence, neural network is one of the most important and preferable topics for the research areas. Various applications like Google translator, Google assistant uses neural network as their basis. Just as human brain consists of gazillion of neurons, these neurons are connected with the help of network that provide the data flow and parallel processing of information in short period. The human brain works on learning algorithm and the brain train itself to learn more. In artificial neural network, the implementation is done in the same way as that of the neural network of human brain. Artificial neurons are connected to a network that train and learn the algorithm through their experiences and try to provide efficient output. Learning algorithm is the basis of the artificial neural network. The input data is converted into meaningful information and learning algorithm helps to learn it more and more by using the keywords providing desired output. This network consists of three layers. Input layer, hidden layer and output layer are present. The nodes are connected to successive nodes. Each node of a layer is connected to the nodes of different layers. Error back propagation is used to generate correct output. In this method, the output goes back to the previous layer if any fault appears. Also the different types of learning are supervised, unsupervised and reinforcement learning. In supervised learning, training data is present that provides the instructions and supervises as both input and output data are present. The system is completely unknown to the present data in the case of unsupervised learning. It consists of only input data and estimates the output on learning basis using K-Mean algorithm. This algorithm forms a group of identical data and thus performs the results. Reinforcement learning works on reward and policy technique.

DISCUSSION:

Let us consider there are students of 5 different schools who has appeared for the examination. And we need to calculate the results. To clear the subject in a particular examination the student of that specific school need to obtain pass marks in that specific question. Suppose there are P1, P2 ... Pn amount of queries in the set, Q is the number of students plus Q1, Q2, Q3 Qn the marks of students in all the subjects. Every pupil has to get marks beyond average score of all queries in the set.

Passing criteria should be:

The avg. will be $(Q1, Q2, Q3 \dots Qn)/Pn$

Suppose the examinee Q1 having identity number 890 has to obtain marks above or equal to the average marks of all the given queries of set in order to obtain the passing criteria.

$Avg. = (32+37+24+34+19)/5 = 29.2$

In the same way the evaluation is performed of all the students of the other schools and the result is declared without any biasness and faults. Hence the given proposed system benefits for the result calculation. It is thus declared better than the previously used method of checking the answer sheets manually.

PROPOSED SYSTEM:

The present evaluation system requires a newly modified system as it deals with the bad marking of the student examination papers. This proposed system is very efficient and reliable and has revolutionized the education system. The idea of artificial neural network having layers of neural system is taken into consideration. Neural network also known as Counterfeit Neural Network rests on the depiction of human neural outline. Neural network consists of a combined assembly of neurons. Special shortcuts used in Chemistry that are frequently used also get featured in this software to make the evaluation easier. An artificial neuron has various inputs and one output. It consists of two modes of operation i.e, the training mode and the using mode. In the training mode, the neuron is allowed to fire or not to fire for specific input patterns. Whereas in the using mode, the associated output becomes the current output when taught input pattern is detected at the input. Various steps are performed to attain the assessment of answer scripts.

1. Image processing system
2. Training
3. Detection

In image processing, at first we need to scan the answer sheet and capture the image of the same. Then various steps are performed like gray-scaling, blur, thinning, boundary detection. In gray-scaling, what we do is to obtain a digital copy of the sheet. This step eliminates the errors caused by different colored inks used in the paper. It makes the image contrast high which is suitable for estimation of every single pixels. To make the image sharper, it is blurred. It makes the image more recognizable. To eliminate the particular pixels from binary images, thinning is done. To detect the breaks in the brightness, boundary detection is performed. Artificial neural system is designed to transmit

the data. These Neurons must be trained to recognize various handwriting patterns of the examinees. The system is trained in different patterns like subject master, language master, and psychology master. Each master has their own roles.

The subject master provides the general idea of evaluation. Language master trains to recognize different kinds of sentences. The last one trains about the fault acceptance. The logic of the answers is fed and trained. Thus the system can actually match the logic as provided. Back propagation technique is widely used for the purpose to check various logics and hand writing patterns. It is mentioned to if the scheme finds that answer logic from the paper is not analogous to the logic of the database, then the logic which is kept from the preceding answers would be hence denoted to find any akin logics. The type scripts of the database are matched with the characters renowned by the system. With each right answer obtained, the result is evaluated and the report chart of the student is prepared. The below flow diagram depicts the whole working of the proposed system.

CONCLUSION:

Soon this proposed model can become a certainty and turn into a working system wherewith the help of artificial neural system we can make the evaluation of examination sheet easier and much reliable. This new system will lessen the workload of the teachers and also saves a lot of time providing error free outcomes. This new innovation in the examination pattern will help the students to secure fair results without any biasness. Thus artificial neural network is termed as one of the emerging areas in the modern trends and scopes a lot for future reckoning. Back propagation algorithm also supports the model providing efficient results.

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TRANSPARENCY IN MACHINE LEARNING

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Abstract: A critical challenge in machine learning is increasing the openness of learning models, which enables users to build more trust and defend justice and equality while safeguarding their privacy and information assets. Transparency is a concern in light of the growing use of machine learning solutions in the real world, however greater progress is required to meet transparency issues. The article analyses the significant disadvantages of opaque machine learning models, sometimes referred to as Black-Box models, and proposes a solution based on explainable and interpretable machine learning models.

Keywords: Black-Box, machine learning, Deep Neural Network, Artificial Intelligence, Transparency, Logistic Regression, Reverse Engineering.

INTRODUCTION :

We live in a social environment where we constantly have to make decisions explicitly and implicitly related to business, health, etc. Now with technical advancement, Machine learning is capable of making rational decisions taking it to a whole new level. Machine learning is a subfield of AI that enables computers to learn and improve automatically from experience without explicit programming. Machine learning is used to create models or computer programmes that can access and learn from data on their own. These are complicated models that empower machine learning algorithms to search for solutions for critical problems, often way more complicated than any human mind can understand. However, it is very difficult to take critical decisions with machine learning algorithms as there are lots of challenges we have to face. The most important and widely discussed is transparency. The most critical decisions are made by and within a black box. Without transparency, we cannot talk about ML algorithms to justify the decisions they have made and the outcome on trust, fairness, privacy, and security. To simply explain transparency in machine learning, it is to understand how a system works internally or to explain how an ml algorithm works and why it gives a particular outcome. There are just a few machine learning algorithms that provide human-comprehensible output directly or indirectly, for example, a linear model, a decision rule, or a decision list. By creating models and data that we do not fully understand, non-transparent machine learning creates a slew of security, safety, and biasing issues. Effective Machine Learning methods, such as Deep Neural Networks, are notoriously difficult to explain ("Black Box problem"). Occasionally, the challenge arises of implementing a specific model (for example, an LSTM Neural Network) that provides a significantly better result than a standard Logistic Regression but is more difficult to grasp and explain. Another significant difficulty is that if the data used to train machine learning algorithms has prejudice, that bias will manifest itself in the algorithms' choices, which is undesirable. [1] This research paper analyses existing scholarship and discussion around transparency in machine learning, identifies new threads for consideration, and discusses Black-Box models and its potential solutions such as explainable AI/ML. Explainable ML generally refers to methods and techniques that enable us to understand why an ML model gives specific results. The paper aims to point out alternative configurations emerging in technical and policy discussions. As most of the calls for algorithmic transparency are made in the absence of precise accountability mechanisms, and across areas of implementation, there is merit in examining the notion of transparency in machine learning in a more granular fashion.

The second section of the paper discusses the previous work related to transparency in machine learning. Then the third section discusses the various challenges and issues with non-transparent machines. The fourth section defines the problem statement related to black-box models and transparency. The fifth and sixth section explore two different types of ML models, i.e., Explainable and Interpretable, and how these will solve the problems of non-transparent machine learning algorithms. Finally, we conclude all the findings and end with references.



RELATED WORK :

A machine learning algorithmic frameworks are made to make progressively noteworthy choices in different domains of regular life, the requirement for fair, accountable, and transparent(FAT) machine learning algorithms has been in great demand. Transparency in machine learning has been advocated and invalidated over a number of reasons. This section discusses previous scholarly works in transparency in machine learning and various disagreements around it.

Transparency and interpretability

In her book, Cathy O'Neil focuses on the demand for transparency through source code revelations, as opacity can 'lead to the feeling of unfairness.' [2] According to further sources, understanding the input data and source code improves the interpretability and confidence of machine learning algorithms, allowing for the detection of bias and unfairness in a process. Frank Pasquale frames opacity as willful self-preservation by corporations, basing his demands to open the black box on the assumption that the source code will reveal the behavior of a machine learning program. [3] Computer scientists like Diakopoulos propose making the code available for scrutiny and propose that journalists use reverse engineering as a possible method to enhance accountability. [4] This claim is refuted by computer scientists and lawyers alike, claiming that sheer complexity in machine learning systems means that understanding the algorithm in action during learning is unlikely. The term disclosure of source code is an 'obvious, but naive' solution. Even if traditional values of transparency are meant to enhance the interpretability of a situation, the very nature of machine learning obscures direct comprehension.

Transparency and accountability

The hidden logic behind the connection between transparency and accountability is that having the option or opportunity to correct it if needed. Professor Alan Winfield suggested that it must always be possible to find out why an AI system made a particular decision. Furthermore, he added that to achieve the same, the requirement is transparency, and therefore without transparency, we cannot fully have accountability. However, there were other professors who clearly disagreed with the proposal as this does not always materialize in machine learning systems. [5] They also added that transparency is not enough because it does not ensure accountability, but instead 'obfuscates the real politics at stake'. [6] So to summaries, transparency cannot fix what morality is meant to address.

Transparency and public/private sector

To achieve a healthy democracy, the idea of transparency and accountability was built. Its uncomfortable transition into discussions around machine learning is inevitable; proprietary concerns of intellectual property are intrinsically in conflict with the idea of transparency. On the other hand, transparency requires understanding and accessibility, machine learning algorithms are needed to be protected as the information cannot be made publicly available. While government applications of these technologies could in fact, be subject to some level of transparency, an absolute requirement is neither desirable nor likely. As mentioned in the Introduction to this paper, existing ethical and legal calls for accountability have been made across the spectrum, lacking well-defined mechanisms, which is a serious impediment to meaningful steps towards accountability. [7] Public law guarantees are framed around promises of good governance, minimization of corruption, and constitutional guarantees, and flow organically from public duties, while private law rests more on horizontal applications of rights in the form of privacy policies, data protection regulation. [8]

Transparency and power structure

Transparency in ML in its present structure require proactive calls for disclosure and consistence from impacted groups, in light of the fact that, to put it casually, designers of these frameworks have an overwhelming advantage. They can, it could be said, decide to be responsible. While some academics have worked at enhancing the current structure, other grant has started to push against this norm. [3, 4] For example, Wachter et al., highlight the impediment of transparency just being a post facto measure, after the harm has already occurred. [9] At the point when Datta et al., found that Google showed more paying jobs positions for men when compared with ladies, they called for machine learning algorithms that would prevent such damages by staying away from segregation, and give transparency. [10]

LACK OF TRANSPARENCY

Lack of transparency in machine learning indicates that a machine can be bias towards specific inputs without the end user knowing. It can cause undesirable results in important decisions and trust issues in an organization. For example, a model predicts a 2 scores for 2 users with similar inputs but it provides distant outputs without the end user knowing why this difference in output is caused. There are various laws and ethics which may also be broken by non transparent machine models.

Trust Issues

Is the final Result trusted by end users? ML models take some data as input and convert it into a forecast, however it tends to be hard to comprehend the mechanisms involved. Designs learned by a black-box can be complicated to see, especially for business analysts cantered in a specific area of business and acquainted to transparency that they can explain. This sort of information is central to building trust in the models. This fundamental information is additionally required when the cycle should be iterated with deftness. Transparency should be underlying.

Bias

Is the machine learning model author biased toward some inputs. Algorithms that might contain hidden biases are now regularly used to make essential financial and lawful choices. Proprietary algorithms are used to choose, for example, who gets a job interview, who gets allowed parole, and who gets an advance. Subsequently, Mitigation of Bias can be helpful in the Financial, Healthcare fields or whatever other region where a Machine assisted choice can affect specific part of the general public or may prompt out unfair treatment of specific groups based on age/race/orientation. [11]

Unexplained results

Models showing unexpected results for some inputs. At a high level, Machine Learning is essentially based on giving a great deal of information to the machines so they learn and that permit developing sophisticated algorithms that can be summed up and extensible to different information that the machine has never seen. This leads to some unexpected results. [12]

PROBLEM STATEMENT

Assume that a person wishes to apply for a credit card and submits an application on a website, but the site informs youthat the credit card cannot be approved after a quick server- side examination. The individual is demanding an explanation. However, customer service advises you that this is the consequence of the website's new Machine learning algorithm, and she/he is unable to explain why you were rejected. Unfortunately, these kind of circumstances are already playing out in real life. Several real-world instances have occurred recently in the sector. Numerous businesses benefit considerably from machine learning and artificial intelligence, which boost efficiency and enable new modes of operation. However, explain ability of decisions and consequences is crucial in systems that make judgements and take actions automatically. While this is a serious issue, it is only applicable to large-scale deep learning models and neural networks. Typically, artificial neural networks decompose the issue into millions or even billions of subproblems and then linearly reassemble them to obtain a solution. However, we have no way of knowing what the algorithm is doing or which tactics it is utilising. This is sometimes referred to as the "black box dilemma," as machine learning looks to be a black box with no method of peeping inside during this time period. This stops us from learning the depth of understanding required for algorithm updates, but it also introduces a plethora of trust issues. Trust in machine learning algorithms will become more critical in the future as the technology comes to play a greater part in our lives than it now does. [13]

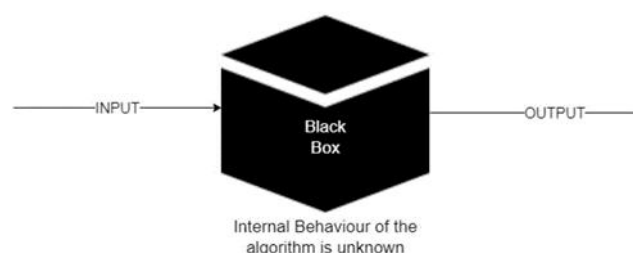


Figure 1: Black-Box in Transparency

EXPLAINABLE ML/AI

Explainable AI (XAI) is a set of methods, design concepts, and procedures that enables developers and organizations to add a layer of transparency to AI algorithms in order to justify their predictions. XAI may be used to characterize AI models, their intended impact, and any biases. Using this technology, human professionals can interpret the resulting projections and create trust and confidence in the outcomes. Explain ability is entirely dependent on the substance of the explanation. Two situations are possible: [14]

1. Defining the AI model's pedigree: how the model was trained, what data was utilized, the many sorts of bias that can occur, and how they can be addressed.

2. Explanation of the model as a whole. This strategy can be applied in two ways:

(a) Proxy modelling: a simpler model, such as a decision tree, is utilized as a proxy for a more complex AI model. While this technique provides a straightforward picture of what to expect, it is still an approximation and may differ from actual findings.

(b) Design for interpretability: structuring AI models in such a way that straightforward, easy-to-understand behaviour is forced. This technique may result in less powerful models due to the developer's toolkit being reduced. [15]

The NIST of the USA created four explainable principles of artificial intelligence:

3. The NIST of the USA created four explainable principles of artificial intelligence: The system's output should be explicable and backed up by evidence (at least). There are numerous sorts of explanations:

(a) Beneficial explanations for the end user

(b) Justifications intended to engender faith in the system

(c) Justifications anticipated to comply with regulatory requirements

(d) Explanations that can aid in the construction and maintenance of algorithms

(e) Justifications that benefit the owner of the model, such as movie recommendation engines

4. The explanation provided must be meaningful and assist users in completing their responsibilities. If there are a variety of users with varying skill levels, the system must give several explanations to accommodate the various user groups.

