

**Report on Case Study of Industrial Training in Microspectra**

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1. **To study Artificial Intelligence its needs & Applications in various domain** .

**Need of Artificial Intelligence**

Artificial Intelligence is the simulation of the human process by machines (computer systems). These processes include the learning, reasoning, and self-correction.

We need Artificial Intelligence (AI) because the work that we need to do is increasing day-to-day. So it’s a good idea to automate the routine work. This saves the manpower of the organization and also increases the productivity. Additionally, through this Artificial Intelligence, the company can also get the skilled the persons for the development of the company. Moreover the companies today think that they want to mechanize all the regular and routine work. And they think they can automate those regular works through the simple program Because, with the development of data science,  automation becomes more common. The application of this AI is majorly seen at website chat portal. You people when you come to the websites probably seen the welcome message. Then after actual conversation usually starts.

So this Powerful Artificial Intelligence has divided into 4 categories. So now let me explain to you  one by one :

Reactive machines **:** A good example of this Reactive machines is Deep blue. And this is usually applied in Chess Board. This can identify the pieces of the chess board and make predictions. But the drawback is that it does not have memory. It means, it cannot use the past experiences to predict the future. So it just uses the current situation and just moves the pawn. It is intended for the application of a small situation. The situation could be handled within a moment itself.

Limited Memory : This type of AI is applied where there is a need for memory. Some machines work on the basis of the past experience. It means they the information of the same thing that happened in the past and does the current work accordingly. This type of AI majority used in the areas of self-driving cars. It uses its memory to act in situations like traffic collisions.

Theory of mind **:** This type of AI refers to the understanding of other behaviors and do the work according to It includes the feeling.  the intention, moves of the other person. In general, this kind of AI still does not exist. And today most of the scientists ware working hard to get it practically.

Self-awareness**:** Like the above type, this type of  Artificial Intelligence systems, need to bring practically. They think that these systems should have a self-awareness and must have a capability to understand the feeling of others

**Application of Artificial Intelligence :**

1. **Artificial Intelligence in Healthcare:**Companies are applying machine learning to make better and faster diagnoses than humans. One of the best-known technologies is IBM’s Watson. It understands natural language and can respond to questions asked of it. The system mines patient data and other available data sources to form a hypothesis, which it then presents with a confidence scoring schema. AI is a study realized to emulate human intelligence into computer technology that could assist both, the doctor and the patients in the following ways:

* By providing a laboratory for the examination, representation and cataloguing medical information
* By devising novel tool to support decision making and research
* By integrating activities in medical, software and cognitive sciences
* By offering a content rich discipline for the future scientific medical communities.

Artificial intelligence is assisting doctors. According to Bloomberg Technology, Microsoft has developed AI to help doctors find the right treatments for cancer.

There is a great amount of research and drugs developed relating to cancer. In detail, there are more than 800 medicines and vaccines to treat cancer. This negatively affects the doctors, because there are too many options to choose from, making it more difficult to choose the right drugs for the patients. Microsoft is working on a project to develop a machine called “Hanove”. Its goal is to memorize all the papers necessary to cancer and help predict which combinations of drugs will be most effective for each patient **.**

1. **Artificial Intelligence in business:** Robotic process automation is being applied to highly repetitive tasks normally performed by humans. Machine learning algorithms are being integrated into analytics and CRM (Customer relationship management) platforms to uncover information on how to better serve customers. Chatbots have already been incorporated into websites and e companies to provide immediate service to customers. Automation of job positions has also become a talking point among academics and IT consultancies. In the early 2000s, if we searched an online store to find a product without knowing it’s exact name, it would become a nightmare to find the product. But now when we search for an item on any e-commerce store, we get all possible results related to the item. It’s like these search engines read our minds! In a matter of seconds, we get a list of all relevant items. An example of this is finding the right movies on Netflix.
2. **AI in education**: It automates grading, giving educators more time. It can also assess students and adapt to their needs, helping them work at their own pace. It is the most important and vast sectors that touch every life regardless of age. AI-based solutions have been helping students and teachers at various levels. AI or machine learning is making our education system smarter and AI & collaborative virtual networks are used to make a perfect learning environment for students as well as teachers. AI and emerging technologies have been creating a proper blend of the learning ecosystem. 21st-century classrooms are equipped with emerging technology solutions to deliver the best learning environment to students.
3. **Artificial Intelligence in Finance and economics:** The use of AI machines in the market in applications such as online trading and decision making has changed major economic theories. For example, AI-based buying and selling platforms have changed the law of supply and demand in that it is now possible to easily estimate individualized demand and supply curves and thus individualized pricing. Furthermore, AI machines reduce information asymmetry in the market and thus making markets more efficient while reducing the volume of trade. Ventures have been relying on computers and data scientists to determine future patterns in the market. Trading mainly depends on the ability to predict the future accurately. Machines are great at this because they can crunch a huge amount of data in a short span. Machines can also learn to observe patterns in past data and predict how these patterns might repeat in the future.In the age of ultra-high-frequency trading, financial organizations are turning to AI to improve their stock trading performance and boost profit.
4. **Artificial Intelligence Banking:** AI in banking is growing faster than you thought! A lot of banks have already adopted AI-based systems to provide customer support, detect anomalies and credit card frauds. An example of this is HDFC Bank. HDFC Bank has developed an AI-based chatbot called EVA (Electronic Virtual Assistant), built by Bengaluru-based Senseforth AI Research. Since its launch, Eva has addressed over 3 million customer queries, interacted with over half a million unique users, and held over a million conversations. Eva can collect knowledge from thousands of sources and provide simple answers in less than 0.4 seconds.
5. **Artificial Intelligence Autonomous Vehicles :** For the longest time, self-driving cars have been a buzzword in the AI industry. The development of autonomous vehicles will definitely revolutionaries the transport system.Companies like Waymo conducted several test drives in Phoenix before deploying their first AI-based public ride-hailing service. The AI system collects data from the vehicles radar, cameras, GPS, and cloud services to produce control signals that operate the vehicle.
6. **To study 3D Printing Technology its needs & Applications in various domain .**

**Need of 3D Printing Technology:**

The invention of 3D printing targets 2 things: reduce time to get the first version of a product and emancipate many constraints that are not possible with traditional production methods. For example, with 3D printing, it is possible to print complex geometric shapes and interlocking parts that require no assembly. It is also possible to produce single objects, in small quantities, at low cost and fast delivery. This technology also helps in the reduction of production-related material loss. For more information on the benefits of 3D printing compared to plastic molding and other manufacturing processes, you can refer to our comparison page between 3D printing and traditional manufacturing methods.

3D Printing can produce different objects without creating specific tooling or even using several tools. This is how 3D Printing helps increasing flexibility in the production flow and helps reducing industrial expenses. Since there’s no need to build a dedicated production line, it helps also to significantly save time: 3D Printing enables us to innovate faster and mechanize faster. Since 3D Printing makes a replica of the 3D files one by one, so economies of scale can’t be realized when the same file is produced several times: this is clearly different from series manufacturing methods that aims to produce millions of units of the same objects. On the contrary, 3D Printing is the perfect method for on-demand and customization needs. There are a lot of other good reasons to choose 3D Printing instead of other manufacturing methods. For more information on the benefits of 3D printing compared to plastic molding and other manufacturing processes, you can refer to our comparison between 3D printing and traditional manufacturing methods page.3D Printing gives to everyone the power to manufacture objects only when they are needed or desired. It’s a fantastic process for the creative ones who wish to make something out of their imagination. 3D Printing enables in this way many people to produce and sell their creations by skipping traditional edition and distribution networks. 3D Printing is also useful to reproduce objects that are no longer on sale, for instance in order to repair an old bike for which spare parts are discontinued. Therefore we must need of 3d printing technology.

