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BANGALORE · INDIA

Data Geek

BUSINESS ANALYTICS Specialization

Volume:1 Issue 5, March 2020

Applications of Analytics in AI

School of Business and Management

From Editors desk,

“In God we trust. All others must bring data.” – W. Edwards Deming, statistician, professor, author, lecturer, and consultant.

We can have data without information, but we cannot have information without data. Without big data analytics, companies are blind and deaf, wandering out onto the web like deer on a freeway. This has motivated us to propose the theme of our newsletter Data Geek ie. “Data management and its security/privacy challenges”. As we know it is the bread and butter of industries and constant challenge too. The world of Data gives big scope for research and a large avenue for new jobs as well. That includes structured data management and also the recent cloud data storage and computing. This issue covers, different types of data management and cloud architecture that supports big data storage. It includes the few of the interesting data analytical presentation of few of the students. It also talks upon various workshops and activities conducted in the specialization as part of Club Activity and Corporate Interfaces. It has Quiz Corner also to cover interesting and useful quizzes with respect to Data and analytics. Team of 4 have worked hard to make the newsletter visually pleasing, easy to read and graphically informative. As much as the words, we want the photos, charts and figures to tell a story. As you read the issue, you'll to be able to glean the information you need quickly and clearly. To name few Bigdata Management, Cloud computing etc. has been depicted in infographics.

Once again congratulations to the entire team for making a wonderful, handy and useful newsletter.

Please reach out to us for any queries or suggestions at datageek@mba.christuniversity.in

With regards,

Dr.Kannika Nirai Vaani

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1.1 AI IN DENTAL

What is coming up for the dental profession in form of AI?

A plenty of dental research is underway in the US as well as all over the globe. Some of these advancements will lead to shorter time for treatment and be commercially available, and some will become obsolete soon. There are a number of innovation in the dental discipline, which will give us unimaginable breakthroughs which can enhance oral health in so many ways. In future AI will have a significant effect in the dental profession for daily tasks. A few of them can be evaluating images for pathology, to prosthetics and systemic care, etc. This technology looks promising in terms of increasing efficiency in dental profession with faster diagnosis, predictive analytics, and auto charting.

There is a lot of research going on to use gene therapy to restore salivary function in patients who have undergone radiation treatment. Lack of saliva has a significant effect on the quality of life of the individual and the health of the oral cavity. The ability to restore salivary function could be life-changing innovation. A lot of these research focused on the clinical application of agents into periodontal pockets does not involve antimicrobial therapies, but rather are regenerative in nature. Working on and preparing of the affected area is simple and quick, followed by application of the regenerative agent. Past trials have demonstrated significant pocket depth reduction and bone regeneration. If the results are reproducible and consistent, a fundamental change in the treatment of periodontitis can take place, one that is essentially non-invasive, quick and inexpensive.

There are a number of disruptive technologies in various stages of development that will dramatically change the manner in which we practice dentistry. Some of these changes will mirror developments in the medical profession, such as gene therapy and influencing the immunoinflammatory system to reduce tissue damage, which ultimately benefits the individual's oral and overall health.

Oral-B releases new toothbrush with compatible app and AI recognition technology

Oral-B has come out with new digital toothbrush named Oral-B iO. This toothbrush comes with an app to help users keep track of their daily dental hygiene and toothbrush usage. It also

features an interactive display, a smart pressure sensor, and a visual timer to make sure users brush for at least 2 minutes. The Oral-B iO toothbrush links to the user's app by Bluetooth, and then 3D graphics of the user's mouth will pop-up on the Oral-B app. Using both 3D Tracking technology and AI Recognition, the toothbrush will track and record the user's dental hygiene progress on the app, as well as alert the user to neglected areas of the mouth.

Oral-B iOTM strikes the right balance between effectiveness and experience and reimagines how a brush performs, cleans and feels. It is a brush that people will look forward to using and will deliver superior oral health. This research took six years of dedication to come up with this product.