5. This explanation must be concise and precise, which is distinct from output correctness.

6. The system must work within its predefined knowledge boundaries in order to provide a reasonable output. [16]

There are various frameworks available to solve the black-box problem and decrease transparency in machine learning algorithms: -

1. SHAP

SHAP (SHapley Additive ex Planations). It is applied on various types of ML models, ranging from simple algorithms such as linear and logistic regression, and tree-based models to more intricate models such as deep learning models for classification of images, as well as a variety of natural language processing tasks such as opinion mining, translation, and summarization of text. It is a model-independent technique for characterizing models based on the shapley values of game theory. It describes how different types of characteristics influence the output of a particular model and contribute to its result. [17]

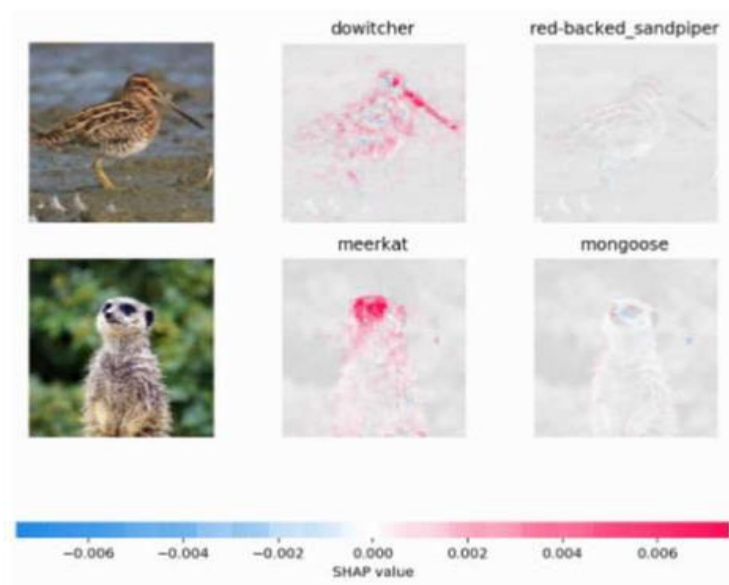


Figure 2: SHAP Framework

2. LIME

LIME (Local Interpretable Model-agnostic Explanations). It is on-par with SHAP but performs computations more quickly. LIME generates a list or index of explanations, one for each part that contributes to the prediction of a provided data sample. Lime is capable enough of explaining any 2 or more class black-box classifiers. It is sufficient for the classifier to build a function that accepts raw data or a numpy array and returns the probability for each individual class. [18].

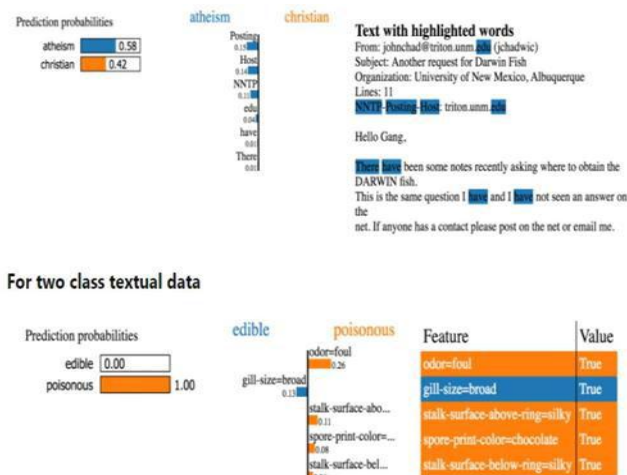
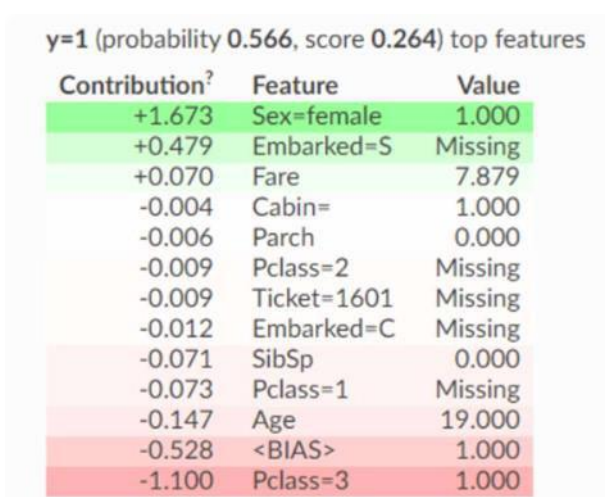


Figure 3: LIME Framework

3. What-if Tool

The WIT was built by Google to aid users in grasping the functioning of machine learning-trained models. WIT enables you to assess model performance in a range of hypothetical scenarios, study the effect of various data elements, and visualise behaviour of various models and sub- parts of input data, as well as for a variety of machine learning fairness criteria. The What-If Tool is a Jupyter, Colaboratory, and Cloud AI Platform notebook add-on. It is capable of performing a variety of tasks, such as binary classification, multiclass classification, and regression. It is capable of handling a broad variety of data kinds, including tabular, image, and text. It is compatible with SHAP and LIME. Additionally, it is Tensor Board compatible. [20]



4ELI5 is a Python library used for debugging and describing ML classifiers. It supports a variety of ML frameworks, such as scikit-learn, Kera's, XGBoost, LightGBM, and CatBoost. [19]

CONCLUSIONS :

Transparency in artificial intelligence is critical for the greater effort to produce more trustworthy artificial intelligence for markets and society. Trust and accountability difficulties are critical to the concept's present value,

particularly given the concept's more limited breadth of openness. Transparency in artificial intelligence "explains ability, and a collection of opposing interests. As a result, transparency in artificial intelligence is best understood as a trade-off between opposing interests and a governance challenge that will require interdisciplinary research to adequately handle. The objective of this research is to provide a deep understanding of machine learning transparency. We emphasised the need of openness, the inherent obstacles (Black-Box), and the inherent solutions (Explainable Machine Learning Frameworks). However, considerable challenges remain to be addressed. For example, these models of Data Transparency are entirely dependent on the training data. As a result, comprehending the facts is critical for appreciating the consequences.

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SCREENLESS DISPLAY: TECHNOLOGY OF FUTURE

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Abstract: This article discusses the introduction of screen less technology, which may be a relatively new technology, with good hopes for a wide range of applications in the near future. It refers to utilizing a projector to display numerous things without using a screen, as the name implies. It has three objectives: virtual image, virtual interface, and virtual image. This article shows how the fundamental paradigm is used in numerous sectors of science. This technology will transform displays and monitors that have hitherto been costly, bulky, and limited by power requirements and constraints. And this is the invention of the future technology.

Key Words: Applications, interference, paradigm, synaptic, and projector.

INTRODUCTION :

Because screenless displays, also known as multidimensional imaging, offer so much promise, I'm hoping that the Web will be a method to use screenless considerations and information in a comprehensive way to assist overcome the barriers that impede them. Reality vs. Wish The ether itself is a foreseeable projection of an essentially screenless introduction. [1] A principle that has received a lot of attention in recent years. Fog is still used to reflect light in screenless exposure. Mirrors and plastic film are two unusual options for imitating this idea, but neither can reflect light from the air. Is it desirable to be able to consider this? That is a strong possibility. As we can see, most of the air reflects light.

The History of Screenless Displays

Reto Meyer, Google's "Android Developer Advocate," jumped in late and provided a reasonable sci-fi forecast of where PC (or other small) interfaces are headed. Most of his aspirations run parallel, from a greater futurist spirit to augmented reality spectacles to enhanced batteries. The bottom line is to walk through what may be on the horizon in the same manner that non-prime-time revelations leave the lab. To work, a typical PC needs a workspace the size of a sheet of paper. As a result, all of our "records" are rather lengthy. Extending the exterior screen with a progressive, more visible screen, navigating gadgets at random, and even PDAs excessively are the greatest ways to play and immerse yourself.

Large screens.[2]

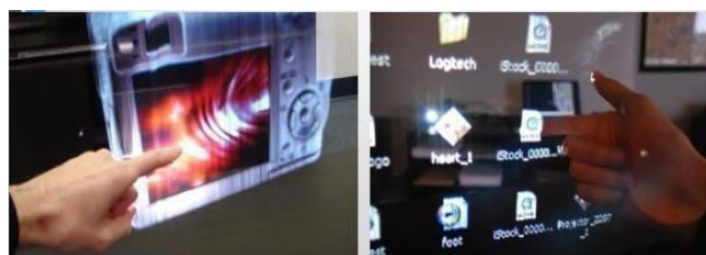


Fig.1. Basic Display

DEVELOPMENT USED IN SCREENLESS DISPLAY:

Systems for interactive projection and visual display The most significant impact on screenless design has been the usage of optical technology. Electronics companies like Apple use optical innovations like the Virtual Retinal Tribune (VRD), Retinal Separation Screen (RSD), and Light Control Optical Part (LOE) in military and personnel management. Microvision Inc., for example, wears a top-mounted defence show that lets army tank commanders to watch the envelope region from above while still being able to see the translucent rails sliding from a few feet away.

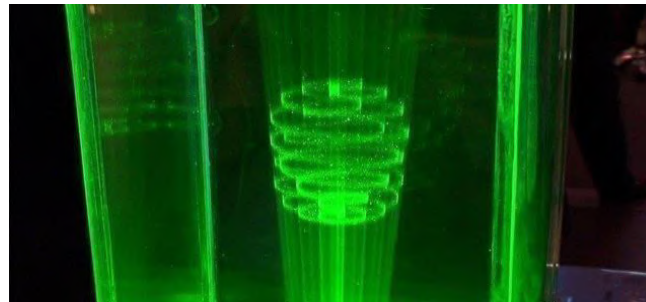


Fig. 2 Interactive projection

3D Display Projection Technology

With so many new shows on the market touting "3D Help," we thought we'd write an article detailing some of the key techniques. Fluctuations and how they manifest themselves. presentation of two 2D photographs differs significantly from displaying a photograph in three dimensions. The most notable difference is that the viewer has neither freedom of head movement or the ability to shout facts about the three- dimensional things on display. Because holographic presentations do not have this limitation, the term "3D show" is appropriate for this period. The word "3D" in modern presentations is an exaggeration of possibilities, referring to double 2D pictures as "3D." The precise term "stereoscopic" is more difficult to define than the widespread misunderstanding "3d," which has gained traction via decades of undeniable abuse.

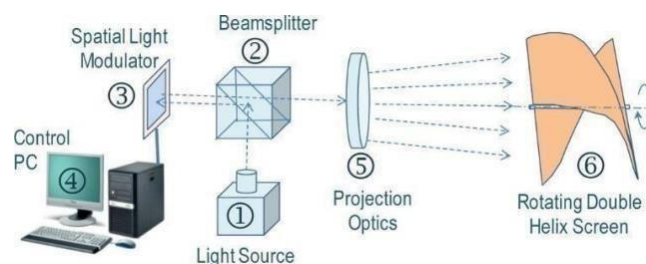


Fig.3. 3D Projection

DESIGN AND BACKGROUND

Google Glass is the first screenless show to be mentioned. Last year, the device was put to the test, and some lucky people were given gadgets. Google Glass looks like a pair of spectacles and features a block of glass on one eye that allows you to gaze at augmented reality. Images, as well as text and statistics about products and locations in front of you, can be presented right in front of your eyes. Although this technology is still in its early stages, it appears that display less shows will become a natural form of media consumption in the future.

Visual Image

Any display much less photograph that the eye may perceive is included in a visual image screen much less show. A hologram is the most prevalent type of visual representation of a picture. Thanks to a new generation of Japanese engineers, the most effective holographic messages seen in movies like Star Wars are becoming a reality. This is True 3D, which was improved in 2006 with the support of AIST and Keio University using entirely old technology.

This revolutionary projection device can be used to show pictures without the usage of a screen.

The technology works by focusing a laser beam that creates a plasma environment from oxygen and nitrogen in the air, allowing holographic photos to be displayed. The projected holographic images seem like 3D floating gadgets in midair, according to Ubergizmo.Com. The system generates roughly 50,000 factors in 2d and has a frame rate of 1015 frames per second, but Japanese scientists are working to increase it to 2430 frames per second. In certain ways, the images are most effective monochromatic (one colour), green, but multicoloured photographs can also be made using lasers producing at several wavelengths, such as blue and red.

• Hologram

Holograms have mostly been utilised in telecommunications as a replacement for displays. Holograms can be transmitted instantly or saved in a variety of storage devices (including holodiscs). The garage tool can then be connected to a holoprojector to access the stored image. Virtual reality goggles (which include smallscreens but are sufficiently different from standard laptop monitors to be considered screen much less) and headsup displays in jet fighters (which display photographs in the clear cockpit glass) are debatably included in the Visual Image category. Unfortunately, holographic technology hasn't progressed much beyond mirror tricks. This picture shape creates a three-dimensional snapshot, and some technology is currently creating images with lenses, helium neon, and other materials. This picture shape creates a three- dimensional photograph, and a number of technologies are now creating images employing lenses, helium neon, and holographic film. Scientists will not have a fully functional holographic table ready for market any time soon, but it is unquestionably in the cards for the future.



Fig.4. Example of Hologram Image

A. *Retinal Display*

As demonstrated in Figure 3, virtual retinal display systems are a type of display screenless presentation in which photos are projected into the retina without delay. They differ from visible picture systems in that light isn't reflected off a few intermediate items onto the retina; instead, it is projected directly onto the retina. Because most inquiring is predicated on viewing the same light as the individual who is legitimately viewing the display, and retinal direct structures send light best into the pupils of their supposed viewer[4], retinal direct structures preserve the promise of intense privacy while computing work is done in public places.

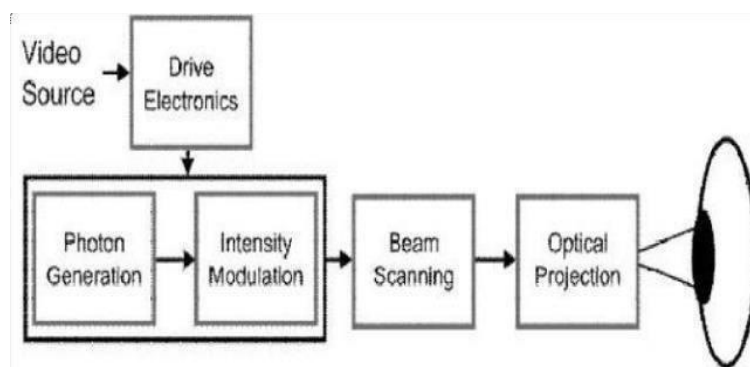


Fig. 5. Block Diagram of Retinal Display



Fig. 6. Retinal display

THE WORKING PRINCLIPLE

There are a slew of innovative techniques to technologically improving the operating principle of display-less displays. For the GENX wonder view, several software programmes are combining. Any computer that can run the mudoc software package can send text in an interactive moveable format. The majority of the mudocs ingested in the next years will be consumed on traditional personal computers, ebook readers, and various types of display and projection devices currently in use. It indicates that a new type of input/output device will soon enable communication and interaction between the computer and the computer user. A telereading terminal is a new human-computer interface. Visual Image is a bitmap image processing and synthesis programme. In image mode, you can alter bitmaps separately, or in object mode, you can stack two bitmaps together to create a "university." Visual Image is capable of creating and manipulating images of any size. The sole stumbling block is the device's memory capacity. Using Visual Images to Create Visual Catalog Files Visual Images allows you to create EYE-format documents for use in visual catalogue software. These EYE documents can be used to generate picture collections in logical subdivisions. You can make an EYE catalogue report that lists all photographs of building materials, for example (brick, concrete, stone, etc.).The EYE entry created by the Export File, Project command applies to all pictures currently imported into Visual Image. You must input the file name of the EYE item to be produced when selecting this command. If Visual Image has created images that have not yet been stored to disc, you will be asked to include them in your EYE item, in which case you must save them as bitmaps. You can highlight and choose photo files on disc that you want to include in your EYE catalogue entry using Visual Image's File, Exports Editor commands. When you pick "File" in the export editor, the record browser appears, allowing you to select the picture file you want to add. This browser can be used to select images in project.