**Application of 3D Printing :**

1. **3D Printing in Aerospace and Defence:** The aerospace and defence (A&D) industry is one of the earliest adopters of 3D printing, with the first use of the technology going back to 1989. Now, three decades later, A&D represents a 16.8% share of the $10.4 billion additive manufacturing market and heavily contributes to ongoing research efforts within the industry. 3D printing, particularly with metals, is increasingly being used in the manufacture of rockets . The technology is enabling engineers to innovate the design of rocket parts and manufacture them in a shorter time frame. One example of this is an injector head for the Ariane 6 launcher, developed by ArianeGroup, a joint venture of Airbus Group and Safran. An injector head is one of the core elements of a propulsion module, which forces the fuel mixture into the combustion chamber. Traditionally, injector heads are made from dozens or even hundreds of parts, which need to be machined and welded together. In contrast, 3D printing enables these components to be manufactured as a single piece.  In the case of the injector head for the Ariane 6 launcher, the team took a design that originally required 248 components and reduced it down to one 3D-printed part. The material used for the part was a nickel-based alloy. The part, which wouldn’t be possible to produce by conventional methods, was then 3D printed using SLM technology. While casting and machining used to take longer than three months, the production time with AM was reduced to 35 hours, using an EOS M 400-4 3D printer with four parallel lasers. An additional advantage included a cost reduction of 50%.
2. **3D Printing in Automotive :**  The automotive industry is a growing user of additive manufacturing: in 2019 alone, global automotive AM revenues reached $1.4 billion. This figure only looks set to increase, as revenues relating to AM in automotive part production are expected to reach $5.8 billion by 2025, according to a SmarTech report. In areas like motorsports and performance racing, design tools like generative design and topology optimisation are slowly changing traditional approaches to designing parts. Porsche has recently introduced a new concept for sports car seating that leverages 3D printing and lattice design.

The new seats feature polyurethane 3D- printed central seat and backrest cushion sections, which can be customised by three firmness levels: hard, medium and soft. With its personalised seating, the German automaker is taking cues from the motorsport sector, where customised driver specific seat fitting is a norm.Porsche plans to 3D print 40 prototype seats for use on European race tracks as early as May 2020, with customer feedback being used to develop the final street-legal models for mid-2021.Down the line, Porsche wants to expand seat customisation beyond firmness and colour by personalising the seat to customer's specific body contour. 3D printing currently remains the only technology that can enable this level of customisation.

1. **3D Printing in Medical and Dental:** Clear aligners are dental devices used to adjust and straighten teeth. It is estimated that the majority of clear aligners are currently produced using 3D-printed moulds. The key technologies enabling this are Stereolithography (SLA) and Material Jetting, due to their high speed and accuracy. In addition to these resin-based processes, HP’s powder-based technology, Multi Jet Fusion, is also gaining traction. The key reason for using 3D printing in manufacturing clear aligners is the ability to customise them cost-effectively, since clear aligners are inherently individualised products. One example of a company using 3D printing for clear aligners in Align Technology, the largest producer of clear aligners, well-known under the Invisalign brand. In 2019, the company has reportedly produced over half a million unique 3D-printed parts per day. Given such volumes, it’s not a surprise that Spartech Analysis, a leading 3D printing research firm, named clear aligners “the single highest volume application for 3D printing technologies in the world today”. With the ever-growing capabilities of 3D printing, we expect that clear aligner companies will ultimately shift to direct 3D printing of aligners within the next five years.
2. **3D Printing in Consumer Goods:** 
   1. Footwear:

Adidas, for example, 3D prints midsoles for its Futurecraft 4D sneakers, using Carbon's proprietary Digital Light Synthesis technology. One of the key benefits of using 3D printing in this way is to improve shoe performance for various sports, thanks to the various properties of the midsole. The one-of-a-kind design of a midsole, which features 20,000 struts for better cushioning, would be impossible to create with traditional techniques. With injection or compression moulding, for example, it would be virtually impossible to create midsoles with the variable properties needed and require assembly.

* 1. Beauty and Cosmetics**:**

While 3D printing has historically been seen as the sole preserve of industrial manufacturing, the technology is also finding its way into the beauty industry. French fashion company Chanel is one company demonstrating the potential of 3D printing, having launched the world’s first 3D-printed mascara brush in 2018. The Revolution Volume mascara brush was created using SLS, a technology that uses a laser beam to fuse layers of polyamide powder. With 3D printing, the design of the brush has been optimised - for example, the rough, granular texture improves the adhesion of the mascara to the lashes.

* 1. Jewellery:

At first thought, jewellery may not seem to be an obvious application of additive manufacturing. However, the technology is benefiting jewellery makers in two ways. The first is by 3D printing investment casting patterns, which are cheaper and faster to produce than traditional methods. A second approach is to 3D print jewellery directly using precious metals. Both ways enable custom jewellery with thin walls and intricate details to be created which would be impossible to make through other means. Austrian jewellery company BOLTENSTERN has used 3D printing to produce jewellery pieces such as bracelets, earrings, necklaces and cufflinks.

1. **3D Printing in Industrial Goods:** Major industrial goods companies are already investigating additive manufacturing as a means of producing end parts. For example, 3D printing is helping to transform the production of bearings at Bowman Additive Production, a leading UK bearings manufacturer. Using HP's Multi Jet Fusion technology and PA11 nylon material, Bowman has been able to manufacture its bespoke Rollertrain cage. The part indicates the complexity of the manufacturing process; it contains an interlocking structure that uses the rolling elements to pin together each section of the cage. The result: bearings that possess a 70% increased load-bearing capacity and an increased working life of up to 500%.Thanks to on-demand 3D printing, manufacturers can produce spare parts quickly and cost effectively. This approach is beneficial, for example, when legacy equipment requires a replacement that may be out of production or difficult to procure. 3D printing spare parts at the point of need also can help reduce inventory, bypassing the costly storage of spare parts that have low demand. Siemens Mobility is one example of a company using 3D printing to manufacture spare parts and tooling on-demand at the Siemens Mobility RRX Rail Service Centre. With roughly 100 trains expected to enter the depot each month, 3D printing will play an important role in optimising spare part production.
2. **To study Internet of Things its needs & Applications in various domain .**

**Need of Internet of Things**

IoT wants to connect all potential objects to interact each other on the internet to provide secure, comfort life for human.

Environmental Monitoring

Simple example is: You surly noticed  by now that you surf the net and suddenly when open your Gmail you see some interesting thing which are near to your favourite. Or in Facebook when you like page, on the right section similar content page will be appeared. These are common and tangible but image when we can monitor all embedded computing system to improve our life. such as -

1.1. with the aid of water or soil or air measurement device can say us how are well for which plant.

1.2. with the aid of earthquake or  tsunami warning systems we can prevent less damages and victims.