REFERENCE

1. https://www.dentistryiq.com/blogs/dr-richard-nagelberg/article/14168492/whats-coming-down-the-pike-in-the-dental-profession
2. https://mobilemarketingmagazine.com/oral-b-releases-new-toothbrush-with-compatible-app-and-ai-recognition-technology-

SAILJA BEHERA (1928144)

1.2 AI IN AGRICULTURE

It is one of the wonders of human advancement yet it offers us extreme rivalry from artificial intelligence (AI). The times of estimating rainfall and daylight may before long blur with the capacity of man-made reasoning to foresee right conditions to a degree with accuracy. It incorporates one of the fundamental parts of precision farming (PA) advanced even by the government to support efficiency, increasing farmer's pay.

AI based planting warnings lead to 30% more significant returns as Microsoft, in a joint effort with ICRISAT, built up an AI Sowing App controlled by Microsoft Cortana Intelligence Suite counting Machine Learning and Power BI. The application sends planting warnings to taking an interest ranchers on the ideal date to plant without them introducing any sensors in their fields or any extra cost; all they need is a telephone fit for getting instant messages. The exhibition of AI on the fields has incited NITI Aayog, to begin a pilot venture on precision agriculture utilizing AI in 10 areas from seven states: Assam, Bihar, Jharkhand, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh.

The AI instrument determined the yield planting period by gathering and investigating the historic climate data spreading over more than 30 years, from 1986 to 2015 and chose a Moisture Adequacy Index (MAI) to decide the ideal planting time frame. MAI is the institutionalized measure utilized for evaluating the level of degree of adequacy of rainfall and soil dampness to meet the potential water requirement of crops. The day by day precipitation recorded and revealed assisted with computing the continuous MAI predicted MAI is determined from climate estimating models which are downscaled to fabricate consistency furthermore, for farmers to pick the perfect planting week. The International Crop Research Institute for the Semi-Arid Tropics (ICRISAT), a non-benefit, non- political association starts ten sowing advisories and they are scattered among the farmers until the harvesting was finished. These warnings contained basic data including the ideal planting date, soil test-based fertilizer application, barnyard manure application, seed treatment, ideal planting depth of seed in soil, and that's only the tip of the iceberg.

Pair with the application, a customized town warning dashboard gave significant bits of knowledge into soil health, suggested fertilizer amounts, and seven-day climate gauges. This is a significant move from the conventional practices where for quite a long time; farmers had been utilizing age- old techniques to anticipate the right planting date for crops like cotton. For the most part, they would decide to sow toward the beginning of June to take advantage of the monsoon season, which commonly keeps going from June to August. In any case, the changing climate in the previous decade have led to unpredictable monsoons, causing poor harvest yields and misfortune to the farmers.

In this manner we can perceive how AI is sensibly modifying the manner in which we do cultivating, presently and sooner rather than later.

PRANAV P. (1928622)

1.3 AI TO PREVENT ROAD ACCIDENTS

AI can help identify manhole, potholes, predict risks upfront and prevent accidents and organize better traffic movement

India is a country that has the dubious distinction of having one of the highest instances of road accidents in the world. On an average 1,374 road accidents occur every day, claiming in 400 deaths, making road safety an acute issue nationwide. Hence, the most effective solution to tackle this problem is technology. This has led to a business opportunity where the tech start-ups have come up with the Internet of Things (IoT), Machine Learning (ML) and Artificial Intelligence (AI) to solve the pressing problem.

A Bangalore based start-up "RoadMetrics" (Bora, 2020) has come application for users, which uses AI-based solutions that provide an Impending danger on the roads such as Potholes, cracks, speed breakers, and poor conditioned roads. They use smartphone sensor data, which includes accelerometer and gyroscope along with image-processing to classify the road types, cracks, patches, speed breakers, potholes, etc. and gives real-time alerts via, a voice message, text message or vibration to the customers with the help of machine learning technique and artificial intelligence. The roads are colour code based on severity into green, yellow, orange, and red. A research conducted by (Madli, Rajeshwari; Hebbar, Santhoshs; Pattar, Praveenraj and GV, 2015) explained how ultrasonic sensors, GPS can help the government in road maintenance and provide precautionary measures to the drivers. Ultrasonic sensors are used to spot the potholes and humps and measure their depth and height, respectively. The Geographical Position system (GPS) captures the geographical location coordinates and can be stored in a cloud server so that the government can fix the issues.