A. How Vision

Works In screenless mode, an image is projected directly onto a person's retina, avoiding the need for bulky equipment and maintaining privacy by prohibiting people from interacting with computers and sharing them with others. By January 2014, a Kickstarter campaign had gathered enough funds to sell a closed gaming and film product based on Retinal Show. In the long run, epochs may allow synaptic interfaces to convey "visual" statistics straight to the mind, bypassing the eye entirely. Reflected light allows us to view objects. Objects reflect light, which reaches our sight. The retina specialises this light to make the image. [5]

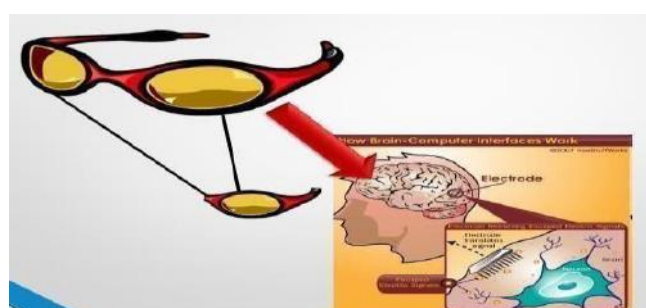


Fig. 7. Vision Process

APPLICATIONS OF SCREENLESS DISPLAY

Applications with no screens The development of mobile phones for the elderly and visually handicapped predominantly uses screenless presentations. OWASYS 2CC mobile phones were the first to integrate this form of screenless show detection. This version is ideal for the aged, blind, or those lacking in creative or visionary energy.



Fig. 8. Application applied to mobile Technology

In the development of screenless notebook computers, screenless presentation technology is also being used. When connected to a CRT or fixed LCD video display, non-LCD computers can be a very cost-effective transmission solution. Laptops sans monitors are another inexperienced solution for minimising the amount of donated CRT television displays that end up in landfills. Volunteers who don't have time to visit people's homes can utilise these laptops without difficulty because they are mobile. In the realm of holographic projection, screenless shows are also popular. Holographic projection is the consequence of a technological breakthrough that allows for considerably fewer holographic interfaces to be used. Holographic projection, in fact, enables the creation of high-quality 3D images that appear to be in contact. However, traditional holograms, which provide three-dimensional photos, have yet to win widespread acceptance. [6] The existence of numerous 3d scope animation or the screen has the advantage of being merged with the Laser Valve Video Projector that assists in projecting video photos utilising laser light rather than Xenon Arc lamps as represented in discern eight. Laser technologies have an advantage over other technologies because the LV provides the projector with excellent depth within the awareness. The most fundamental functioning principle of the screen less show may also be applied to the emergence of new display screen less TVs. Imagine looking at a TV photograph that appears to materialise out of nowhere in the thin air. The snapshot simply floats in front of the observer; this is a modern developing era within the projected destiny.



Fig.9. Virtual Screens

FUTURE WORKS IN SCREENLESS DISPLAYS

Various studies are being conducted for the future development of this developing new generation, and several well-known IT quarter agencies and other fine labs across the world are tackling the task of screenless displays. In today's world, technology has become possibly the most effective agent of change. Superior technology discoveries, while not without risk, promise modern solutions to the most pressing global concerns of our day, ranging from humanitarian scarcity to global environmental exchange. However, a lack of adequate funding, antiquated regulatory frameworks, and gaps in public knowledge prevent many promising technologies from reaching their full potential. In 2013, this field saw rapid growth, and it appears that the next innovation in the implementation of scaled screenless displays will be in this area. Digital truth headsets, bionic contact lenses, cell phone upgrades for the elderly and partially blind, and holographic-like films that do not require moving parts or glasses have all made important advances in this

field. Multi-touch is a human-computer interface technology that allows users to conduct calculations without the use of standard input devices.

- CUBIT is progressing toward its aim of multi-sensory use.
- Non-display displays now have a better and more futuristic look because to advances in micro-image enhancement and foresight. For artificial retina display features, this generation of micro-imaging and prediction is quite useful. Within the Artificial Retinal Display characteristics, vision is extremely advantageous.
- When people close their eyes, smart glasses created by Japanese scientists recall where their keys, luggage, iPods, and cell phones are.
- Smart Google is developing a small video camera that records everything the wearer sees on film. What the viewer desires will be seen instantly through the glasses where no display screen or projector is available.

Several laboratories are working on developing electron beam lithography, which will allow for a superior enhancement of the futuristic display screenless display.



Fig.10. Virtual Screens in Watches

ADVANTAGES OF TECHNOLOGY

- Low electricity consumption To convey their images to the user's eyes, only six diodes and a few watts are required [3].
- Images at a higher resolution Higher resolution is often obtained by making the pixels inside the images produced by the diodes smaller than is possible with any CRT or flat panel display. The only constraint in terms of visual image resolution with retinal projectors is the users' eye resolution
- Outstanding portability: The retinal projector system's diode, lens, and processor components weigh only a few ounces together. Field of View Expansion Retinal projectors have a larger field of view than a display screen. For a more precise colour, retinal projection uses a light source that is modulated to modify the intensity of red, green, and blue light. Displaying photos from afar Myopia is caused by growing usage of laptops, cell phones, and other screen devices. As a result, screenless displays are ideal for providing farsightedness.
- Low Cost – Because the technology is still in development and pricey, low-cost systems will be available soon, but there are no production issues that can't be solved with mass production and low-cost parts. These tiny delivery devices have lower environmental and disposal costs since they do not include harmful components like lead, phosphorous, arsenic, cadmium, or mercury [4].

DISADVANTAGES :

- Due to a lack of availability and the fact that the technology is still a prototype, it is difficult to obtain. Expensive and not feasible. VRD technology is still being developed.

CONCLUSION :

This study discusses screenless screens, one of the fastest- growing computing technologies and an exciting new craze for future generations as scientists. Because there are so many advantages to constructing, designing, and coding screenless devices, it takes a lot of practise, and progress is still far behind the state of the art. Perhaps, in the future, screenless technology will take over the planet, expanding the realm of technological possibilities for laptop users. In the laptop era, screenless displays ensure a higher price as well as a better future.



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EMOTION DETECTION USING CNN

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Abstract: Emotions expressed by touching a face, conversation, or text. It is important to improve the accuracy and durability of the data. Based on the collected results, make appropriate recommendations. Several emotions are expressed using real-time images of human faces. Sadness, joy, anger, fear, and other emotions will be separated. A state of surprise, and a state of neutrality. There will be more details of facial movement. Captured, and appropriate emotions will be identified through the use of CNN as an in-depth learning algorithm. Selecting the best and most unique analysts to differentiate certain emotions. The use of multi-layer networks will be investigated. Various editing of both facial images and photographs representing images that will be applied to the areas around the mouth and eyes. On the other hand, a neural network cascade was created based on the findings. CNN's emotional analysis will help to make specific recommendations and activities related to a specific situation. As a result, it will benefit people to be happy and happy.

Key Words: Deep Learning, CNN, Facial Emotion Recognition, feature extraction, Cascade, Classification of emotions.

INTRODUCTION :

A person's mood may change depending on the circumstances and the people around him, and this may trigger mood swings that can disrupt his daily routine. People are constantly confronted with emotional problems, which hinder their productivity and personal development. Emotions are closely linked to the work we do as it is just a state of mind. Therefore, it is only a matter of doing modest work or activities to change one's personality. There are a variety of places where deep-rooted CNN-based learning methods and other computer-based methods have been used in social science, for example making personal ideas based on clothing images, finding different types of social interactions based on that. Images of everyday life or sex segregation in facial images.

Insignificant gestures such as body language and facial expressions are used to express emotions and to provide feedback to individual communication. They also help us to understand the intentions of others. The oral components transmit one-third of human communication, while the non-oral components transmit two-thirds, according to one study. With the rapid growth of artificial intelligence techniques, such as Human-Computer Interaction (HCI), Virtual Reality (VR), Augmented Reality (AR), Advanced Driver Assistance Systems (ADAS), and entertainment, the need for facial recognition is growing. By examining the information gathered by the ears and eyes at the same time, people can see these signs even if they are changed. If computers can detect sensory inputs, they can provide users with clear and appropriate help in ways that best suit their needs and preferences. A person's emotions can be divided into seven archetypal emotions, according to psychological theory: surprise, fear, disgust, anger, happiness, sadness, or neutrality.

When it comes to expressing these emotions, facial expressions are essential. Facial muscles can be used and carefully adjusted to communicate a wide range of emotions. As a result, we may be able to discern a person's feelings and facial expressions and thus give him or her appropriate thoughts to improve his or her mood. The goal of this project is to develop an AI/ML module that takes a picture of a person's face as input and restores facial expressions. Individual and multi-layered networks will be explored to determine the best dividers for emotion. Photographs of faces in various resolutions, as well as photographs containing the regions of the lips and eyes, will be provided. If computers are able to detect these implants, they will be able to provide users with clear and appropriate support in ways that best suit their needs and preferences, while also keeping them happy and content.

LITERATURE SURVEY :

Discusses detailed research on facial recognition, identifying databases and phase of sensory research. In the visual elements of the image are studied, and the dividing algorithms are provided, which will be useful in further exploring the mechanisms of sensory perception. The use of neural networks to understand the challenges in data science is becoming increasingly popular. In the world of research, facial recognition is on the rise. All research sites evaluate and evaluate the perception of facial expressions. Sensitivity is found in facial images using filter banks and Deep CNN, which has a good level of accuracy, which leads us to believe that in-depth reading can be used for emotional detection. Image spectrograms with deep communication networks, as done in them, can also be used to detect facial expressions. Various features, such as speech or bi-modal systems, which use both voice and facial expressions, can also be used to sense emotions. According to some scholars, the program should appeal to and motivate the student's emotions. However, the program must first identify the learner's feelings.

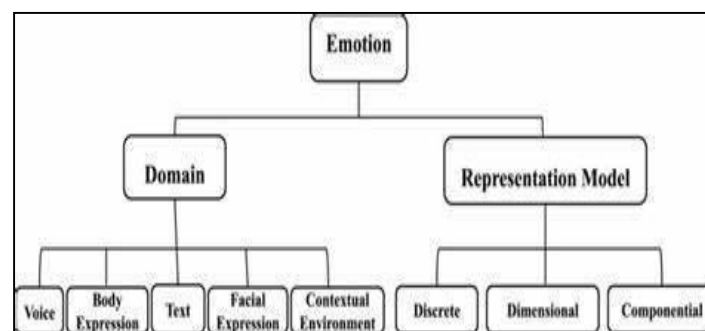


Fig. 1: survey of emotion detection

User interrogation, unspecified parameters, speech recognition, face recognition, key indicators and signals, or touch recognition can be used to determine emotions. Mixed methods are also proposed, which include two or more processes and a variety of emotional indicators. This study also discusses the latest in-depth concept of integrated learning, which combines a convolutional neural (CNN) network of single-frame local data with short-term memory (LSM) of interim features of several frames.

METHODOLOGY :

Concept

Emotions can be expressed through facial expressions. In contrast to noise-based methods, which use global acoustic features, the features used are usually based on location or the shift of specific points and locations. This can lead to incorrect spelling of the face annotation. Therefore, an effective approach is still necessary to improve the reliability of facial annotations. Therefore, in this project, a novel approach called The Similarity Matrix-based Noise Label Refinement (SMNLR) is proposed, which successfully predicts an accurate label from noisy facial images. In order to improve the effectiveness of the proposed method, an in-depth learning method called Convolutional Neural Networks (CNN) is used for feature representation. Several tests are performed to evaluate the effectiveness of the proposed face annotation method using LFW, IMFDB and Yahoo database. The test results clearly show the robustness of the SMNLR proposed method in dealing with a labeled noisy face that will be photographed on a person's face, and a few features will be discovered. Spatial (frame-based) and spatiotemporal (sequential) templates will be used to identify facial features. The goal of this project is to use real-time images of a person's face as an input to determine the most appropriate human emotions using facial expression as an outline.

Proposed Work

With the help of a deep learning algorithm like CNN, detailed facial expressions will be taken and determined by the appropriate feeling. The program will explore individual and multidisciplinary networks to determine the best sensors for perceiving specific emotions. Photographs of faces in various resolutions, as well as photographs containing the regions of the lips and eyes, will be provided. The neural network cascade will be proposed based on test results. Six basic emotions and a neutral tone will be seen by the cascade. The module will recommend appropriate songs or actions based on the emerging feeling of pleasing the person and improving his or her mood.

CNN's emotional analysis will help to suggest a variety of activities related to a particular situation. As a result, it will help a person to be optimistic and happy. The website will keep track of all interactions between the user and the

system. This information will be used to create a CNN filtering algorithm for collaboration. The result will be displayed to the user using a trusted interface. This software will not only detect a person's condition, but will also provide appropriate recommendations depending on the results. Our system is trained using the "fer2013.csv" database, and its accuracy is constantly improving. Then, instead of training the network again, set the model to JSON and save the model weights to the hd5file so that we can use this file to make predictions.

ALGORITHM USED :

Convolutional Neural Network (CNN) is an in-depth Learning algorithm that is able to capture images, assign value values (readable and discriminating metrics) to the elements / elements in an image, and discriminate against one another. Compared to other segregation strategies, the Convolutional Network requires very little pre-processing. Although traditional filtering methods are hand-made, Convolutional Networks can analyze these filters / features with adequate training.

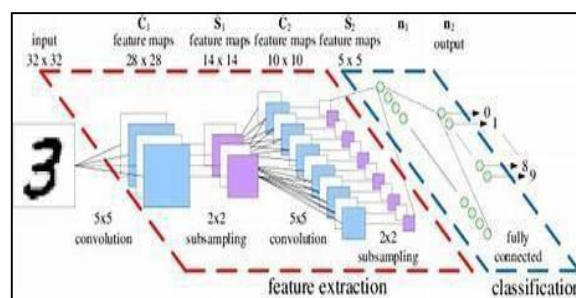


Fig. 2: CNN Architecture

CNN is inspired by the organization Visual Cortex and has a structure similar to the patterns that connect neurons in the human brain [18]. Individual neurons respond specifically to stimuli in the reception field, the closed part of the visual field. The collection of such fields pierces the visible area to completely cover it. By using appropriate filters, Convolutional Networks is able to collect local and temporal dependencies on the image. Due to the reduction in the number of elements involved and the reuse of weights, architecture produces a better balance on the image website. To put it another way, the network can be sharpened to better understand the image view.

ADVANTAGES :

Although the applications and benefits of sensory technology are limited only by our imagination, there are some obvious benefits.

- Emotional technologies can help employees make better decisions, improve their focus and performance in the workplace, manage stress, and help them adopt healthier and more productive work styles.
- Real-time voice-based emotional analysis opens up more business opportunities by allowing the default customer service agent to recognize the caller's emotional state and adapt accordingly. Such information can also help to analyze and manage the stress levels of human workers.
- Emotional technology will allow companies to gain in-depth emotional contact with consumers through visible assistants. Data collected by such devices can help companies understand how internal and external environmental factors affect their employees. As a result, companies can redesign processes accordingly, to help keep their employees more engaged and productive.
- Feelings of weariness can help monitor the user's mood according to the mood and other health issues.
- Neurological technology can help children or adults, who need care, to get help and timely support from family members or caregivers, whom they warn doctors.
- Technology that captures a person's emotions based on audio and visual signals may allow businesses to perceive a positive and negative consumer attitude in order to better understand their preferences. Such technology can assist in analyzing customer preferences that can be used for marketing purposes and helps to identify their annoyances in order to improve product usability.
- Smart home listening devices can provide entertainment (music, videos, TV shows or photos) to match the current user attitude.



DISADVANTAGES :

The following are the challenges or drawbacks or disadvantages of Emotion Sensing Technology:

- Verifying a set of emotional data is a challenge to having an accurate emotional monitoring system.
- Finding or finding emotions in a haystack.
- It is a challenge to make emotions available in different languages.
- There are limitations with different types and versions of the software such as inputting data is only text data, image, pattern, video and audio input are not allowed.
- Performance and sensory system results depend on sensor accuracy such as cameras, hot photo sensors, used face recognition algorithm and more. The most accurate system will cost due to the use of expensive components.

RESULTS :

The module we create to assess a person's condition and help him improve when he is depressed or depressed is a key feature of this article. It is an Android-based application with Python background and AI module. Alternatively, the application is a self-contained unit that does not require additional Desktop OS software components or storage space. When a user subscribes to this app, it will communicate with them through a trusted interface. Advanced modern learning techniques such as neural networks will be used to differentiate them so that the system is more accurate and precise with its effects. The app has no effect on other machine performance, and no hardware other than the camera is used. The software will be able to detect human emotions. Quickly and effectively with his facial expressions. Any business professional will benefit from this app. A business that helps people manage their stress levels This will lead to a healthier environment. An application of a better work environment and increased productivity will make appropriate recommendations for the user according to his will so that their attitude is improved due to the improvement of the result. The CNN algorithm will do just fine. Bringing the most accurate results through the operating system to the results of the application.