1.3. we can monitor wild life habit and by this tracking prepare them their desire condition and prevent their extinction.

2. Infrastructure Management

Infrastructure Management is useful for monitoring and tracking if there is any problem in urban or rural Infrastructure such as bridge, railway or etc. to diminish and reduce risk of dangeour and any failure in strength would be tested and alarm as soon as possible to repair it.

3. Industrial Applications

Industrial Applications investigate the quality of product in order to realtime optimizing to have a good marketing such as who are most intersed to which product and how this product can find marketing with which tiny changes.

4. Energy Management

Energy Management are categorized with systems which are connected to internet and with some sensor to reduce power consumption such as cloud based, remote control for oven, lamp and etc.

5. Medical and Healthcare Systems

Healthcare Systems helps to improve patient state better by monitoring and controling their heart rate or blood pressure or even for their diet. Smart tablet which show us how much dows with which gradient can helps patient to get better.

6. Building and Home Automation :

It is related to everything in home which have the potential to monitor and remote control such as air condition, security lock lightening, heating, ventilation, telephone system, TV to make a comfort , secure, with low energy consumption.

**Application of Internet of Things:**

1. **Smart Home**

With IoT creating the buzz, ‘Smart Home’ is the most searched IoT associated feature on Google. But, what is a Smart Home?

Wouldn’t you love if you could switch on air conditioning before reaching home or switch off lights even after you have left home? Or unlock the doors to friends for temporary access even when you are not at home. Don’t be surprised with IoT taking shape companies are building products to make your life simpler and convenient.Smart Home has become the revolutionary ladder of success in the residential spaces and it is predicted Smart homes will become as common as  smartphones.

The cost of owning a house is the biggest expense in a homeowner’s life. Smart Home products are promised to save time, energy and money. With Smart home companies like Nest, Ecobee, Ring and August, to name a few, will become household brands and are planning to deliver a never seen before experience

1. **Wearables :**

Wearables have experienced a explosive demand in markets all over the world. Companies like Google, Samsung have invested heavily in building such devices. But, how do they work?

Wearable devices are installed with sensors and software’s which collect data and information about the users. This data is later pre-processed to extract essential insights about user. These devices broadly cover fitness, health and entertainment requirements. The pre-requisite from internet of things technology for wearable applications is to be highly energy efficient or ultra-low power and small sized.

1. **Connected Cars:**

The automotive digital technology has focused on optimizing vehicles internal functions. But now, this attention is growing towards enhancing the in-car experience.A connected car is a vehicle which is able to optimize it’s own operation, maintenance as well as comfort of passengers using onboard sensors and internet connectivity.

Most large auto makers as well as some brave startups are working on connected car solutions. Major brands like Tesla, BMW, Apple, Google are working on bringing the next revolution in automobiles.

1. **Industrial Internet**

Industrial Internet is the new buzz in the industrial sector, also termed as Industrial Internet of Things ( IIoT ). It is empowering industrial engineering with sensors, software and big data analytics to create brilliant machines.

According to Jeff Immelt, CEO, GE Electric, IIoT is a “beautiful, desirable and investable” asset. The driving philosophy behind IIoT is that, smart machines are more accurate and consistent than humans in communicating through data. And, this data can help companies pick  inefficiencies and problems sooner.IIoT holds great potential for quality control and sustainability. Applications for tracking goods, real time information exchange about inventory among suppliers and retailers and automated delivery will increase the supply chain efficiency. According to GE the improvement industry productivity will generate $10 trillion to $15 trillion in GDP worldwide over next 15 years.

1. **Smart Cities**

Smart city is another powerful application of IoT generating curiosity among world’s population. Smart surveillance, automated transportation, smarter energy management systems, water distribution, urban security and environmental monitoring all are examples of internet of things applications for smart cities.IoT will solve major problems faced by the people living in cities like pollution, traffic congestion and shortage of energy supplies etc. Products like cellular communication enabled Smart Belly trash will send alerts to municipal services when a bin needs to be emptied.By installing sensors and using web applications, citizens can find free available parking slots across the city. Also, the sensors can detect meter tampering issues, general malfunctions and any installation issues in the electricity system.

1. **IoT in agriculture**

With the continous increase in world’s population, demand for food supply is extremely raised. Governments are helping farmers to use advanced  techniques and research to increase food production. Smart farming is one of the fastest growing field in IoT.Farmers are using meaningful insights from the data to yield better return on investment. Sensing for soil moisture and nutrients, controlling water usage for plant growth and determining custom fertilizer are some simple uses of IoT.

1. **Smart Retail**

The potential of IoT in the retail sector is enormous. IoT provides an opportunity to retailers to connect with the customers to enhance the in-store experience.Smartphones will be the way for retailers to remain connected with their consumers even out of store. Interacting through Smartphones and using Beacon technology can help retailers serve their consumers better. They can also track consumers path through a store and improve store layout and place premium products in high traffic areas.

1. **To study Machine Learning its needs & Applications in various domain .**

**Need of Machine Learning:**

Before going to know the need for Machine learning, let me first explain to you what is Machine learning?

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So this Powerful Machine learning has divided into 4 categories. So now let me explain to you one by one :

Reactive machines :

A good example of this Reactive machines is Deep blue. And this is usually applied in Chess Board. This can identify the pieces of the chess board and make predictions. But the drawback is that it does not have memory. It means, it cannot use the past experiences to predict the future. So it just uses the current situation and just moves the pawn. It is intended for the application of a small situation. The situation could be handled within a moment itself.

**Application of Machine Learning:**

1. **Virtual Personal Assistants** : Siri, Alexa, Google Now are some of the popular examples of virtual personal assistants. As the name suggests, they assist in finding information, when asked over voice. All you need to do is activate them and ask “What is my schedule for today?”, “What are the flights from Germany to London”, or similar questions. For answering, your personal assistant looks out for the information, recalls your related queries, or send a command to other resources (like phone apps) to collect info. You can even instruct assistants for certain tasks like “Set an alarm for 6 AM next morning”, “Remind me to visit Visa Office day after tomorrow”.

Machine learning is an important part of these personal assistants as they collect and refine the information on the basis of your previous involvement with them. Later, this set of data is utilized to render results that are tailored to your preferences.

Virtual Assistants are integrated to a variety of platforms. For example:

* Smart Speakers: Amazon Echo and Google Home
* Smartphones: Samsung Bixby on Samsung S8
* Mobile Apps: Google Allo

1. **Predictions while Commuting:**

Traffic Predictions: We all have been using GPS navigation services. While we do that, our current locations and velocities are being saved at a central server for managing traffic. This data is then used to build a map of current traffic. While this helps in preventing the traffic and does congestion analysis, the underlying problem is that there are less number of cars that are equipped with GPS. Machine learning in such scenarios helps to estimate the regions where congestion can be found on the basis of daily experiences.

Online Transportation Networks: When booking a cab, the app estimates the price of the ride. When sharing these services, how do they minimize the detours? The answer is machine learning. Jeff Schneider, the engineering lead at Uber ATC reveals in a an interview that they use ML to define price surge hours by predicting the rider demand. In the entire cycle of the services, ML is playing a major role.