The HMWSSB (Hyderabad Metropolitan Water Supply & Sewerage Board) is planning to adopt a sensor-based manhole monitoring system, which primarily uses IoT. This technology sends caution regarding the unauthorized opening of manhole caps, cover thefts, damaged caps, accumulation of silt, and overflow detection besides the detection of poisonous gases like methane and others. This sensor-based smart manhole management monitoring system will provide instant alerts to the respective in-charge officers to act. This will prove to be very handy in proposing sewer cleaning activity and reduce the risk of unwanted accidents(Kumar, 2018).A US-based start-up Netradyne,("Improving road safety with machine vision and deep learning," n.d.) which has its innovation centre in Bangalore uses multi-sensor, cloud-

connected, integrated platform including multiple cameras, LTE, GPS, accelerometer, gyroscope, and an advanced NVIDIA processor with one TFLOP (direct mathematical measurement of a computer's performance) compute power to aid in Edge Computing to capture every moment of driving experience on roads, following lane discipline and traffic rules. This technology is mostly used by taxi aggregators. Similarly, 'Driveri' (APP) uses a computer vision-based driver system to identify and reduce unsafe driving instances and appreciate reward based positive driving performance. In the city of New York, Machine learning techniques to predict the bridges deteriorating in terms of quality using image processing, detect instances when a vehicle's driver is not alert due to fatigue, distraction, intoxication etc. distraction, fatigue, or intoxication, and to predict when automotive parts would fail so as to proactively plan maintenance (LINGEMAN, 2019). Driverless cars prototypes are using machine learning algorithms, which identifies objects in the vicinity, predicts their movements, and optimizes navigation.

A leader in technology, IBM has a Patented smart traffic light system where based on the traffic movement, the decisions are taken. Smart traffic control works on camera, sensors, remotely controlled signs, and traffic lights, as well as traffic management centres that collect information and make decisions to adapt the light and traffic signs. PTT Global Chemical Public Company Limited ("Artificial Intelligence and road safety: A new eye on the highway," 2019) along a partnership with FRONTIS and Microsoft has come up with an AI solution for road safety in Thailand ("Driv. better road Saf. with Technol. Artif. Intell.," 2019). It uses AI technology to perform big data analytics and real-time video to trace the drowsy behaviour of drivers and monitor them to ensure a safe and efficient transport management system. The city of gold Dubai uses AI based technologies for enforcement and compliance for the purposes of tracking driver behaviour with real-time data using advanced image analysis developed by Sparkbit (Karolina, 2019). This technology automatically detects and analyses crossing on red lights, rash, dangerous or illegal overtaking, maintaining safe distances between vehicles, and not following lane discipline. The offenders are notified and penalized using this system.

BADAL SONI (1928608)

1.4 AI in VIDEO BASED KYC PROCESS

RBI allows KYC process on mobile video

The PAN details should be verified from the database of the issuing authority. The RBI said that the regulated entities will have to ensure that the video recording is stored in a safe and secure manner and bears the date and time stamp. The V-CIP, which will be consent-based, will make it easier for banks and other regulated entities to adhere to the RBI's Know Your Customer (KYC) norms by leveraging the digital technology, with a view to leveraging the digital channels for Customer Identification Process (CIP) by Regulated Entities (REs), the Reserve Bank has decided to permit V-CIP as a consent based alternate method of establishing the customer's identity and customer onboarding.

The RBI further said that the regulated entities will have to ensure that the video recording is stored in a safe and secure manner and bears the date and time stamp. Also, "REs are encouraged to take assistance of the latest available technology", including artificial intelligence (AI) and face matching technologies, to ensure the integrity of the process as well as the information furnished by the customer. "However, the responsibility of customer identification shall rest with the RE," the circular on master directions said. Last year, the government had notified amendment to the Prevention of Money-laundering (Maintenance of Records) Rules, 2005. The Reserve Bank said it decided to permit video-based Customer Identification Process (V-CIP) as a consent based alternate method of establishing the customer's identity, for customer onboarding with a view to leveraging the digital channels for Customer Identification Process (CIP) by REs. The PAN details should be verified from the database of the issuing authority. "Live location of the customer (Geotagging) shall be captured to ensure that customer is physically present in India," it said. Further, the official of the reporting entity should ensure that photograph of the customer in the Aadhaar/PAN details matches with the customer undertaking the V-CIP and the identification details in Aadhaar/PAN should match with the details provided by the customer.