CONCLUSION :

At present, sensory technology is still in its infancy. The benefits of this technology will help people in various areas of life once they have fully developed. The most important benefit is that it will prevent accidents or other bad things. Risks caused by the driver's attitude, such as frustration, depression, and sadness, to name a few. Our aim was to assess a person's current status based on their facial expressions and secondly to provide the necessary support. Recommendations for improving their mood and having a good time. The program makes an effort to deliver stress-relieving videos or homework to help the user relieve anger or stress. It also suggests encouraging articles for users to help them overcome melancholy and depression and stay happy. This study aims to provide a quick, effective solution. Simpler and shorter with the use of simple visual effects, such as Android. An application that can take pictures and perform related tasks. This will not bother the user. The program has greatly improved. Because it uses Advanced Learning techniques, it is as reliable as the Convolutional Neural Network, which improves accuracy. This will be really helpful during difficult times. And it is important in furthering the production of a graph of human activity.

FUTURE SCOPE :

Due to your great academic and economic potential, Face Recognition (FER) will be a hot topic in the field of computer vision and artificial intelligence. The most difficult challenge to extract relevant visual material directly from regular videos will be the focus of future research in this area. Smaller films such as input will be able to shoot and see facial expressions in the future.

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VGG16 CONVOLUTIONAL NEURAL NETWORK ARCHITECTURE & METHODOLOGY IN IMAGE ANALYSIS

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Abstract: VGG16 is a neural convolutional network used to visualize and locate an object. It has great accuracy over many large datasets so we are reviewing its architectures and functionality that makes it suitable for Image Analysis.

Key Words: Image recognition, CNN, Neural Network, pooling layer.

INTRODUCTION :

VGG16 is a very popular and extremely highly computational object detection and classification algorithm, which has great potential to classify 1000 images of different categories with 92.7% accuracy. It is highly parameterized and easy to use with transfer learnings. Today's era is artificial intelligence that is combined with machine learning and deep learning. In image classification, this CNN algorithm has its solid presence and reduces the error rate in less time. It works with Keras and Tensorflow. Thought of this CNN model is proposed by Karen Simonyan and Andrew Zisserman at the University of Oxford in 2013. Be that as it may, the genuine model was submitted during the ILSVRC ImageNet Challenge held in 2014. The ILSVRC is ImageNet Large Scale Visual Recognition Challenge which is a contest that assessed calculations for picture order and item discovery at a huge scope. GoogLeNet was the winner of this challenge with a very low error rate but VGG16 was also the best model and it couldn't win the challenge and was first runner-up. Here we are presenting its architecture and methodology in image analysis.

METHODS :

VGGNet has huge improvement over AlexNet, the champ in 2012, and ZFNet, the victor in 2013. ImageNet has a dataset of 15,000,000 high goal pictures of 22,000 classes. The challenge ILSVRC uses a subset of 1000 images of each category with nearly 1,300,000 training images and 50,000 validation images. And this is the convolutional model which achieved an error rate below 10% so it created a high impression in the data science world. Here we will observe this model with its architecture that makes it highly outstanding and efficient in image classification. We will optimize it based on its filter layer dimensions and strides, multidimensional training and testing, and dense testing besides model fusion.

ARCHITECTURE :

Above all else, contrasted with these huge responsive fields in the first convolutional layer of this model proposed the tiny 3 x 3 open field for example channels across the organization in a 1-pixel step. Note that the AlexNet utilizes 11 x 11 with step 4, and the equivalent was 7 x 7 in ZFNet with step 2. Utilizing 3 x 3 channels is something that makes it a stand-apart model since two sequential 3 x 3 channels give the successful particular field of 5 x 5 and three 3 x 3 represents separate 7 x 7 fields, etc bigger fields. However, here we would utilize a 7 x 7 layer to diminish the number of layers and superfluously intricacy. No, notwithstanding 3 convolutional layers there will be three non-direct actuation capacities in spite of one. So that would make our outcome more discriminative and quicker combined. As we will see it's more elements to show why it is more liked. In the accompanying outline, we can see various forms of VGG.

Here VGG16(Conv 1) achieved a 9.4% error rate, 1 x 1 convolutional layer help to achieve non-linearity of decision function and is doing project mapping of same high dimensionality. But an upgraded version of VGG16 with an 8.8% error rate and more than 138 million weight parameters stands out. Ergo it is highly recommended than VGG19,

which has 144 million parameters and a 9.0% error rate forasmuch we conclude as a further increase in layers doesn't give better results. VGG16 has the setup of different convolution layers of channel size 3 x 3, step and padding 1, trailed by a greatest pooling layer for 2 x 2 sizes. The Convolution stacks are followed by three completely incorporated layers, two with 4,096 sizes and the last with 1,000 sizes. The latter is the result layer with the Softmax enactment work. 1,000 alludes to the complete number of potential classes in ImageNet. For multi-scale training, an image is scaled with a smaller value and then it will be cropped to 224. That is how we are inputting different scaled objects or images for training datasets to improve the flexibility of the model and reduce overfitting. Now 224 x 224 images has three base colors called channels -red, green & blue. We normalize the RGB values of each pixel and passed into the model like the following. At last, it comes to fully connected layers as they are neural networks, and based on the input they try to analyze which combination of the input gives which output so it has activation function like ReLu, Softmax also.



Fig.1 - VGGNet Model architecture layout comparison

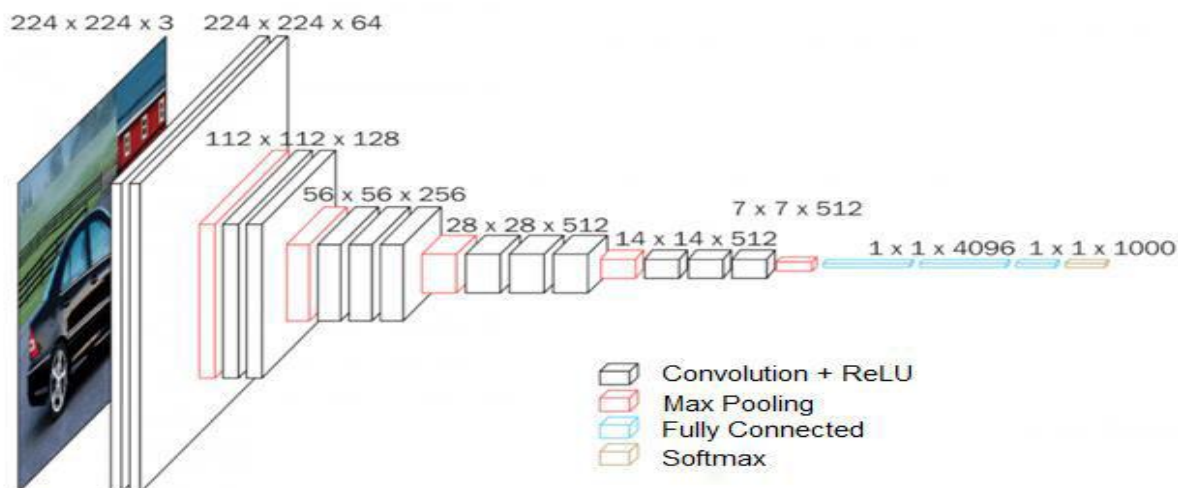


Fig. 2 - VGG16 model working layout

DISCUSSION & CONCLUSION :

Ergo we have known the capacity of the VGG16 model as it is highly scientific and computationally powerful. We can use multi-scale, data augmentation with Image Data Generator, dense testing, and model fusion; Model fusion is like combining the different model approaches and adapting newly formed variant objects that make the model precise and the output better. This has better accuracy on many datasets and can be used on others like transfer learning.

Comparing with GoogLeNet:

- GoogLeNet utilizes 7 Nets with a 6.7% blunder rate and VGG Net utilizes 2 Nets in addition to multi-scale preparing, multi-scale testing, multi-crop and thick has a 6.8% mistake rate.
- With just 1 Net VGGNet has a 7.0% blunder rate which is superior to GoogLeNet which is a 7.9% mistake rate.
- It has the best outcomes on VOC 2007, 2012, and Caltech 256 dataset and even outflanks GoogLeNet and won the restriction task with a 25.32% confinement blunder in ILSVRC 2014. GoogLeNet uses inception modules to go deeper and contain few parameters to be trained resulting in better faster convergence and reduced overfitting problems.

In VGG we can't go lower than a 3 x 3 receptive size filter because it is the minimum for understanding the special feature of the image. We can use scaled images, and rotated and sheared images for a better understanding of features for the model to be trained. We can increase model performance by significant changes in hyperparameters like dropout, the number of hidden layers and units, network weight function, activation function, gradient and learning rate, and the number of epochs. There are some challenges that it has 138,000,000 very large number of weighted parameters and the model size is over 500MB. This puts specific limitations on the utilization of the model, particularly in edge processing as the interface time required is higher. Second, there is no particular measure accessible to control the issue of eradication or blast of slopes. This issue was addressed on GoogLeNet utilizing numerous origin modules like inception modules and on ResNet utilizing skipping associations. Here we have observed this model with its architecture that makes it highly outstanding and efficient in image classification. We will optimize it based on its filter layer dimensions and strides, multidimensional training and testing, and dense testing besides model fusion.

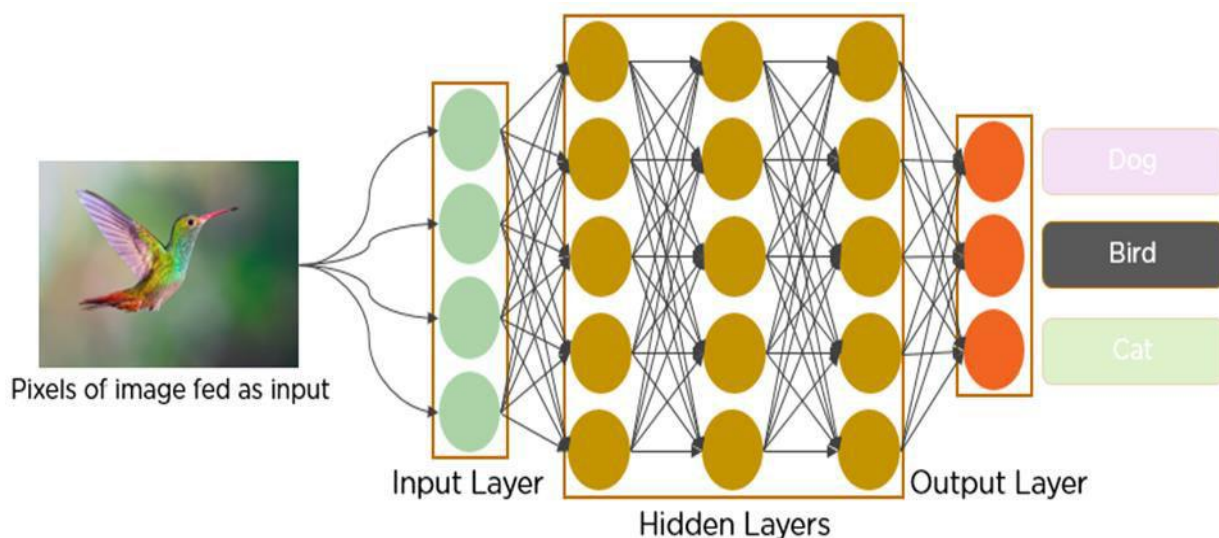


Fig. 3 - Fully Connected layers example

VGG16 Use Cases:

- Image recognition and characterization: It can be utilized for sickness finding utilizing clinical pictures like X-beams or MRIs. It can help to recognize street signs on moving vehicles.
- Handwritten character recognition: It can recognize handwritten characters also.
- Image detection and localization: It can recognize anomaly detection and recognition of objects and was the winner in the localization task in 2014.
- Picture Embedding vectors: After jumping out the top result layer, it very well may be used as preparation to make picture inserting vectors like face checks utilizing VGG16 inside the Siamese organization.
- Automating moving vehicle: VGG16 can implement the model to recognize whether it is an object or a clear path to move forward.

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DEEP LEARNING: THE FUTURE OF MEDICAL IMAGE PROCESSING

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Abstract: *The important field that has always been in high demand is health treatment. The expectation of people in this field is to get advanced whatever the status of people is but they prefer a better treatment. Many medical reports have to be read manually but sometimes we can say that there are many cases where the reports are not clear and the disease cannot be understood at an initial stage. As the reading of the medical image is done manually that means it will be done gradually and will be less accurate as the image is blurred which cannot be understood easily sometimes. This problem can be solved by using several models of deep learning and machine learning. Let's discuss how Medical Image Processing using deep learning models can be achieved.*

Key Words: *CNN, Deep Learning, Medical Image Processing, Diabetic Retinopathy, Cardiac Image Processing.*

INTRODUCTION :

Years ago, what we use to follow still, if we use the same track, we won't be able to survive. Earlier when the technology was not so much advanced in the medical field people used to die because of last moment knowing of diseases like cancer and others. We make the medical sector more advanced by using modern technology and processing medical images by using ml and DL models. Learning means acquiring new knowledge, and skills. There is a process of learning which is done by everyone like plants, animals, humans or machines. Here we will discuss the learning done by machines to process the data. This means the scientific study of algorithms and statistical models that the system used to effectively perform the user-specific task without explicit instruction. How we can use this in the medical field and how the task can be performed. We will discuss how the medical image can be processed by using models, here we didn't mention which models whether ml or dl models because we will go on comparison mode and will compare the life of medical before and after deep learning in this sector. We will process reports and medical images and data through Deep Learning models. In this model, the basic requirement is of the dataset that required you to train your data that has to be processed in the model let's discuss this in detail

LITERATURE REVIEW :

Before deep learning

Before deep learning what we were using were standard machine learning techniques, for instance Scikit-Learn algorithm, a python library that was quite successful among many. It was easy to implement, instructions are present to understand which algorithm to use when encountered with a different and complex data science problem, for example, whether it is a classification problem, dimensionality reduction problem or regression problem. Also, for medical imaging, decision tree technique was also proven very successful before deep learning. A vast majority of clinicians were using decision trees and there was also the case of using randomized decision trees which was successful in its application to machine learning not only for medical imaging but for computer vision problems as well. Decision trees were easy to interpret, it is entirely based on feature selection, and the data can be separated easily. For example, you have a set of decisions to make to tell you that whether this feature is useful or not and it can easily separate your data based on it and then in the leaf nodes you can make decisions. A few years back before deep learning there was a time when everyone started to use random forests for a lot of things. The reason behind this was that when we started to put a lot of decision trees together, we get very strong classifier. It was quite useful as scaling a decision tree upward is also quite easy, by building deeper and deeper trees, so you can use lots of feature in your data. In particular for medical imaging this is found to be quite useful.

After deep learning

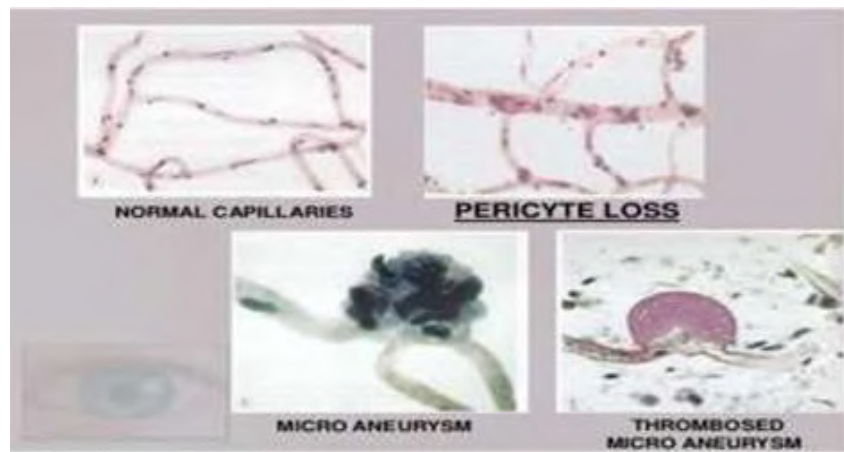
After the introduction of deep learning however, now for a problem a standard convolutional neural network is being used more as a baseline to understand the complexity of the problem. And the reason why is the power of deep learning, for instance if we compare a decision tree with a neural network, Comparative studies (Mooney, Shavlik, Towell, and Gove, 1989; [1] Weiss, and Kapouleas, 1989) have shown that whereas the decision tree algorithms run significantly faster during training, the connectionist methods almost always perform better at classifying novel examples in the presence of noisy data. Even in the case of a deeper decision tree where you are faced with the more discriminative predictive power from in the decision trees you don't face with deeper networks. Instead of a deeper network, we get a wider network. Modal being used these days in neural network have lots of hidden layers stacked on each other. These stacked hidden layers allow you to learn these very complex data associations between your input and output data.