1. **Videos Surveillance**: Imagine a single person monitoring multiple video cameras! Certainly, a difficult job to do and boring as well. This is why the idea of training computers to do this job makes sense.The video surveillance system nowadays are powered by AI that makes it possible to detect crime before they happen. They track unusual behaviour of people like standing motionless for a long time, stumbling, or napping on benches etc. The system can thus give an alert to human attendants, which can ultimately help to avoid mishaps. And when such activities are reported and counted to be true, they help to improve the surveillance services. This happens with machine learning doing its job at the backend.
2. **Email Spam and Malware Filtering**

* There are a number of spam filtering approaches that email clients use. To ascertain that these spam filters are continuously updated, they are powered by machine learning. When rule-based spam filtering is done, it fails to track the latest tricks adopted by spammers. Multi Layer Perceptron, C 4.5 Decision Tree Induction are some of the spam filtering techniques that are powered by ML.
* Over 325, 000 malwares are detected everyday and each piece of code is 90–98% similar to its previous versions. The system security programs that are powered by machine learning understand the coding pattern. Therefore, they detects new malware with 2–10% variation easily and offer protection against them.

1. **Online Customer Support**

A number of websites nowadays offer the option to chat with customer support representative while they are navigating within the site. However, not every website has a live executive to answer your queries. In most of the cases, you talk to a chatbot. These bots tend to extract information from the website and present it to the customers. Meanwhile, the chatbots advances with time. They tend to understand the user queries better and serve them with better answers, which is possible due to its machine learning algorithms.

1. **Search Engine Result Refining**

Google and other search engines use machine learning to improve the search results for you. Every time you execute a search, the algorithms at the backend keep a watch at how you respond to the results. If you open the top results and stay on the web page for long, the search engine assumes that the results it displayed were in accordance to the query. Similarly, if you reach the second or third page of the search results but do not open any of the results, the search engine estimates that the results served did not match requirement. This way, the algorithms working at the backend improve the search results

1. **To study Data Science its needs & Applications in various domain.**

**Needs of Data Science:**

Data creates magic. Industries need data to help them make careful decisions. Data Science churns raw data into meaningful insights. Therefore, industries need data science. A Data Scientist is a wizard who knows how to create magic using data. A skilled Data Scientist will know how to dig out meaningful information with whatever data he comes across. He helps the company in the right direction. The company requires strong data-driven decisions at which he’s an expert. The Data Scientist is an expert in various underlying fields of Statistics and Computer Science. He uses his analytical aptitude to solve business problems. Early data analysis  based on surveying and finding solutions to public problems. For example, a survey regarding a number of children in a district would lead to a decision of development of the school in that area. With the help of computers, the decision-making process has been simplified. As a result, computers could solve more complex statistical problems. As Data started to proliferate, companies started to realize its value. Its importance reflected in the many products designed to boost customer experiences. Industries sought experts who could tap the potential that data holstered. Data could help them make the right business decisions and maximize their profits. Moreover, it gave the company an opportunity to examine and act according to customer behavior based on their purchasing patterns. Data helped companies boost their revenue model and helped them craft a better quality product for clients.

Data is to products what electricity is to household gadgets. We need data to engineer the products that cater to the users. It is what drives the product and makes it usable. A Data Scientist is like a sculptor. He chisels the data to create something meaningful out of it. While it can be a tedious task, a Data Scientist needs to have the right expertise to deliver the results. The purpose of Data Science, we conclude that Data Scientists are the backbone of data-intensive companies. The purpose of Data Scientists is to extract, pre-process and analyse data. Through this, companies can make better decisions. Various companies have their own requirements and use data accordingly. In the end, the goal of Data Scientist to make businesses grow better. With the decisions and insights provided, the companies can adopt appropriate strategies and customize themselves for enhanced customer experience.

**Application of Data Science:**

* 1. **Medical Image Analysis:**

Procedures such as detecting tumours, artery stenosis, organ delineation employ various different methods and frameworks like Map Reduce to find optimal parameters for tasks like lung texture classification. It applies machine learning methods, support vector machines (SVM), content-based medical image indexing, and wavelet analysis for solid texture classification.

* 1. **Genetics & Genomics**

Data Science applications also enable an advanced level of treatment personalization through research in genetics and genomics. The goal is to understand the impact of the DNA on our health and find individual biological connections between genetics, diseases, and drug response. Data science techniques allow integration of different kinds of data with genomic data in the disease research, which provides a deeper understanding of genetic issues in reactions to particular drugs and diseases. As soon as we acquire reliable personal genome data, we will achieve a deeper understanding of the human DNA. The advanced genetic risk prediction will be a major step towards more individual care.

* 1. **Internet Searching**:

 Well, apart from Google there are a lot of search engines such as Yahoo, Bing, Ask, AOL, etc. All these search engines utilize data science algorithms to provide the best outcome for our searched query in a few seconds. Because Google processes more than 20 petabytes of information daily. If there has been no data science, Google wouldn’t have been the one which we know today.

* 1. **Digital Advertisements**:

Data science algorithms are also used in digital advertising. Though internet surfing is one of the most significant applications of data science and machine learning, the entire digital marketing spectrum is it’s another application. Data science algorithms are used to display banners on different websites, digital billboards at the airports. That’s why the digital advertisement has been able to obtain a higher CTR than traditional ads.

* 1. **Fraud and Risk Detection:**

The first application of data science is started from the Finance discipline. Organizations were exhausted by terrible obligations and misfortunes consistently. Nonetheless, they had a great deal of data which is used to get gathered during the initial paperwork while endorsing credits. They selected to carry data science practices to protect them out of losses. Throughout the years, managing banking organizations figured out how to isolate and defeat data using client profiling, past uses, and other fundamental factors to investigate the probabilities of hazard and default. Besides, it equally helped them to push their banking items dependent on client’s buying power.

* 1. **Airline Route Planning:** Airline Industry over the world is known to hold up under overwhelming misfortunes. But a couple of airline service providers, organizations are attempting to keep up their occupancy proportion and working benefits. With skyscraper in air-fuel costs and need to offer substantial limits to clients have additionally exacerbated things. It wasn’t for long when airlines organization began utilizing data science to distinguish the vital territories of enhancements. Presently, with the help of data science, the aircraft organizations can:
* Forecast the delay in flights.
* Decide which class of planes to purchase
* Whether to accurately arrive at the goal, or take a stop in the middle of (For instance: A flight can have an immediate route from New Delhi to New York. On the other hand, it can also stop in any nation.)
* Effectively drive client faithfulness programs

Southwest Airlines, Alaska Airlines are among the best organizations that have included data science to bring changes in their manner of working.

* 1. **Gaming:**

Data science is also used in gaming. With the help of data science EA sports, Zynga, Sony, Nintendo, Activision-Blizzard have managed the gaming skill to the next level. Presently, most of the games are designed using machine learning algorithms which enhance themselves as the player’s transfers up to an advanced degree. Also, in motion gaming, your challenger can investigate your past moves and then shapes up its games accordingly.

* 1. **ImageImage Recognition:**

Another application of data science can be seen in the image recognition field. To understand this, let’s take an example, you upload your pics with friends on Facebook then you start getting ideas to tag your friends. This automatic tag suggestion feature is carried out by using the face recognition algorithm. In a similar manner, when using web WhatsApp, you scan a barcode in your web browser using your cell phone. Additionally, Google offers you the option to search for images by uploading them. It utilizes image recognition algorithm and gives relevant search outcomes.