DEEP LEARNING MODEL IN MEDICAL IMAGE PROCESSING :

We will now discuss how Deep Learning models will be used in Health care sector, let's take an example disease where image processing is a necessary part and how the implementation is possible, we have taken two diseases as follows and tried to understand the implementation part through various reports, images and models of Deep Learning.

DIABETIC RETINOPATHY :

Diabetic Retinopathy is a disorder of the retinal vessels that eventually develops to some degree in nearly all patients with long standing diabetes mellitus. Mainly Diabetic is also of two types i.e. type 1 and type 2, in type 1 there is diabetes Mellitus (DM) is a Metabolic disorder in which pancreases cannot produce proper insulin which result in low Blood Sugar in Type 2 diabetes in this the body tissue do not response to the insulin properly which result in high Blood Sugar. Diabetic retinopathy is eye disease due to diabetes which result eye blindness at early age of patient. According to Varun Gulshan [2], almost 415 million people are diabetes and 15% of them suffer from serious vision impairment problem, blindness and loss of eyes. We can cure this disease if we are able to detect it on time like in Cancer if it detect on first stage then the treatment is possible, but not in last stage. Similar happen with diabetic retinopathy. This disease can also be cured and controlled if it is known on time and at retinal screening. One can go and test for a particular disease only if a symptom is observed but in diabetic retinopathy sometimes the symptoms are not observed.



The eye PACS dataset consists of approx. 10,000 retinal images and the Messidor-2 data set consists 1700 images that are collected from 874 patients. This was dataset of model that is data convolution neural network. A renowned researcher C T R Kathirvel [3] trained data convolution neural network with dropout layer techniques and tested it on publicly available datasets similar to Kaggle fundus, DRIVE and STARE for classification of fundus. The accuracy reported is quite high, up to 94-96%. Another researcher Prat [4] employed NVIDIA CUDA DCNN library on Kaggle dataset which consist of above 80,000 digital fundus images. They also formalized the network on 5,000 images. The images were resized into 512x512 pixels and then sharpened to improve quality. Finally, the features vector was fed to Cu-DCNN. They classified the images into 5 different classes using features like exudates, hemorrhages and micro-aneurysms which achieve up to 95% specificity, 30% sensitivity and 75% accuracy.

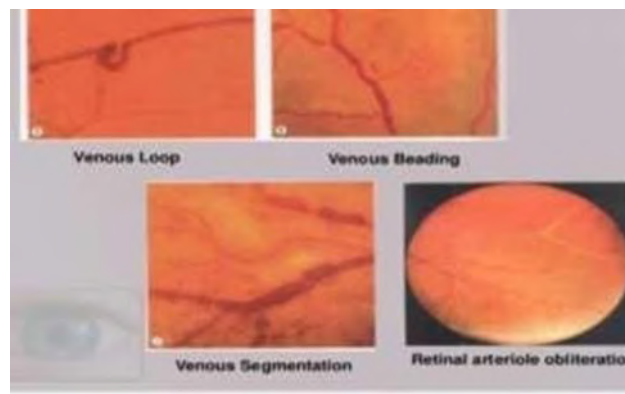


Fig 4(a): Diabetic Retinopathy – Retina Images



Fig 4(b): Diabetic Retinopathy – Retina Images

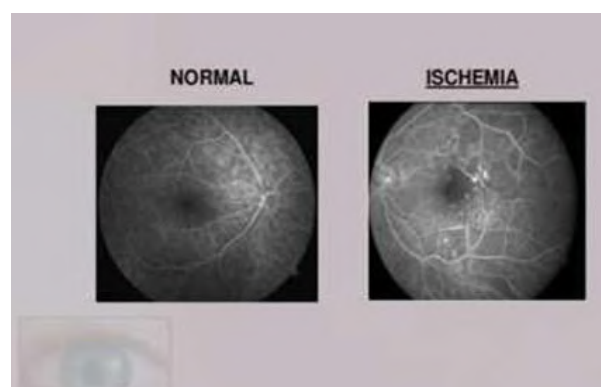


Fig 4(c): Diabetic Retinopathy – Retina Images

CARDIAC IMAGING :

Cardiac imaging is done to support the diagnosis of a heart condition. Cardiovascular MRI is the standard method for measuring cardiac volume, function, and blood flow. Cardiac MRI can be performed sequentially, where previous images are used to determine the plane of subsequent acquisitions. The detection of cardiac disease can be detected by using CT scan and MRI done for image segmentation of left ventricle. Manual reading of this image needs an expertise and this will take time too. By applying Deep learning model here it will provide accurate results for cardiac imaging especially for calcium score quantification. Medical images are increasingly using deep learning (DL) techniques for a variety of computational tasks, including disease risk categorization, segmentation of anatomical structures, and quantification of imaging features. To overcome this all problem or hurdles that arise in this path is proposed as Semi-Automatic Calcium scoring methods have been proposed for CSCT. Recent work that has been done on Cardiac images is focusing on CT Angiographic images based on CAC computation using deep conventional neural network. Chen Chen and others in their paper [6] have shown a table summarizing public code for DL- based cardiac image segmentation. Some top datasets has been mentioned in the table 1 with the github links

Modality	Application(s)	References	Code repo
MR (SAX) MR (SAX)	Bi-ventricular Segmentation	Tran [7]	vuptran/cardia c-segmentationcq615
	ventricular segmentation and Motion Estimation	Qin et al. [8]	
MR (3D scans)MR		Yu et al. [9]	yulequan/HeartSeg baiwenjia/ukbb
(Multi-view)MR	Four-chamber Segmentation	Bai et al. [10]	_cardiac
	Cardiac segmentation motion tracking and	Duan et al. [11]	Jduan/4Dsegment cherise215/atri
LGE Left	Atrial Segmentation	Chen et al. MRI [12]	a_segmentation_201yulequan/UA-MT jmerkow/121
CT, MRI	Coronary arteries	Merkow et al [13]	

Table 1: DL-Based Cardiac Image Segmentation

When we look at the algorithm used by Tran [7] in detail we see that the paper has used A Keras re-implementation of the original Caffe FCN model. This model contains 15 layers deep neural network which is shown in figure 5.

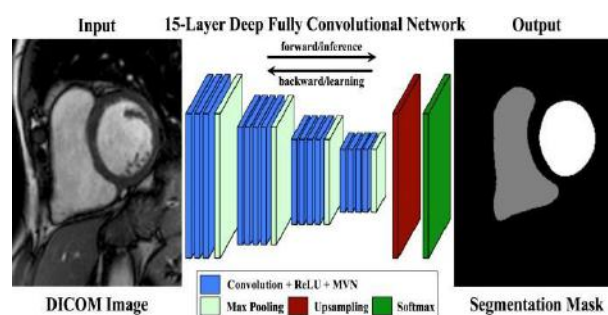


Fig 5: CNN implemented by paper [7]

CHALLENGES :

Obtaining great quality ground truth data, developing generalizable and diagnostically accurate methods, and integrating workflow are the key challenges of implementing machine learning in medical imaging. The performance of machine learning systems for diagnosis and decision making must be monitored. In case of medical errors, it is unlikely that the manufacturers and developers of the machine learning systems should be held accountable since the computers continuously learn and relearn based on data provided to them in ways not known to the creators. Machine learning maybe useful for predicting treatment response. E-health records and other massive data sets will soon be able to link imaging data more with non- imaging. It is possible to create an interdisciplinary datapool using an abundance of electronic medical record data. Using machine learning, we can extract knowledge from his big data and use it to make predictions about individual outcomes as well as make clinical decisions. Despite its complexity, machine learning produces high dimensional functions that can be difficult to comprehend in simple terms. Machine learning faces a substantial challenge in areas where it is important to identify the underlying causes and logic, which makes its interpretability one of the main challenges for its acceptance. Unsupervised machine learning has a limited visibility into the factors that influence its decisions.

CONCLUSION :

During the recent few years, deep learning has gained a central position toward the automation of our daily life and delivered considerable improvements as compared to traditional machine learning algorithms. Based on the tremendous performance, most researchers believe that within next 15 years, deep learning-based applications will take over human and most of the daily activities with be performed by autonomous machine. However, penetration of deep learning in healthcare especially in medical image is quite slow as compare to the other real- world problems. In this chapter, we highlighted the barriers that are reducing the growth in health sector. In last section, we highlighted state



of the art applications of deep learning in medical image analysis. Though, the list is by no means complete however it provides an indication of the long-ranging deep learning impact in the medical imaging industry today. Finally, we have highlighted the open research issues. Many big research organizations are working on deep learning-based solution that encourage to use deep learning to apply deep learning on medical images. Looking to the brighter side of machine learning, we are hoping the sooner human will be replaced in most of the medical application especially diagnosis. However, we should not consider it as only solution as there are several challenges that reduce its growth. One of the big barriers is unavailability of annotated dataset. Thus, this question is still answerable, that whether we will be able to get enough training data without affecting the performance of deep learning algorithms. So far, we have concluded that there are many opportunity and technology advancement has make medical sector more advanced and Deep Learning has make medical imaging more accurate and advanced.

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LATEST BATTERY POWERED DRIVE SYSTEMS AND THEIR FUNCTIONING

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Abstract: The flashpoint of the present situation of the drive systems in railways is electrification. But the use of battery-powered systems for drive applications is not only the alternative for other power sources but also proves to be an improvement in the structural components of the drive system. There are technologies being developed for use in the traction power system based on the installation of lithium-ion batteries that possess high capacity. This involves the implementation of rolling stock batteries on the sections of the system that are not necessarily electrified. This operation results in the reduction of maintenance costs as opposed to the conventional drive systems. The other advantages of progressing with the battery-based drive systems or the hybrid systems is the minimization of noise and the energy conservation. In this research, we are aiming at, prevalent battery-powered systems and the functioning of their components. We also navigate through the hybrid system being a combination of the rolling stock batteries along with the convention power source[2].

Key Words: hybrid systems, hybrid vehicles, batteries.

INTRODUCTION :

Trends in Railway System for the Past Century

Contrasting from most industries who have had considerable technological success in the last few years, the railroad industry has been dormant in many aspects. In particular when it comes to trace maintenance and repair; same technology has been used by rail crews to do the job, that is hydraulics and hand tools. The complete electrification of all vital lines was accomplished in the then British railway (BR) by 1960, except between England and Scotland, which was later completed in 1967 due to cost implications. From that time onward electric trains have been validated as more dependable and environment friendly compared to the diesel trains or old fashioned steam. [13]

Present Standpoint of Drive Systems

AC single-phase electrical propulsion systems are commonly used for electrified railways world-wide. This system has a drawback that it causes interference into nearby signaling systems. This interference can be very dreadful and risk the equipment and personnel. Hence the idea of moving them longer distances via battery is one better alternative just now being realized. Lithium-ion battery packs are used for long-range electric cars due to their energy density and longevity. Some rail routes are allowed to go electric by the special trains where it would not be possible otherwise[5]. A lithium-ion battery pack is mounted under the train's floor in the battery-electric trains, and is charged while it is in motion with overhead lines, using them to both charge the battery and power the train. Battery takes over when the train reaches a stretch of rail where there are no overhead lines. [3]

Future of the Railway System

Only about 40 percent of the track is electrified in Germany. It is predicted that trains will clean the air along routes that might be too expensive to electrify. 20 two-car trains are ordered by the state of Baden-Württemberg which are built in Germany by Siemens. These trains will inspect the energy consumption and energy costs over an almost 30-year service time. It's the first such order for Siemens Mobility for battery-electric trains, who will deliver them by June 2023. [7]

Battery-Powered Train charged from AC Overhead Lines

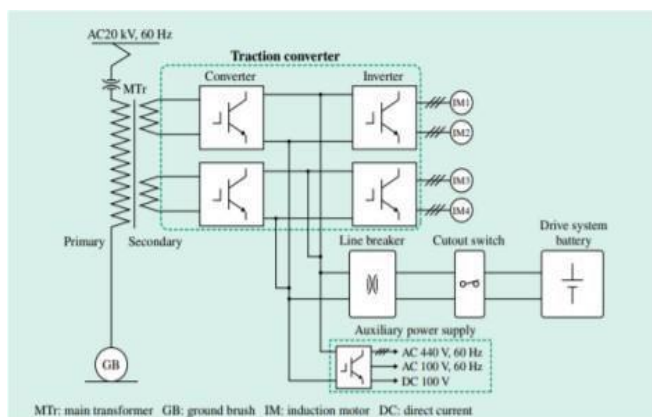


Fig.1 Traction Power Supply System Configuration of Battery Powered Train Charged from AC Overhead Line[19].

Figure 1 shows the basic configuration of the frame. The primary circuit is configured with the operating system batteries and the auxiliary power supply associated with the DC phase of the main converter. If you pass through a neutral section at low speeds in the power line area, custom AC train may see the closure of the auxiliary gear, (for example, glazed locomotive lights and cooling) due to interference from the overhead line. Regardless of how it is possible this framework can use the power from the battery to drive the power adapter, enabling the continuous operation of the auxiliary gear.[2] In terms of stock performance, the power from the overhead line is used for acceleration in the segments of the zapped lines, similar to conventional AC trains. Batteries are charged with rechargeable power while slowing down, and power from overhead when flooded or repaired[Fig. 2]. Battery power, charged in the areas of power lines, is used to control the train parts of power lines [Fig. 3]. Batteries charged with renewable energy while slowing down [Fig. 4].

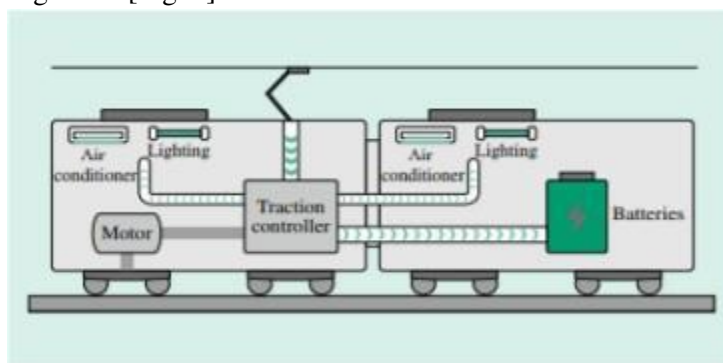


Fig.2 Energy Flow on Electrified Line Sections (when Stationary or Coasting)[19].

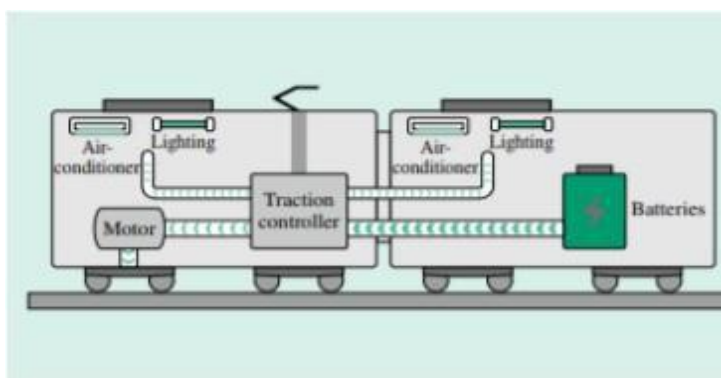


Fig.3 Energy Flow on Non-electrified Line Sections (during Powered Travel)[19].

Use of High Energy-density Battery Modules

This framework uses very powerful battery modules. The module includes a battery bank consisting of 72 system-connected batteries with a limit of about 120 kWh (1,598 V, 75 Ah), and three of these banks are used with a total output limit of about 360 kWh [15]. The introduction of high-capacity batteries enables the train to travel 30 km or more across parts of the unfinished line without charging. Although lithium-ion batteries have the problem of internal resistance increasing due to low temperatures, which reduce the output of the output, the battery module used in the frame significantly reduces this decrease in temperature at -20°C .

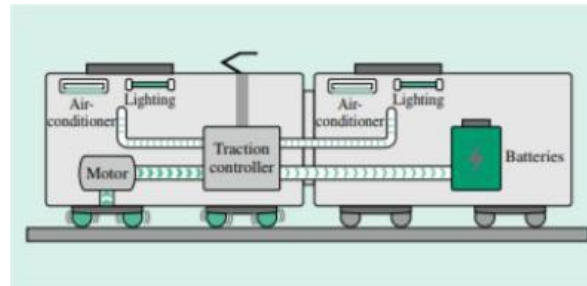


Fig. 4 Energy Flow on Non-electrified Line Sections (during Power Regeneration) [19].

FUNCTIONING OF HYBRID VEHICLES

Working of Hybrid Vehicles

Working of electric machine and internal combustion engine in hybrid vehicles is as follows:

Electric mode only: When the hybrid vehicle is in this mode, the coupling is open along with decoupling of the combustion engine and hence is switched off.

- Recuperation with the electric machine: The coupling is unaffected in this mode, i.e., remains open and the electric machine starts working as an alternator thus charging the battery by converting mechanical energy into electrical energy.
- Hybrid mode: The coupling is closed while the vehicle is running in hybrid mode. The internal combustion engine and electric machine are operated by the intelligent hybrid control system in terms of comfort and efficiency criteria.
- Coasting mode: Again the coupling is open and the combustion engine is switched off in this mode. Movement of the vehicle does not generate any losses of the combustion engine.
- Boost: Power is also supplied by the electric machine apart from the full load of the combustion engine. [18]

Advantages of Hybrid Vehicles

As the technology of the plug-in hybrid vehicle involves the working of both combustion engine and electric drive, so are their advantages. These vehicles can be driven exclusively in electric mode even in large urban traffic due to the presence of large batteries. However, the use of a combustion engine for greater distances ensures that the vehicle is suitable for long-distance driving as well. The electric drive replaces or supports the combustion engine where the latter displays rather unfavorable behavior, therefore, helps in reducing overall consumption and improves performance [18].

Use of Emergency Batteries

In drive systems, emergency storage batteries are also used with the drive system batteries. These are used to enable continuous operation. Enables fraud and embezzlement in the absence of operating system batteries. Emergency batteries are also used to power the entire generator. The modules used by the emergency batteries are similar to those of the operating system batteries to ensure that the flexibility does not change [4]. Two batteries (Rated 340V and 1.9kWh) are connected in series to set up the emergency battery module.

Starting Engine with the Help of Emergency Batteries

To start the engine with emergency batteries, an emergency battery button called the battery connector is turned on. Emergency batteries supply electricity to DC machines. To crank the engine, the converter drives the generator. When the unchanging battery voltage controller starts, it closes the battery connector [12]

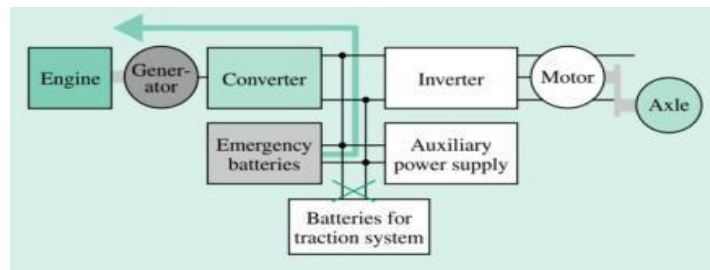


Fig.5 Engine Starting Circuit using Emergency Batteries [19].

Powering Engine inverter converter circuit

In accordance with the total power consumption of the auxiliary power supply and inverter, we control the engine speed. To balance the budget of the consumption of power between the power supplied to the auxiliary power supply and the inverter and the power for the converter generator, we use the constant voltage control (680V) for DC equipment [15].

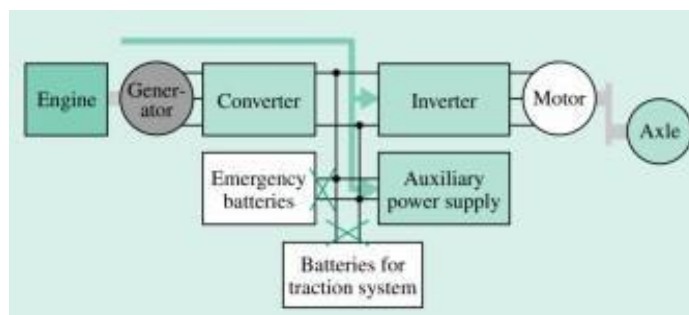


Fig.6 Engine Power circuit diagram [19].

EMERGENCY BATTERIES CHARGING

If emergency batteries are used during a trip or the SOC is reduced due to overcrowding, the charging function of those batteries is deployed. Emergency batteries are supplied with an unusual voltage of 340V and charging begins automatically. Charging occurs until SOC is 55% [13].

ARE BATTERY-OPERATED TRAINS A VIABLE ALTERNATIVE TO ELECTRIFICATION?

Comparison of DMU with EMU

Over the past 20 years, battery-powered railway technology has become much more sophisticated. The pitfalls of using conventional battery technology include heavy weight gain on trains and proper care, but the range of these vehicles is very limited as they have no rechargeable means while on the go. For example, for many years London Underground Limited (LUL) has been using battery-powered trains to transport infrastructure trains, but making a single return run to the workplace is often enough with a single charge. The latest lithium-ion battery technology is now very popular in broadcast systems. It can provide a range of several miles in a single charge due to the overcrowding available with this type of battery technology. They allow the installation of large battery packs on multiple units [7]. In the case of Electrical Multiple Unit configurations, the rechargeable batteries can be recharged while moving in electrified phases by pulling the power of the overhead lines. If only by using battery power, a sufficient distance can be reached then the EMU hybrid / battery will certainly make a return on the branch line connected to the main power line or provide for “connecting” the power lines between the power lines. A common solution to this problem would be to simply activate

the Diesel Multiple Unit (DMU), so that it can supply a few powerless parts, perhaps over a highly electrified line.

Some real life examples

For these less electrified routes, the integrated battery / EMU will be much better as it eliminates the need to use DMU for these resources. For example, large costs are saved as the less used Matlock branch in Derbyshire does not need to be electrified along with the entire Midland Main line. With only battery power, a hybrid battery / EMU based on the image of the Bombardier Class 379 can comfortably reconnect to this branch line[17]. Another great example of a hybrid / battery EMU will be important, is in the queuepassing through Farringdon station in London. Such a unit would be able to eliminate the current use of two conventional power lines and lead to the complete removal of a short section of electricity for the third railway north of the Thames.

EMU not completely an alternative

Battery-operated EMUs maintain a high initial purchase price and may require additional infrastructure depending on the specific operating requirements to be installed to facilitate battery recharge. EMU has not yet been able to completely shut down diesel on all power lines due to limitable size limits which means it has full battery power[9].

CONCLUSION :

Despite the aforementioned advantages, integrated battery / EMUs may be more difficult than conventional EMU, simply due to additional equipment installed (running battery pack, charging equipment and thermal management systems). Special precautions need to be taken with regard to operating the battery and keeping it safe, as there are 700V series power terminals. In addition, the batteries themselves contain harmful substances, which can present additional fire hazards to the unit. The battery-based solution should therefore be considered as a "closed" tank, this requires careful design to maintain adequate heat dissipation. The resulting excess weight of the unit may adversely affect performance and incur high track access charges. So in some cases, installing electricity throughout the route may be a better option[6]. Electrical installation is still expensive and can take years to complete. The UK network is very complex, with many branch lines coming from major line routes. While the charge for electrification of key components may be clear, electrification of all branch cords may seem economically unavoidable. Unfortunately, this situation could lead to diesel trains continuing to operate on large sections of power-connected networks for many years due to the need to provide non-electrified branch cables.

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SENTIMENT ANALYSIS IN TWITTER USING NATURAL LANGUAGE PROCESSING AND LSTM

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Abstract: Twitter is one of the most commonly used social media platforms. Users use Twitter to spread their tweets to the public. The number of Twitter users has reached 330 million people worldwide. Besides, on Twitter, some tweets can be emotional. Emotions themselves can be defined as policy, vision, mind, mud, etc. Sentiment analysis thus determines the diversity or type of perspective in a predetermined text or subject. Natural Language Processing (NLP) methods are used to support the beginning of text. The processes used for analysis are tokenization, permanent word termination, and indication of root extraction. The purpose of this study is to improve sentiment analysis by using dictionary and repetitive polarity. The accuracy results are still lower than those using machine learning. Therefore, this dictionary should be developed according to its meaning.

Key Words: LSTM (Long short-term memory), NLP (Natural language processing), RNN (Recurrent neural network), Stemming, Lemmatization.

INTRODUCTION :

Twitter is one of the most commonly used social media platforms. Users use Twitter to spread their tweets to the general public. The number of Twitter users has reached 330 million people worldwide. Besides, on Twitter, some tweets can be emotional. Emotions themselves can be defined as policy, vision, mind, mud, etc. Emotional analysis, therefore, determines the variability or type of point of view in a predetermined text or topic. The NLP (Natural Language Processing) method is used to support text commencement. The process used in the analysis is a sign of tokenization, termination of standing words, and stemming. This study focuses on improving emotional analysis using Twitter Sentiment Analysis means, using advanced text cutting techniques to investigate text sentiment (here, tweet) within the good, bad, and neutral genres. also known as Opinion Mining, is an analysis of conversations, ideas, and sharing of ideas (all within a kind of tweet) in order to determine business strategy, political analysis, and evaluate community actions. Sentiment analysis often aims to identify trends in tweet content that are analyzed by machine learning algorithms. Sentiment analysis is an important tool in social media marketing. Because we are discussing how to get used to predicting user behavior.

Sentiment Analysis is used to explore the topic or sentiment for a given post. In fact, it is one of the most popular social media tools. Text comprehension can be an important problem to solve. One way is to measure the value of the sentences in the text and create a summary of the text backed by significant numbers. These systems are not based on artificial rules, but rather on machine learning techniques such as separation. Edit used for sentiment analysis is a basic program and should be accompanied by sample text before returning categories such as good, bad, or average. Twitter is a popular social network where members create and interact with messages known as "tweets". It is a way for people to express their thoughts or feelings on a variety of topics. Various groups, including buyers and sellers, comment on these Tweets to collect product information or market themselves. Moreover, recent advances in machine learning algorithms have made it possible to increase the accuracy of sentiment analysis predictions. In this report, we intend to perform sentiment analysis on "tweets" using various machine learning algorithms. You tried to distinguish between correct or negative polarity in a tweet. If a tweet has both positive and negative sides, the dominant sentiment should be considered zero. I used Kaggle's database to scan and display positive/negative results. The data provided comes with icons, usernames and hashtags that need to be parsed and converted to a standard format. It should also extract useful features from the text, such as unigrams and big grams that



represent "tweets". However, using separate models does not provide high accuracy, so a combination of models was created by selecting several advanced models. Blending is a mathematical learning algorithm that combines different class delimiters to improve prediction accuracy. Finally, we report the test results and final conclusions.

Natural Language Processing (NLP) is a branch of artificial intelligence. The field seeks to provide communication with people in their native language [6]. This kind of intelligent system requires computer technology and language to be developed, and the system processes natural language like human beings. The NLP development process consists of steps.

The development cycle with NLP begins with text collection. The text collected in a set is called a corpus. Then, all text data is analysed because not all text is processed in addition, the process proceeds to the initial stage of processing. This section aims to clean up and select the appropriate text. Then, you switch to the feature engineering category. This section tries to find attributes in random text. With the presence of built-in features, the text is structured and ready to be calculated to produce emotions. The decision making process can be based on legal or mechanical learning. This study uses dictionary based rules.

A learning field that is part of the NLP and aims to translate people's ideas, on specific topics, for any event, etc. [7] [8]. Text mining is known as the analysis of ideas or emotions. This creates a broader problem area. There are also different names and have different assignments, egg, Emotional analysis, commentary, opinion polls, emotion analysis, impact analysis, subjectivity analysis, mining review, etc. The flow of processes that take place to analyse emotions is shown in Figure 2 The process in Figure 2 starts by selecting a topic, then collecting tweets with that keyword and performing emotional analysis in the tweet. Tweets can be random, slightly structured, and have random types. Sentiment Analysis Research can collect tweets using different editing languages such as R or python. Data preprocessing is nothing more than data filtering to remove incomplete and noisy data.

METHODOLOGY :

The most important emotional indicator is the emotional word. These words are often used to express positive or negative emotions. For example, beautiful, beautiful and wonderful words that evoke good, bad and terrible words of negative emotions. Sentiment terms are important in sentiment analysis for obvious reasons. A list of such words is called a dictionary of emotions (or a dictionary of ideas). Over the years, researchers have developed many algorithms to compile such dictionaries.

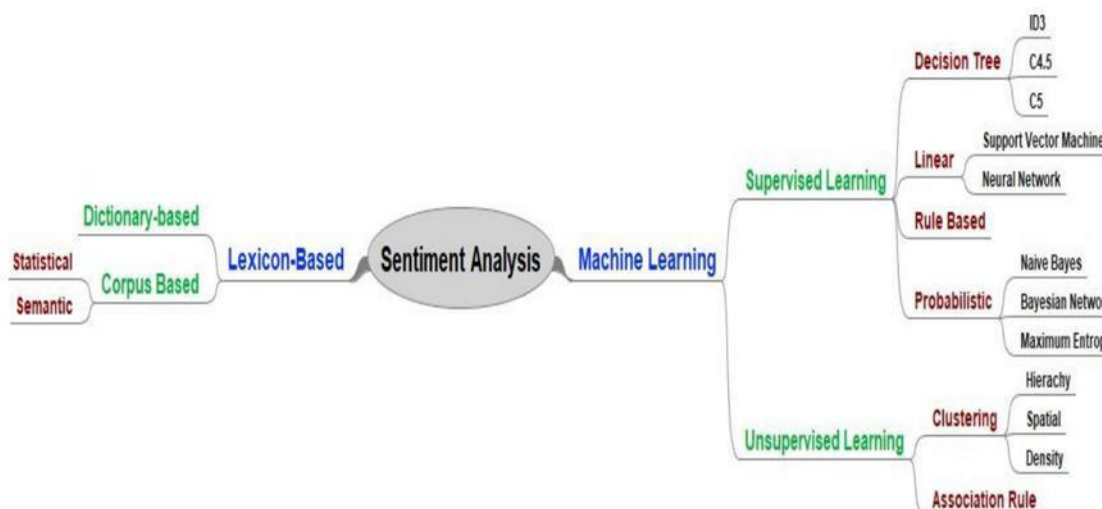
Although emotional words are important for emotional analysis, simply using them is not enough. The problem is very complex

In the emotional phase, there are several ways to differentiate emotions. These methods are shown in Figure 3. This division was first divided into 2 methods, namely machine learning and lexiconbased methods. In this study, we focused on a dictionary that has been prepared for the dictionary. This dictionary contains only the adjectives that are collected and labelled.

The following activities are involved in preprocessing work:

- Deletes retweets (on Twitter databases)
- Release URLs, special characters, punctuation marks, numbers, etc.
- Removing block words
- Qualifications
- Making tokens.

The term emotional intelligence is an important tool used in many emotional analyses and digging such as mining tweets, the discovery of ideas, and the segregation of tweets. Emotional words can be divided into positive, negative, and middle words such as mining tweets, the discovery of ideas, and the segregation of tweets. Emotional words can be divided into positive, negative, and middle words.



LITERATURE REVIEW: -

We used neural networks with LSTM layers in our experiments. We have used the vocabulary of the top 20000 words from the training database. We used a vector presentation to train our models. We override or minimize each vector representation to make it equal to the max_length parameter we adjust in our test. The first layer of our network is the embedded layer described in section 4.9 We explore two different types of LSTM models.

- **Random Embedding Implementation:** In this model we use an embedding size of 32 words and teach embeddings from scratch. After the embedding layer is an LSTM layer that tested a different number of LSTM units. The LSTM level is followed by a fully integrated level with 32 modules and trigger functions. Finally the output is a single number with a sigmoid function. I also added 0.2 output after embedding the layer and added the previous layer to make the network more canonical.
- **Include GloVe:** This option uses a 200 word vector instead and replaces the GloVe vector word provided by the Stanford NLP Group. Word embeddings are now correctly enabled during training. We follow the fully connected layer using com followed by the LSTM layer embedding layer. Finally the output is a single number with a sigmoid function. To make the network more legit, we add outputs of 0.4 and 0.5 respectively after layer embedding and prelayer.