* 1. **Logistics Delivery**:

Data science is also used in logistics companies such as DHL, FedEx, UPS to enhance their operational efficiency. With the help of data science, these companies have found out the best way to ship, the most appropriate time to deliver, the best method of transport to pick subsequently prompting cost-effectiveness, and a lot more to make refer to. Moreover, the data that these organizations produce utilizing the GPS introduced, gives them a lot of likely outcomes to investigate utilizing data science.

* 1. **Speech Recognition:**

Similar to image recognition application, data science algorithms is also used in speech recognition. Few of the best examples of speech recognition products are Google Voice, Siri, Cortana, etc. If you are not able to type any message, it is possible to send the message with the help of speech recognition feature. You have to speak out the message, and it will convert into text.

1. **To study Data Analytics its needs & Applications in various domain .**

**Needs of Data Analytics:**

Big data analytics helps organizations harness their data and use it to identify new opportunities. That, in turn, leads to smarter business moves, more efficient operations, higher profits and happier customers. In his report Big Data in Big Companies, IIA Director of Research Tom Davenport interviewed more than 50 businesses to understand how they used big data. He found they got value in the following ways:

1. Cost reduction. Big data technologies such as Hadoop and cloud-based analytics bring significant cost advantages when it comes to storing large amounts of data – plus they can identify more efficient ways of doing business.
2. Faster, better decision making. With the speed of Hadoop and in-memory analytics, combined with the ability to analyze new sources of data, businesses are able to analyze information immediately – and make decisions based on what they’ve learned.
3. New products and services. With the ability to gauge customer needs and satisfaction through analytics comes the power to give customers what they want. Davenport points out that with big data analytics, more companies are creating new products to meet customers’ needs.

**Application of Data Analytics:**

**1. Security**

Data analytics applications or, more specifically, predictive analysis has also helped in dropping crime rates in certain areas. In a few major cities like Los Angeles and Chicago, historical and geographical data has been used to isolate specific areas where crime rates could surge. On that basis, while arrests could not be made on a whim, police patrols could be increased. Thus, using applications of data analytics, crime rates dropped in these areas.

**2. Transportation**

Data analytics can be used to revolutionize transportation. It can be used especially in areas where you need to transport a large number of people to a specific area and require seamless transportation. This data analytical technique was applied in the London Olympics a few years ago.

For this event, around 18 million journeys had to be made. So, the train operators and TFL were able to use data from similar events, predict the number of people who would travel, and then ensure that the transportation was kept smooth.

**3. Risk detection**

One of the first data analytics applications may have been in the discovery of fraud. Many organizations were struggling under debt, and they wanted a solution to this problem. They already had enough customer data in their hands, and so, they applied data analytics. They used ‘divide and conquer’ policy with the data, analyzing recent expenditure, profiles, and any other important information to understand any probability of a customer defaulting. Eventually, it led to lower risks and fraud.

**4. Risk Management**

Risk management is an essential aspect in the world of insurance. While a person is being insured, there is a lot of data analytics that goes on during the process. The risk involved while insuring the person is based on several data like actuarial data and claims data, and the analysis of them helps insurance companies to realize the risk.

Underwriters generally do this evaluation, but with the advent of data analysis, analytical software can be used to detect risky claims and push such claims before the authorities for further analysis.

**5. Delivery**

Several top logistic companies like DHL and FedEx are using data analysis to examine collected data and improve their overall efficiency. Using data analytics applications, the companies were able to find the best shipping routes, delivery time, as well as the most cost-efficient transport means. Using GPS and accumulating data from the GPS gives them a huge advantage in data analytics.

**6. Fast internet allocation**

While it might seem that allocating fast internet in every area makes a city ‘Smart’, in reality, it is more important to engage in smart allocation. This smart allocation would mean understanding how bandwidth is being used in specific areas and for the right cause.

It is also important to shift the data allocation based on timing and priority. It is assumed that financial and commercial areas require the most bandwidth during weekdays, while residential areas require it during the weekends. But the situation is much more complex. Data analytics can solve it.

For example, using applications of data analysis, a community can draw the attention of high-tech industries and in such cases, higher bandwidth will be required in such areas.

**7. Reasonable Expenditure**

When one is building Smart cities, it becomes difficult to plan it out in the right way. Remodelling of the landmark or making any change would incur large amounts of expenditure, which might eventually turn out to be a waste. Data analytics can be used in such cases. With data analytics, it will become easier to direct the tax money in a cost-efficient way to build the right infrastructure and reduce expenditure.

### **8. Interaction with customers**

In insurance, there should be a healthy relationship between the claims handlers and customers. Hence, to improve their services, many insurance companies often use customer surveys to collect data. Since insurance companies target a diverse group of people, each demographic has their own preference when it comes to communication.

Data analysis can help in zeroing in on specific preferences. For example, a study showed that modern customers prefer communication through social media or online channels, while the older demographic prefers telephonic communication.

### **9. Planning of cities**

One of the untapped disciplines where data analysis can really grow is city planning. While many city planners might be hesitant towards using data analysis in their favour, it only results in faulty cities riddled congestion. Using data analysis would help in bettering accessibility and minimizing overloading in the city.

Overall, it will generate more efficiency in the planning process. Just erecting a building in a suitable spot will not create an overall benefit for a city since it can harm the neighbors or the traffic in the area. Using data analytics and modelling, it will be easy to predict the outcome of placing a building in a specific situation and therefore, plan accordingly.

### **10. Healthcare**

While medicine has come a long way since ancient times and is ever-improving, it remains a costly affair. Many hospitals are struggling with the cost pressures that modern healthcare has come with, which includes the use of sophisticated machinery, medicines, etc.

But now, with the help of data analytics applications, healthcare facilities can track the treatment of patients and patient flow as well as how equipment are being used in hospitals. It has been estimated that there can be a 1% efficiency gain achieved if data analytics became an integral part of healthcare, which will translate to more than $63 billion in healthcare services.

### **11. For Travelling**

If you ever thought travelling is a hassle, then data analytics is here to save you. Data analysis can use data that shows the desires and preferences of different customers from social media and helps in optimizing the buying experience of travellers. It will also help companies customize their own packages and offer and hence boost more personalized travel recommendations with the help data collected from social media.

1. **To study Block chain Technology its needs & Applications in various domain** .

**Need of Block chain Technology:**

There are three key reasons why blockchain is becoming mainstream today:

* Increased digital processing power
* Rapid growth in cybercrimes
* Rise of bitcoin and cryptocurrency

Blockchain, by design, requires higher processing power than normal data computing. It is all because of the redundancy of data, distributed storage, and cryptography. Data encryption and decryption is a costly affair by nature. Today, computers have more processing power thanks to modern processors developed by NVIDIA.

Blockchain is only good for transactional systems. Let’s look at the definition of blockchain:

Blockchain is a technology to create and maintain a cryptographically secure, shared, and distributed ledger (a database) for transactions. Blockchain brings trust, accountability, and transparency to digital transactions.

All transactions that exist on a blockchain are shared and distributed among a network of peer-to-peer computers. Transactions are encrypted before they are stored and shared.