We tried the SGD optimizer with Adam with the training intensity of our network and found that Adam performed better and met faster.

CONCLUSION :

The tweets provided were a mixture of words, emoticons, URLs, hashtags, user comments, and symbols. Prior to training, we preprocess tweets to suit the models. Regular Neural networks to differentiate the polarity of a tweet. We used two types of features namely unigrams and bigrams to differentiate and we saw that magnifying the vector feature with bigrams improves accuracy. When the element is removed it is represented as a bright vector or a dense vector. It has been observed that having a small vector representation gives better performance than quantity. Neural pathways usually work better than other stages. Our flagship LSTM model achieved an accuracy of 85.0%.

Model	Accuracy score
Naïve Bayes	70-75%
SVM	75-80%
RNN	80-90%

Emotional control: we can develop and train our models to handle the range of emotions. Tweets do not always feel good or bad. At times, they may even be emotionally drained, meaning that they are neutral. Emotions can also have categories like a sentence, this is good, positive but a sentence, this is amazing. it says it is much better than the first one. So you can distinguish emotions from 2 to +2. **Symbol usage:** Previous analysis discarded most symbols such as commas, periods, and exclamation points. This symbol can help isolate emotions in a sentence.



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FRAUD DETECTION IN E-COMMERCE USING MACHINE LEARNING

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Abstract: With the recent pandemic and change in consumer trends there has been an increase in online payments for services and groceries, with this increase there has been an increase in fraudulent activities as well. Various ML models were tested in their efficiency to detect frauds. There were promising results with Neural Networks, but it also contains a few downsides which need to be overcome using optimization techniques. There are 2 types of optimization styles that can be used, First Order style uses gradient information and constructs the coming training replication. Whereas Alternate Order Style uses hessian derivations to calculate replication based on the optimization line. Some refinement methods try to enhance accuracy while simultaneously trying to reduce the size of the model. This paper aims to compare the following various machine learning methods like the random forest, k-nearest neighbor (KNN), and support vector machines (SVM), also various deep learning methods like Restricted Boltzmann Machine (RBM), auto encoders, convolutional neural networks (CNN), and deep belief networks (DBN). We will be evaluating them on 3 metrics: Matthews Correlation Coefficient (MCC), Area Under the ROC Curve (AUC), and Cost of failure.

Key Words: fraud detection, deep learning, machine learning, k nearest neighbor, random forest, auto encoder, support vector machine, restricted Boltzmann machine, convolutional neural networks.

INTRODUCTION :

There has been a growth in credit card usage given that there has been a rapid growth in e-commerce. It had a steep rise in the last two years due to the pandemic situation and everyone shifting to buy their groceries online cause of the lockdown and to maintain social distancing. A recent study found that even though there was a decrease in sales of some commodities it led to economic losses. There was a sharp increase in online shopping by the end of April 2020 especially in groceries which had an increase of more than 75% [1]. The increase in credit cards for online payments makes one vulnerable to cyber attacks, trying to steal their credentials or payment info which they later for fraud or leak online. The amount of credit card info present on the dark web for sale increased by a whopping 153% in 2018 compared to 2017 [2]. There was a loss of approximately 17.5\$ billion in 2020 due to frauds in e-commerce which rose to 20\$ billion dollars by 2021. Thus it is vital that we develop effective measures which can detect fraudulent activities, and prevent them from occurring [3]. Machine Learning (ML) plays an important part in the discovery, forestalment, and mitigation of fraud in e-commerce associations. Intimately- known exemplifications include Microsoft, LinkedIn, and eBay. In practice, fraud discovery ML models in e-commerce associations don't operate in isolation, but they're bedded in a larger anti-fraud department that also employs fraud judges or fraud investigators who perform case examinations and proactively search for fraud trends. This requires fraud discovery models to be embedded in such a way that the daily operations of an anti-fraud department can be detected. In this research paper, we deal with different ML and DL models and compare which works best for fraud detection for E-commerce. An ensemble of the best 3 performing models is applied to the dataset. Section 3 of the paper provides details on the implementation of the model and experimental setup. In section 4 we discuss and present the results of the model. Conclusions and work in the future are summarized in sections 5 and 6 respectively.

BASIC THEORY :

There are several challenges in the model of Fraud Detection for E-commerce. First, we have to deal with the datasets which are highly unbalanced with only a small amount of fraudulent activities, making the training of efficient models relatively difficult. Besides, other problems arise from data that is noisy and has patterns that are overlapping.



The hardest challenge to deal with is the fact that the trends in frauds keep changing and modifying themselves to escape detection, any approach we come up with has to be dynamic in nature to deal with this problem.

KNN

In statistics, the k-nearest neighbors algorithm (k-NN) is a non-parametric supervised learning method used for both classification and regression. The input consists of the k closest training examples of a data set. The output depends on what k-NN is used for classification or regression. In classification, the output is a class membership. An object is classified by the plurality of votes of its neighbors, with the object assigned to the class which is most common among its k nearest neighbors (k being a positive integer, usually small). If the value of $k = 1$, then that object is assigned to the class of the single nearest neighbor. In k-NN regression, the output is the property value for that object. The value is the average of all the values of the k nearest neighbors. k-NN is a kind of classification where the function is approximated locally and all computation is deferred until function evaluation. Since the algorithm uses distance for classification if the features represent different physical units or have vastly different scales then normalizing the training data can lead to improving its accuracy dramatically. For both classification and regression, a useful technique is to assign weights to the contributions of the neighbors, so the nearer neighbors can contribute more to the average than the distant ones. A common weighting scheme used is to give each neighbor a weight that is inverse of its distance $1/d$.

Random Forest

Random forest is a method for classification, regression, and other tasks, it constructs a multitude of decision trees at the time of training. For classification, the outcome of the random forest is the class that gets selected by the most trees. For regression tasks, the mean or average of the prediction of the individual trees is returned. Random decision forests correct the habit of decision trees to overfit to their training set. Random forests usually outperform decision trees, but they have lower accuracy than gradient boosted trees.

Restricted Boltzmann machines (RBM)

As their name says, RBMs are a variant of Boltzmann machines, with having the restriction that their neurons must form a bipartite graph: a pair of nodes from each of the two groups of units (commonly known as the "visible" and "hidden" units respectively) may have a symmetric connection between them, and there are no connections between nodes within a group. By contrast, "unrestricted" Boltzmann machines may have connections between the units which are hidden. This is the restriction that allows for more efficient training algorithms than are available for the general class of Boltzmann machines, in particular the gradient-based contrastive divergence algorithm.[9]

CNN

In deep learning, a convolutional neural network (CNN/ConvNet) is a class of deep neural networks, generally applied to analyze visual imagery. Now when we think of a neural network, matrix multiplications also come into the mind with it, but that is not the case with ConvNet. It uses a special technique called Convolution. In mathematics, convolution is a mathematical operation on two functions that produces a third function that expresses how the shape of one is modified by the other.

DBN

A Deep Belief Network (DBN) is an Unsupervised Probabilistic Deep learning algorithm that is composed of a multi-layer of stochastic latent variables. Latent variables are binary, also called feature detectors or hidden units. DBN is a generative hybrid graphical model. The top two layers are undirected. Lower layers have directed connections from the above layers.

SVM

Support vector machine algorithm (SVM) finds a hyperplane in an N-dimensional space (N - the number of features) that distinctly classifies the data points.

IMPLEMENTATION AND ANALYSIS

A. Data Sets

Our dataset consists of the transactions made by credit card users in 2 days of September 2013 [3]. All of the fields have been PCA transformed except time and amount. It consists of only 492 fraud instances out of the 284,807 instances of transactions.

Through experimentation, we try to find how effective different ML and DL models are in dealing with datasets involving fraud.



B. Experimental Setup

We used Rstudio to clean our datasets. And all the experimentation was done in python using a diverse number of python libraries such as Pandas, NumPy, Scikit-Learn, Keras, and Tensorflow to name a few. The approach we used for the K-nearest neighbor is that we used cross-validation to find out the best value of the neighbor's K. We did this for each dataset. Using the best value of K for each data set further analysis was done on the entire dataset. We applied a grid-based search approach to find the best parameters for Random Forest and SVM. We evaluate the entire dataset using the best parameters.

The main idea of Auto encoders is that they can reconstruct the input given to them. So to apply them to fraud detection we train them in normal instances. When running our experiment and applying them to the test dataset, it will result in reconstruction errors for each instance. Fraudulent transactions result in higher reconstruction errors compared while normal instances will result in lower errors. So we fix a threshold value so that if for an instance the reconstruction error is above the threshold value we classify it as fraudulent. In our research, we experimented with different threshold values and present the results. Same as the Auto encoders, RBM results in free energy which we measure against a threshold value to determine whether the transaction is normal or fraudulent. The RBM model we used was developed by Weiman Wang to detect Fraud[12]. We used an adapted version of the deep belief networks developed by Albert UP, implemented in Tensor Flow for pattern recognition [13]. For CNN instead of using the data in the form of a 1D array, we convert it into a 2D array. The data then is processed by various convolutional and max-pooling layers. In the end, data is classified by the SoftMax layer.

RESULTS

Here we present what we found through our experimentation on the dataset. Table I below presents the results we gathered. It lists the Area Under the Curve measure (AUC) and the Matthew Correlation Coefficient (MCC) for particular ML models.

TABLE I. EUROPEAN DATASET RESULTS

Method	MCC	AUC	Cost of Failure
RBM	0.176	0.9109	227360
Autoencoders	0.2315	0.8943	127220
Random Forest	0.7947	0.8507	30340
CNN	0.8096	0.8764	25700
SVM	0.8145	0.9004	21220
KNN	0.8354	0.8887	22660
Ensemble (KNN, SVM and CNN)	0.8226	0.8964	21740

Auto encoders and RBM both produce high false positives and thus have bad MCC and cost. On the other hand, Random Forest performs well with regard to MCC And AUC. KNN<CNN and SVM perform the best based on AUC and MCC values. SVM has the least value for the cost of failure whereas Auto encoders and RBM produce the highest values. Random Forest gives good results in terms of MCC and AUC but performs poorly in terms of cost. The models which perform the best for this dataset are SVM, KNN, and CNN.

The top 3 best performing models are used to create the majority voting classifier (MVC). The ensemble method is far better than CNN and SVM alone, although, the ensemble method and SVM have the same cost. Although, the AUC value is better in SVM. Here, SVM outperforms the ensemble in terms of cost efficiency as this method takes a long time in terms of testing and as well as training, whereas in terms of testing and training SVM has the least time. Hence, it would be better to choose SVM if the company is looking to reduce the cost as much as possible. Table II lists the no of times a particular model appeared in the top 3 models for the datasets. SVM gave the best results consistently and was among the best performing models. KNN also produced good results with both large and small datasets.

Table II Top performing models

Method	Number of times in Top 3
Support Vector Machines	3 Times
K-Nearest Neighbors	2 Times
Convolutional Neural Networks	2 Times
Random Forest	2 Times
Deep Belief Network	1 Time

CONCLUSION :

For almost 20 years now research on Fraud Detection in E-commerce has been done and has been used for different methods from checking the data manually to authentication of the customer. In this area model of Machine Learning have a good success rate. Deep learning models have been successful lately due to low computing costs and high computation power. The research paper emphasizes different deep learning and machine learning models for the detection of fraudulent transactions. Many companies nowadays are investing in new techniques, so as to improve their business. our research could lead them to develop a better understanding of how different ml models perform for fraud detection. In our research, we found that SVM coupled with CNN produces the best results in detecting fraud activities and getting the reliable performance. A shortcoming of our research is that we only deal with detecting fraudulent activities in the context of supervised learning models and do not look into unsupervised ml models. and although KNN, CNN, and Random forest perform well and give good outcomes they are not a good fit to be used in a dynamic environment. Fraud patterns evolve with time and thus it is hard to keep up and catch them using traditional methods. Also, we would need to collect new data sets and the ml models would have to be retrained on them. Auto encoders can solve this problem as they have to be trained on normal traffic rather than fraudulent ones. Fraudulent activities are detected as deviations from normal ones. Even though training Auto encoders is costly at the start. It can be effectively utilized to label datasets. And once enough data gets collected, we can use that dataset to build machine learning models or have them retrained.

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A PERSPECTIVE OF CRM WITH REFERENCE OF SALESFORCE

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Abstract: With the increase in number of companies and business worldwide, the usage of CRM is also increasing. Any business that has sales, marketing and customer relations uses CRM to increase their sales and also customer care. In this paper we will look at various companies that provide CRM solutions and one such company Salesforce. What kind of products does Salesforce provide to give solutions to companies and some statics related to salesforce. A good CRM should be able to increase sales and improve customer relations. We will also look at the benefits that a CRM has on a business or company.

Key Words: CRM, Salesforce, customers.

INTRODUCTION

Introduction to CRM

CRM stands for Customer Relationship Management. The full form alone is insufficient to understand the meaning of CRM. CRM acts as a central database where all the information about customers, sales, marketing etc. is stored. A CRM is a software tool that is crucial for any business as it helps to maintain, manage and develop relationships with customers, clients, leads, individuals or potential customers. CRM enables businesses to create and implement successful customer management strategies and enables companies to increase revenue and profits. Any business does not only want to sell product with good quality and better prices but it should also answer customer's desires.

Introduction to Salesforce

If you ask anyone what is Salesforce, the first thing that comes to mind is cloud because of its logo. It is correct indeed. Salesforce Inc. is a cloud based software company that provides CRM services and it is currently #1 in CRM market. Salesforce started as Software as a Service (SaaS) CRM company. It allows to connect with customers, potential customers and also allows to track customer activity. Salesforce CRM runs on force.com platform, which is a platform as a service, which makes it easy to develop and deploy applications on cloud. Salesforce has multi-tenant structure. It provides great customizability to users and developers to make CRM fit according to the needs and make custom software.

TYPES OF CRM

Collaborative CRM

Collaborative CRM also known as strategic CRM focuses on centralizing the customer information. It enables to share data with various business units like sales, marketing, support etc. As data is centralized service reps will be better prepared to solve their customers' problems. Main aim of this CRM is to use all information to improve the quality of customer service to gain loyalty and acquire new customers to increase sales.



Operational CRM

Operational CRM focuses on customer centric process such as marketing, sales and services. It provides three main automation -

Sales Automation - Main purpose is to acquire new customers and deal with existing customers.

Marketing Automation - Main purpose is to find out the best way to offer products and approach potential customers.

Service Automation - Service automation enables business to retain customers by providing best quality of service and building strong relationship.

Analytical CRM

Analytical CRM as the name suggests focuses on collecting, storing, sorting, analyzing, processing all your customer information and data. This helps in identifying important insights like customer trends, behavior etc. It contains data like Sales, Finance, and Marketing. Customers benefit from analytical CRM because it provides them with specific and quick solutions to their concerns. Business benefit because it provides more opportunities for sales, customer acquisition, and retention.

SOME CRM PROVIDING COMPANIES

Microsoft Dynamics

Microsoft developed a CRM package named Microsoft Dynamics 365. It mainly focuses on sales; marketing and customer services areas. Microsoft offers three deployment modes cloud, on premise and hybrid. Main clients include coca cola, Toyota, Mercedes Benz, Investec, L'Oreal etc. It has integration with Office and Outlook. The Dynamic 365 has SQL as the core CRM database so it provides speed and security.

Oracle

Oracle is one of the leading players in CRM market. Oracle CRM includes custom integrations with the full suite of Oracle products. It provides a robust analytics system, highly rated mobile applications, and full browser and cloud support. Oracle CRM has a rich, intuitive and user-friendly interface. It helps business increase their sale; automate tasks, easier customer relationship management, analytics etc.

SAP

SAP CRM is customer relation solution offered by SAP for companies to handle customers effectively and efficiently. SAP CRM is a part of ERP – Enterprise Resource Planning business package. SAP CRM has shown over \$31 bln revenue in 2020 and is one of the top popular CRM in market. SAP offers multiple cloud based services in its CRM, each one of it has dedicated focus like Data Cloud, Marketing Cloud, Commerce Cloud, Sales Cloud and Service Cloud.

Zoho CRM

Zoho CRM is an emerging company that is best known for small business, but the CRM is packed with all features at an aggressive price. Zoho CRM recently added Zia, and AI analytics to predict leads, sales trends, and deals. Zoho is also featured with a sandbox enriched with advanced deployment options. It allows you to test and publish without affecting the data. Other features Sales automation, Complete Security, Marketing Automation, Team Collaboration, Zoho CRM Integration, process management etc.