**Applications of Block chain Technology:**

**1.Asset Management**:

Trade Processing and Settlement  
Traditional trade processes within asset management (where parties trade and manage assets) can be expensive and risky, particularly when it comes to cross-border transactions. Each party in the process, such as broker, custodian, or the settlement manager, keeps their own records which create significant inefficiencies and room for error. The blockchain ledger reduces error by encrypting the records. At the same time, the ledger simplifies the process, while canceling the need for intermediaries.

**2.Insurance**:

Claims processing  
Claims processing can be a frustrating and thankless procedure. Insurance processors have to wade through fraudulent claims, fragmented data sources, or abandoned policies for users to state a few – and process these forms manually. Room for error is huge. The blockchain provides a perfect system for risk-free management and transparency. Its encryption properties allow insurers to capture the ownership of assets to be insured.

**3.Payments:**

Cross-Border Payments

The global payments sector is error-prone, costly, and open to money laundering. It takes days if not longer for money to cross the world. The blockchain is already providing solutions with remittance companies such as Abra, Align Commerce and Bitspark that offer end-to-end blockchain powered remittance services. In 2004, Santander became one of the first banks to merge blockchain to a payments app, enabling customers to make international payments 24 hours a day, while clearing the next day.

**4. Monitor supply chains**

Blockchain also comes in particularly handy when it comes to monitoring supply chains. By removing paper-based trails, businesses should be able to pinpoint inefficiencies within their supply chains quickly, as well as locate items in real time. Further, blockchain would allow businesses, and possibly even consumers, to view how products performed from a quality-control perspective as they traveled from their place of origin to the retailer.

**5. Retail loyalty rewards programs**

Blockchain could further revolutionize the retail experience by becoming the go-to for loyalty rewards. By creating a token-based system that rewards consumers, and storing these tokens within a blockchain, it would incentivize consumers to return to a certain store or chain to do their shopping. It would also eliminate the fraud and waste commonly associated with paper- and card-based loyalty rewards programs.

**6. Digital IDs**

More than 1 billion people worldwide face identity challenges. Microsoft (NASDAQ:MSFT) is looking to change that. It's creating digital IDs within its Authenticator app -- currently used by millions of people -- which would give users a way to control their digital identities. This would allow folks in impoverished regions to get access to financial services, or start their own business, as an example. Of course, Microsoft's attempts to create a decentralized digital ID are still in the early stages.

**7. Data sharing**

Cryptocurrency IOTA launched a beta version of its Data Marketplace in November, demonstrating that blockchain could be used as a marketplace to share or sell unused data. Since most enterprise data goes unused, blockchain could act as an intermediary to store and move this data to improve a host of industries. While still in its early stages, IOTA has more than 35 brand-name participants (with Microsoft being one) offering it feedback.

**8. Copyright and royalty protection**

In a world with growing internet access, copyright and ownership laws on music and other content has grown hazy. With blockchain, those copyright laws would be beefed up considerably for digital content downloads, ensuring the artist or creator of the content being purchased gets their fair share. The blockchain would also provide real-time and transparent royalty distribution data to musicians and content creators.

**9. Digital voting**

Worried about voter fraud? Well, worry no more with blockchain technology. Blockchain offers the ability to vote digitally, but it's transparent enough that any regulators would be able to see if something were changed on the network. It combines the ease of digital voting with the immutability (i.e., unchanging nature) of blockchain to make your vote truly count.

**10. Real estate, land, and auto title transfers**

One of the primary goals of blockchain is to take paper out of the equation, since paper trails are often a source of confusion. If you're buying or selling land, a house, or a car, you'll need to transfer or receive a title. Instead of handling this on paper, blockchain can store titles on its network, allowing for a transparent view of this transfer, as well as presenting a crystal-clear picture of legal ownership.

**12. Immutable data backup**

Blockchain might also be the perfect way to back up data. Even though cloud storage systems are designed to be a go-to source for data safekeeping, they're not immune to hackers, or even infrastructure problems. Using blockchain as a backup source for cloud data centers -- or for any data, as Boeing is considering with GPS receivers on its planes -- could resolve this concern.

**13. Tax regulation and compliance**

Have I mentioned how important transparency and immutability are yet? For example, marijuana companies can use blockchain as a means to record their sales and demonstrate to lawmakers that they're abiding by local, state, and/or federal laws. More importantly, these sales act as a clear record for the IRS that they've paid their fair share of taxes to the federal government, assuming they're profitable.

**14. Workers' rights**

Another interesting use for blockchain is as a means to bolster the rights of workers around the globe. According to the International Labor Organization, 25 million people worldwide work in forced-labor conditions. Coca-Cola, along with the U.S. State Department and other partners, is working on a blockchain registry complete with smart contracts -- protocols that verify, facilitate, or enforce a contract -- to improve labor policies and coerce employers to honor digital contracts with their workers.

**15. Medical recordkeeping**

The good news is the medical sector has already been moving away from paper for recordkeeping purposes for years. However, blockchain offers even more safety and convenience. In addition to storing patient records, the patient, who possesses the key to access these digital records, would be in control of who gains access to that data. It would be a means of strengthening the HIPAA laws that are designed to protect patient privacy.

1. **To study of Cyber security its needs & Applications in various domain .**

**Needs of Cyber security:**

* Chances are good that your assumptions regarding what you’re defending against are wrong (or at least incomplete). Perhaps you’re only concerned about compliance, or network intrusion—there are dozens of things that might have driven your strategy before. How many of them are still valid, and how many have you missed? You’ll probably never find out if you don’t engage in a deliberate effort to question them.
* Having a strategy dedicated to nothing but cybersecurity implies a level of commitment that may not have otherwise been present. Keeping that strategy current and making it specific gives it the power to influence the decisions at the highest level (e.g. not just the IT group).
* Reactive defense is a sure path to defeat. We don’t need a cyber Maginot Line and we already know that won’t work. But how can an organization become more proactive? This begins with the cyber strategy, which takes into account what’s unique about your organization (as well as what’s important to it). All else should derive from that foundation.
* Strategy is the central organizing mechanism for any group or organization. It allows for centralized control, decision-making and is the only way that policy, funding and action can be coordinated to solve a common problem. Again, this isn’t just a statement of principles, but rather a specific set of goals, objectives and the key decisions designed to tackle the challenges.
* In any war, strategy drives tactics; there is no difference for cybersecurity. All of the detailed planning, solution architecture, behavioral response and processes should largely align to what is laid out in the strategy.
* A strategy is the ultimate performance metric. You can use it to highlight your expectations as to how you will perform against the challenge, while outlining the approach necessary towards achieving those expectations. Without a strategy, you can never properly assess your security stance. Keep in mind that the metric should not be based entirely on the threats you’ve seen before; it must extend to those you haven’t experienced yet. Defending against yesterday’s attack won’t protect against many of today’s (and perhaps most of tomorrow’s) dangers.
* Using that metric, your cyber strategy provides accountability to your business stakeholders. It serves as the highest-level contract (or SLA if you will) for what you can and will do to make them and their information secure.
* A cyber strategy is the first step towards helping to fit together organizations attempting to coordinate. Each individual entity in a larger group of companies might share certain parts of their strategy at a high level (and perhaps this is where things like NIST’s Cybersecurity Framework can come in handy). This can allow defenders to collaborate and coordinate just like attackers do now. The key is to make sure not all of the strategy is generic or shared.
* Your cyber strategy can and should provide language that can be passed along to consumers or end-users that illustrates your commitment to security.
* A strategy is just a really good place to start when dealing with complexity—and few things are as complex today as cybersecurity

**Application of Cyber security:**

**1.It Can Protect Your Business**– The biggest advantage is that the best in IT security cyber security solutions can provide comprehensive digital protection to your business. This will allow your employees to surf the internet as and when they need, and ensure that they aren’t at risk from potential threats.

**2.Protects Personal Info** – One of the most valuable commodities in the digital age is personal information. If a virus is able to obtain personal information regarding your employees or customers, they are quite capable of selling that information on, or even using it to steal their money.

**3.Allows Employees to Work Safely** – Without the best cyber security solutions for your business, you and your employees are constantly at risk from a potential cyber-attack. If your system, or even individual computers, become infected than that can really hamper their productivity and even force you to replace computers.

**4.Protects Productivity** – Viruses can slow down personal computers to a crawl, and make working on them practically impossible. This can cause a lot of wasted time for your employees, and can often bring your entire business to a standstill.

**5.Stop Your Website from Going Down –** As a business, the chances are you’re hosting your own website. If your system becomes infected, there is a very real chance that your website be forced to shut down. This means that not only will you be losing money from missed transactions, but you will also lose customer trust and certain viruses can often do lasting damage to a system.

**6.Denies Spyware** – Spyware is a form of cyber infection which is designed to spy on your computer actions, and relay that information back to the cyber-criminal. A great cyber security solution, such as Fortinet’s FortiGate firewall, can prevent this spyware from taking effect and ensure that your employees’ actions remain private and confidential within your workplace.

**7. Prevents Adware** – Adware is a form of computer virus which fills your computer with advertisements and is fairly common. However, all these adverts can really have an impact on productivity and can often allow other viruses to enter your computer once you’ve accidentally clicked on them.

**8.A Consolidated Solution**– The very best kinds of IT security for your business will offer a comprehensive solution to protect against a diverse range of issues. Ideally, your security needs to include a firewall, anti-virus, anti-spam, wireless security and online content filtration. Discover how your business can benefit from a layered security approach with Fortinet Security Fabric.

**9.Support Your IT Expert** – It might be unpleasant to hear, but most cyber-criminals will have much more experience than your average employee when it comes to digital crime. The best IT security systems can provide your team with the features and support that they need to effectively fight against even the most determined criminal.

**10.Inspire Confidence in Your Customers!–** If you can prove that your business is effectively protected against all kinds of cyber threats, you can inspire trust in your customers and clients. They will then feel more confident when purchasing your products or using of your services.

1. **To study of Cloud computing its needs & Applications in various domain .**

**Needs of Cloud computing:**

* Efficiency

Efficiency in business operations is achieved in the following ways through the use of cloud computing:

Accessibility; Cloud computing facilitates the access of applications and data from any location worldwide and from any device with an internet connection.

Cost savings; Cloud computing offers businesses with scalable computing resources hence saving them on the cost of acquiring and maintaining them. These resources are paid for on a pay-as-you-go basis which means businesses pay only for the resources they use. This has proven to be much cheaper than acquiring the resources on their own.

Security; Cloud providers especially those offering private cloud services, have strived to implement the best security standards and procedures in order to protect client’s data saved in the cloud.

Disaster recovery; Cloud computing offers the most efficient means for small, medium and even large enterprises to backup and restore their data and applications in a fast and reliable way.

* Flexibility

Flexibility is achieved in the following ways when using cloud computing:

Scalability; Cloud computing is the best option for businesses with fluctuating workloads since cloud infrastructure scales depending on the demands of the business.

Tools selection; Cloud computing allows businesses to select specific prebuilt tools and features to derive solutions tailored to their specific needs.

Cloud options; Cloud computing offers private cloud, public cloud and hybrid cloud solutions each with different features. Organizations can choose these options depending on what best serves their need.

Control choices;  Businesses can determine their level of control with as-a-service options offered by the cloud provider. These options include SaaS, PaaS, and IaaS.

* Strategic edge

Cloud computing allows businesses to gain a strategic edge in their niche in the following ways:

Increased productivity; Cloud service providers acquire and manage underlying cloud infrastructure hence enabling businesses to focus their energies on their core business operations.

Automatic software updates;  All the software applications that are accessed through the cloud are usually up-to-date. This enables businesses to access the latest features without having to maintain the system themselves.

Competitiveness; Businesses that employ cloud computing are able to maneuver more nimbly as compared to competitors who devote their energies to acquiring and maintaining IT resources.

Increased collaboration;  With the capabilities of cloud computing, individuals from different places can collaborate in business projects without necessarily having to meet.

**Applications of Cloud Computing:**

**Online File Storage:**

MediaFire, megaupload, hotfile, 4Shared, rapidshare, yourfilehost are such examples which are used to host files including documents, images, presentation, videos, etc. The interface is easy to use, and users can upload and download files from these sites. Here users can utilize 200GB of storage space and a file size of 2GB. The charge for the premium version of these cloud storage application is an average of $9.

**Photo Editing Software**

Picnik, Pixlr, etc. are popular free online photo editing software. This online software has features such as cropping of the image, resizing, rotation based on degrees, special effects, addition and editing features are also included in a GUI (Graphical User Interface) format. Some of them offer paint tools and other adjustment features. The brightness and contrast can also be editable, and users can layer the images. In the case of Pixlr, though it has various high-level, complex features, still it's easy to use.

**Digital Video Software**

Hulu is a free application for videos that are found online for free. Cloud users can download popular movies, television shows, and documentaries and view them on their web-browser. Hulu is a joint venture of three firms viz. - Fox Entertainment Group, NBC Universal and ABC Inc. There are other popular video sites like - WatchMoviesOnline, the most famous YouTube, Google video, etc.

**Twitter-Related Applications**

One example is bit.ly which converts long URL into a short small-sized unique URL. When a user clicks that small unique URL, it redirects the user to that real website. Sometimes it seems harmful as hackers can put malicious attachments or programs with it which can further affect the user. Ly made a partnership with Twitter, to allow twitter users to use shortened URLs. There is also another site name Twitpic which allows the user to upload pictures to be linked from twitter. It uses twitters login, creates shorterened URLs that can be invoked from twitters microblogging.

**Creating Image Album**

Some of the examples are flickr, photobucket,  webshots,  imagebam and ziddu that allows users to host images on the web. These sites are a part of the cloud that allows users to organize images into albums and create slideshows for free.

**Web Application for Antivirus**

One example is Cloud Antivirus, this application on the cloud is provided by Panda Security - a Spanish company which provides functionality to keep the virus away from a clean system and also detects and fix a system infested with malware or other forms of computer viruses. It has been rated as the best free antivirus application by PC World. This also includes the feature to download it into the systems, and the checking of malware is done by sending the information of the file to the data-center of the cloud.

**Presentation Software**

Sliderocket is an online free application to create a presentation. It allows importing of Microsoft's PowerPoint presentations. Since it is a web-based cloud application, the presentations can be accessed from anywhere within the globe. But the free version doesn't allow cloud users to edit presentations offline.

**Finding a Way on the Map**

Another area where cloud applications became worth popular was finding directions and locations on the web. The leading sites are mapquest, Google Maps, and Yahoo Maps. They are the most useful free online application that helped millions of users in various ways by showing direction and paths and helped people get to their destinations over the last decade.