Hubspot CRM

HubSpot launched free CRM in 2014. It is helping small and medium business as well as startups to grow. It provides several services such as Marketing Hub, Sales Hub, Services Hub etc. It is a cloud based platform aimed at proving business with better strategy and resources. Feature of Hubspot that make it better than few other crm are task management, built in analytics, Automation Tools and Workflows, Reporting and Analytics, api and integration etc.

TOP SALESFORCE PRODUCTS

Sales Cloud

Sales Cloud was launched back in 1999. It was released when Salesforce was founded. Sales Cloud is all about your sales department. It focuses on functions like managing customer contacts, identifying, selling, and managing your prospects, reports and dashboard, manage leads etc. which in turn enhances the effectiveness of sales team and increases the sales. Some of the key features of Sales Cloud are Contact Management, Opportunity Management, Lead

Management, Reports and Dashboards, Sales Forecasting, Sales Performance Management etc.

Service Cloud

Service Cloud is a CRM which is all about the Customer support team. It provides support and help to customers anytime and anywhere. It provides the facility to customers to get in touch with the company and provide a resolution to the issue. It helps in retaining customer, increase satisfaction and loyalty which ultimately creates good impact on sales. It enables the team to provide faster and smarter service to individual customer. Some of the key features of Service Cloud are Case Management, Console for Service, Knowledge base, Social Customer Service, Live Agent etc.

Marketing Cloud

Salesforce Marketing Cloud is a platform that provides digital marketing tools that help a brand to interact with current and potential customers. It does so by providing enterprise-level email, marketing automation, digital advertising, data management, analytics and more. This helps the brand to increase customer acquisition and sales. Salesforce says, with Marketing Cloud, "Every imaginable customer interaction and engagement is covered". It connects a brand to customer across various channels like email, web, mobile, social and ads.

Analytics Cloud

Salesforce Analytics Cloud is popular software that has quick and efficient data analysis. Salesforce acquired Tableau CRM in 2019. Analytics Cloud is powered by Tableau CRM. This helped in providing the data processing and analysis function to the Salesforce CRM. It provides Business Intelligence and deeper insights into the customer data. You can also see the data visualizations on your mobile devices. It can reveal details about the trends, and productivity graphs to measure the performance.

Commerce Cloud

Salesforce Commerce Cloud is all B2C and B2B commerce solution. It provides a cloud based e-commerce platform. Its main focus is to fasten the growth of your brand and convert your leads into customers. This provides you with a complete picture of your inventory, orders, and activities. It unifies the purchasing experience of customers across all channels — mobile, social, web, and store. With the help of AI it also provides best purchase experience and personalization.

Salesforce Integration Mulesoft

Salesforce acquired Mulesoft in 2018. It focuses on system integration by connection device, application and data with APIs. Salesforce Integration connects CRM and cloud to each other or SaaS applications. This API led integration helps in providing better services and insights for decision making.

IMPORTANT STATISTICS ABOUT SALESFORCE

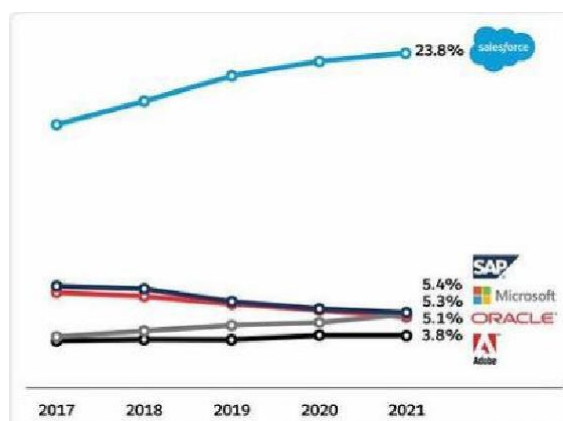


Fig I – Salesforce market share 2021
(source – IDC, Worldwide Semimanual Software Tracker, April 2022)

- Salesforce is number 1 in market share as of 2021 with a share of 23.8%. In 2020, AppExchange comprised over 4,600 prebuilt and customizable apps

- 90% of Fortune 500 companies are Salesforce customers in 2020. This represents a drop from 95% in 2019.
- Salesforce has acquired over 70 companies as of 2020 of which top acquisitions are Mule soft and tableau.

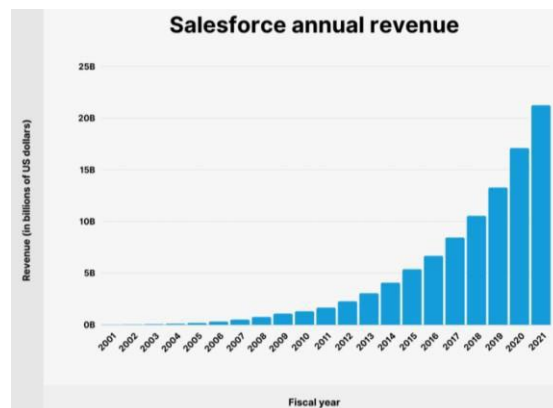


Fig II Salesforce Annual Revenue 2021
(source - <https://backlinko.com/salesforce-stats>)

- Salesforce generated **\$21.25 billion** in the 2021 fiscal year
- Salesforce made **\$5.19 billion** in fees related to Sales Cloud, **\$5.38 billion** from revenue related to Service Cloud and **\$6.27 billion** in annual revenue made by Platform, Mulesoft and Tableau.

CRM BENEFITS :

For a business or a company CRM provides great benefit in many areas. Customer relations, sales etc. are benefited from it. Some of the benefits of a CRM are-

- Better customer service - The main benefit of CRM is that it improves customer relationship. CRM maintains and manages all the customer information like graphs on previous purchases, complaints etc. which is helpful for sales team to understand the customers nature. It also helps in customer retention.
- Centralized database of information - All the information related to customers is present in a single place, which can be accessed by anyone authorized in the organization. This helps when the different teams working on the data are present in different locations where they interact with clients throughout different phases.
- Improved Sales and Sales forecasting - A CRM has all the sales data present at one place. It helps build sales pipeline and automate tasks increasing sales and growth. The dashboard and report feature is helpful to organize data about customers. CRM has all the data about the previous sales that can be analyzed to forecast the future sales.
- Automation - CRM has the ability to automate repetitive, day-to-day tasks (marketing automation, service automation etc.) saving time and makes your business smarter. CRM automation can be used for data entry, emails, workflows, lead tracking etc.
- Better Marketing - CRM enables you to generate more focused marketing that is developed for specific demands of your clients. It enables your company to create a more personal approach to communication, as well as produce new products and services that your customers truly need.

CONCLUSION :

Today companies invest in CRM during the first 5 years of launching. 91% of companies with more than 11 employees use a CRM. The fact that CRM market is predicted to reach more than \$80 billion in revenues by 2025 concludes that CRM is widely used and is indeed efficient in the growth of business. Salesforce has grown substantially in terms of people, customers, and offices around the world by giving creative and finest solutions to today's business concerns. It is without a doubt the most popular company in CRM market because of its range of products and the platform it is built upon.



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KEY CHARACTERISTICS OF CONTAINER ORCHESTRATION PLATFORM TO ENABLE MODERN APPLICATIONS

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Abstract: We propose a system for lightweight and deployment-oriented application components that binds the deployed app/web-application source code with the operating system root files and dependent files that are necessary for running identical code in ever evolving environments to provide agile and dynamic application hosting. In small numbers, containers can easily be deployed and managed manually such as deletion, restart, exposing to public world and launching more containers as clients load increases. In most organizations, the containerized applications usage/need is boosting at a fast pace and managing such an agile and large-scale architecture as a part of continuous integration/continuous delivery (CI/CD) cycle or DevOps pipeline is next to impossible without including automation in complete process.

Keywords: container, docker, DevOps.

INTRODUCTION :

The ability to spawn containers has been in existence for quite a long time, but it became widely available and prevailed in 2008 as Linux Operating System included container functionality as a part of its kernel, and widely used with the arrival of docker container platform in the year of 2013. As these containers are smaller than traditional virtual machines, are extremely resource efficient and easily to scale up/down as per customer needs which has lead containerized micro services to be entitled as the demanded standard for compute units of modern apps and customer oriented services. As the container orchestration platforms automates the operations tasks around deploying and running the advanced use cases of containerized applications services. These orchestration tools are quite helpful in scheduling various deployment on different machines based on available computational power, RAM availability and other system needs. These orchestration tools are quite helpful in regulating the complete start till end lifecycle of containerized application based on the container definition file which contains lots of information regarding exposed ports and CPU requirements of a launched container. In addition, orchestration tool's intelligence is useful in enhancing and extending many of the in-built advantages of including containerization in real world use cases. Extensive usage of containers in production environment maximizes the efficiency of computing resources; automate the complete health monitoring and relocation of containers maximizes availability, which in turn increases the uptime of the container applications.

BACKGROUND :

A. Kubernetes

Kubernetes is a container orchestration platform that solves advanced production app deployment use cases by delivering highly productive platform-as-a-service (PaaS) that addresses the persisting issues regarding infrastructure deployment and management of agile containerization. Kubernetes provides a lot of advantages over other orchestration solutions/platforms and it's the outcome of its more comprehensive and sophisticated functionality in terms of container deployment as Kubernetes containers on top of base operating system as per business requirements, make them running in a desired state, rollouts are change to a deployment and also provides automatic provisioning of containers as load increases over system. When a container stops due to any reason, Kubernetes can restart or replace it automatically providing ease for production environment application hosting and testing purposes also. Kubernetes provides a large



support across all cloud providers as large number of organizations are hosting applications to hybrid cloud environment. For each service, it provides a declarative approach to allocate tasks you would like to run on top of cluster. Kubernetes provides a stable framework of usability and networking tools to provide its services.

B. Docker Swarm

Docker Swarm can be termed as a containerized cluster management having either physical or virtual machines that are running the Docker application as a functionality to be attached inside the cluster. Once a cluster containing machines are combined together, we have ability to run the Docker commands that you're want to, but it could be administered by the component machines inside our cluster. Docker swarm provides functionality of container orchestration by allowing user to manage multiple containers deployed across multiple machines as cluster provides high availability and fault tolerance. It provides high availability to containers via robust monitoring and trigger capability. Docker Engine uses a declarative approach to allow you to define the specified state of the varied services in your application stack. For example, you would possibly describe an application comprised of Internet front service end service with message queuing services and a database backend. In case of any traffic related update in deployment strategy, it takes care of the specified state and it continuously monitors for desired state. In case of any container failure due to issues such as network failure or hardware load imbalance, the manager node triggers the creation of new replicas of same containers so as to fulfil the demands of ongoing content requests. The swarm manager provides high availability to users by assigning new replicas to workers nodes that are running and available for providing high availability to end users. The swarm manager proves to be useful in providing unique names to the containers as it starts the application web app so as to uniquely identify containers while scale up/down operations. Swarm manager nodes assign each service for load balancing purposes for all the running containers. Internally, Docker swarm allows user to specify the way to distribute service containers between nodes as we have option to setup node affinity according to the computing resources available on particular nodes.

RESULTS :

Container orchestration are useful for connecting containers and base host hardware resource pools. Configuration files are used for regulating the containers in the production/development/testing environment which are mostly written in either YAML or JSON. These configuration files are declarative in nature and tells container orchestration software about the location of your container images and maintains the logs of monitored containers. Configuration files are useful in connecting base host hard disk and it sets up a way to determine network connections between your containers so that they can interact with each other in a private LAN setup.

In addition, container orchestration software is responsible for scheduling the orchestration of containers and creates replica bundles of them, to launch cluster based supported factors such as computational power and RAM availability. Labels are attached to containers to make deployment/rolling update process streamlined for agile and robust delivery. When a particular container is deployed on top a host machine, configuration file is the one that IT administrators create for the container as it contains all the desired information for a container apply upon it.

Using containers at various divisions like applications development, testing and production have accelerated the complete cycle from development to production. Thus, containers are best fit for being used in Agile environments. These tools add up efficiency in entire DevOps Pipeline since containerized applications would run practically anywhere in all environments like dev/prod/test.

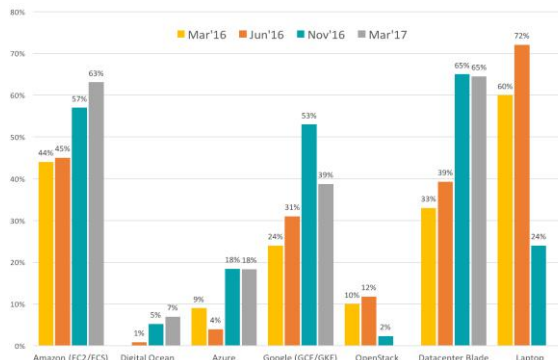


Fig: 1

Since all components associated with the application resides within containers, application installation is easier and it adds up more agility to application hosting process. When there is requirement to scale up the container due to increased demand of web network traffic, container orchestration allows for the easy setup of new instances.

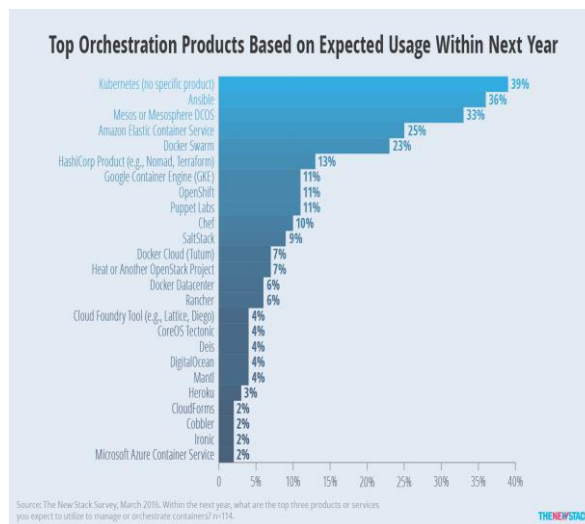


Fig: 2

Traditional applications are mostly monolithic in nature which means these are tightly coupled together to perform the tasks which they are specialized in. Microservices are characterized by loose coupling among various components of particular application such that all its components work separately in different manner to enable a working hosted architecture. Container orchestration allows containerized services to act in more agile and responsive in conjunction with other services.



Fig: 3

FUTURE WORK :

Container orchestration continues to gain popularity over a long period of due to agility and flexibility they show in provisioning virtual environments to run applications and services. Containers had laid a helping hand in enveloping the web application, its dependencies, and only leverage the resources taking from base operating system for faster and efficient provisioning. Containers are making it easy for everybody to run applications over serverless setup. There will be more options to possess more applications running inside the containers launched for particular use case. They will still change, improve, become more stable, get over from failure more quickly, while returning big money savings. Server less and FAAS are on the way. They aren't here yet and we're unsure on the way to manage them. Higher levels of abstractions are helping but also getting smaller components within the system. As the size of the particles get smaller and smaller, you've got to work on the way to manage and know what's running were. Istio may be a service mesh product which will help track all of the components.

CONCLUSION :

In this paper, we proposed an overview of container orchestration platforms and their positive impact on modern applications. Containerized apps can run as smoothly on on-premise base operating systems as these are versatile environment to test things and host them for production environment. Containerization approach of developing, packaging, and deploying applications in containers launched for modern applications. Containers are instantiated over base server's hardware, allowing multiple containers to work on shared server's resources in a flexible, agile and effective manner fulfilling the customer demands regarding latency and fast throughput. Virtual Machines can



take minutes rather than seconds to start up and consumes lots of hard disk space for establishing setup, that acts as a major drawback as it turns into huge time loss running complex applications and disaster recovery efforts. Containers are lightweight and users host server's resources via resource sharing techniques like shared volume form base operating system and using virtual network card attached on base operating system for external/public connectivity.

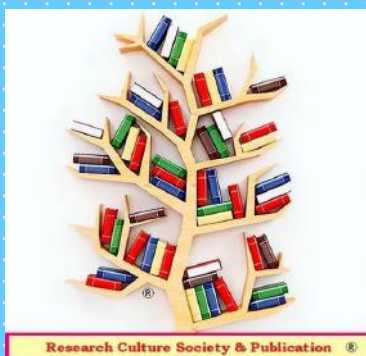
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