**E-Commerce Software**

Cloud based e-application allows users and e-business to respond quickly to market opportunities & challenges the modern e-commerce is facing. It became for business tycoons to focus on the usage of cloud computing without considering the time and effort involved in implementing a reliable solution. Whatever cloud computing solution they select, the free online application will need to access customer data, product data, fulfillment systems and other operational systems to support e-commerce. Cloud-based e-commerce application provides IT firms, and business leaders evaluate new opportunities without a huge amount of upfront investment.

**Miscellaneous Applications**

One of the 1st utilization of free SaaS applications is to check for the status of packages & items. Applications such as UPS, FedEx, US Postal Service, etc. provide free tracking of packages online. Another application name - XE provides services online from foreign exchange tools.

So every users and reader must need to know the benefits that cloud computing gives by providing free applications for users. This can reduce cost OS storage and buy paid software to do different tasks.

1. **To study Industry 4.0 its needs and List Minimum 20 IT Product based & Service based Industry.**

Manufacturing industry profoundly impact economic and societal progress. As being a commonly accepted term for research centers and universities, the Industry 4.0 initiative has received a splendid attention of the business and research community. Although the idea is not new and was on the agenda of academic research in many years with different perceptions, the term “Industry 4.0” is just launched and well accepted to some extend not only in academic life but also in the industrial society as well. While academic research focuses on understanding and defining the concept and trying to develop related systems, business models and respective methodologies, industry, on the other hand, focuses its attention on the change of industrial machine suits and intelligent products as well as potential customers on this progress. It is therefore important for the companies to primarily understand the features and content of the Industry 4.0 for potential transformation from machine dominant manufacturing to digital manufacturing. In order to achieve a successful transformation, they should clearly review their positions and respective potentials against basic requirements set forward for Industry 4.0 standard. This will allow them to generate a well-defined road map. There has been several approaches and discussions going on along this line, a several road maps are already proposed. Some of those are reviewed in this paper. However, the literature clearly indicates the lack of respective assessment methodologies. Since the implementation and applications of related theorems and definitions outlined for the 4th industrial revolution is not mature enough for most of the reel life implementations, a systematic approach for making respective assessments and evaluations seems to be urgently required for those who are intending to speed this transformation up. It is now main responsibility of the research community to developed technological infrastructure with physical systems, management models, business models as well as some well-defined Industry 4.0 scenarios in order to make the life for the practitioners easy. It is estimated by the experts that the Industry 4.0 and related progress along this line will have an enormous effect on social life. As outlined in the introduction, some social transformation is also expected. It is assumed that the robots will be more dominant in manufacturing, implanted technologies, cooperating and coordinating machines, self-decision-making systems, autonom problem solvers, learning machines, 3D printing etc. will dominate the production process. Wearable internet, big data analysis, sensor based life, smart city implementations or similar applications will be the main concern of the community. This social transformation will naturally trigger the manufacturing society to improve their manufacturing suits to cope with the customer requirements and sustain competitive advantage. A summary of the potential progress along this line is reviewed in introduction of the paper. It is so obvious that the future manufacturing systems will have a different vision composed of products, intelligence, communications and information network. This will bring about new business models to be dominant in industrial life. Another important issue to take into account is that the time span of this so-called revolution will be so short triggering a continues transformation process to yield some new industrial areas to emerge.

**Product Based and Service Based IT Industry:**

**1.Adobe**

Adobe Inc. was founded in December 1982 in a garage by John Warnock and Charles Geschke. Name of the company, Adobe comes from Adobe Creek in Los Altos, California, which ran behind Warnock’s house.

**2.Amazon**

Amazon does not need any introduction in today’s World. Jeff Bezos founded Amazon on July 5, 1994, in Bellevue, Washington, USA.

**3.Amdocs**

Amdocs is a market leader in Telecom Domain products and services. Morris Kahn founded Amdocs in 1982 in Israel.

**4.BMC**

Three Shell Oil employees, Scott Boulette, John J. Moores, and Dan Cloer, founded BMC in September 1980 in Houston, Texas, USA. Companies are derived from their surname initials.

**5.FACEBOOK**

Facebook was founded by Mark Zuckerberg and five other Harvard fellow in 2004.As of December 2019, Facebook has 2.50 billion monthly active users making it the World’s # 1 Social Networking site.

**6.Google**

Ph.D. students from Stanford University, Sergey Brin and Larry Page started Google search engine as one of their research projects in 1996. They came up with a game-changing algorithm called PageRank.The name was a misspelling of the word “googol.” Google’s initial public offering (IPO) happened in 2004. Larry Page, Sergey Brin, and Eric Schmidt decided to work at Google until 2024.

**7.Intel**

Intel was founded in 1968 Arthur Rock, along with Gordon E. Moore and Robert Noyce. It is a semiconductor chip manufacturing company used in computer microprocessors. They were the suppliers to computer system manufacturing companies like HP, Apple, Dell, Lenovo. Intel means intelligence information.

**8.Microsoft**

Bill Henry Gates and Paul Allen founded Microsoft in 1975. In the 1980’s it dominated the personal computer operating system space with MS-DOS, and currently Microsoft Windows.

**9. Rockstar games**

Rockstar Games, Inc. is an American company based in New York City, founded in December 1998.

**10.Paypal**

PayPal Holdings, Inc. is an American firm that runs the most prominent online payment system for online money transfers.

**11.HCL Technologies Ltd**

HCL Technologies Ltd was founded in the year 1976 by Shiv Nadar, and it is headquartered in Noida, India.

**12.Infosys Ltd**

Infosys Ltd was founded in the year 1981 by N.R. Narayana Murthy. The Indian MNC company is offering Information Technology, Outsourcing Services, and Business Consulting.

**13. Larsen & Toubro Infotech Ltd (LTI)**

The company was established in the year 1997. It is headquartered in Mumbai, Maharashtra. It is offering digital & automation solutions, IT Service Management, and IT Consulting.

**14. Oracle Financial Services Software Ltd**

Oracle Financial Services Software Ltd was founded in the year 1990. It is a subsidiary of Oracle Corporation.

**15. Wipro Ltd**

Wipro Ltd was founded in the year 1945 in Amalner, Maharashtra. It is headquartered in Bangalore, Karnataka. Wipro Ltd is among the top 10 IT companies in India.

**16.Microspectra**

Microspectra is providing successful solutions to the clients and we are proud to say that our solutions are successfully. We have started to IT HUB in Vidarbha Region since year 2015.For Software Solutions to Customized Software such as ERP, CRM, Web Development, Mobile APP Development,MLM Software.'

**17. Accenture**

Accenture plc, (stylised as accent͐ure ), is an Irish-domiciled multinational professional services company. A Fortune Global 500 company, it has been incorporated in Dublin, Ireland since 1 September 2009.

**18. Synechron**

Synechron Inc. is a New York-based information technology and consulting company focused on the financial services industry including capital markets, insurance, banking and digital.

**19.Capita**

Capita plc (LSE: CPI), commonly known as Capita, is an international business process outsourcing and professional services company headquartered in London.19.

**20.Logica**

Logica plc was a multinational IT and management consultancy company headquartered in London and later Reading, United Kingdom.