VARUN WILSON (1927559)

1.5 DATA ANALYTICS OF AI TO EVALUATE EYE GAZE FOR MARKETING

Capturing people's attention today is a huge challenge. Eye-tracking technology helps understand what people give more attention to. Eye-tracking is important for gathering customers' attention and understanding the subconscious decisions.

Market researchers are working on putting probes near the customer's head in order to understand the correlation between electrical signals in the brain and the advertisements seen by them. Neuroscience is one way to study and track how people's eye move is another way. Eye-Tracking is essentially a window to understand people's behavior and assess what is going on in the subconscious. The leaders of brands require more data regarding the emotions and the cognitive processes that affect consumer actions. Whenever market researchers test new products in the real-world, changes to the design of products or brands based on traditional market research results are exorbitant and sluggish. Eye-tracking technology is helpful in such cases as it helps us to analyze the human processing of visual information, measuring attention, interest, and arousal, making it an incredibly useful tool for research on human behavior.

The eye-tracking technology has been popular among market researchers since the concept of understanding the customer's perspective seems to be a lucrative idea, as it gives the advertiser a lot of information regarding the purchase decision and shopping experience of the customer

at a subconscious level. Compared to an average consumer 100 years ago, today's consumer is bombarded with a multiple variety of stimuli in terms of, products, advertisements. Even though a product makes it to a market, it will face a lot of competition in terms of attention-seeking as there would be similar kind of products sold by other companies. Getting the right pack design that captures the attention of consumers now gives your product a chance to engage with the consumer and educate her about the merits of the product. Brands can use eye-tracking to evaluate their products, packaging designs, advertising, websites, mobile apps, and online and offline shopping behavior, in order to optimize the customer experience. One can combine visual behavior data from Eye Tracking and contextual information related to advertisement with the help of data like the respondent's demographic data, and the respondent's self-declared data, it is possible to form a rough picture of the customer's mindset and determine what interests of the customer more accurately. Future research may also tell us the reasons underlying the customer's decisions.

References

I. Artificial Intelligence and road safety: A new eye on the highway. (2019). Retrieved from Microsoft Asia News Cente website: https://news.microsoft.com/apac/features/artificial-intelligence-and-road-safety-a-new-eye-on-the-highway/

II. Bora, G. (2020). One for the road: This app will alert you of potholes, help prevent accidents. Retrieved from Economic Times website: https://economictimes.indiatimes.com/small-biz/startups/features/one-for-the-road-this-app-will-alert-you-of-potholes-help-prevent-road-accidents/articleshow/73094405.cms

III. Driving better road safety with technology and artificial intelligence. (2019). Retrieved from Driving better road safety with technology and artificial intelligence website: https://news.microsoft.com/apac/2019/02/04/driving-better-road-safety-with-technology-and-artificial-intelligence/

SARANYA (1928630)

1.6 AI HELPING MICROSOFT RETHINK OFFICE FOR MOBILE

Microsoft this week launched an Office application that replaces Word, Excel, and PowerPoint on Android and iOS. Consolidating three applications into one, while including more highlights, is a remarkable accomplishment. The new Office application isn't only for expending content and perhaps a little light altering, but actually creating content on the go. Most interestingly, a great deal of these highlights on a very basic level require AI and machine learning to accomplish this new portable efficiency worldview. Microsoft has been adding AI-driven highlights to its once most profitable product offering throughout recent years. A large portion of the new highlights are not just customary desktop features ported to mobiles. They are use cases that are better on mobiles, or not in any case conceivable on desktops. Office lets you take a picture of a document and turn it into a Word file. You can take a picture of a table and turn it into an Excel file. It takes a ton of smarts to comprehend what a picture depicts, yet in addition to then change over it into an editable arrangement. You can pick a couple of pictures on your telephone and have Office structure a PowerPoint introduction for you. You can catch a whiteboard, record, or photograph and let Office consequently carefully improve it for you. These are use cases that you can't sensibly do on your PC, nor would you essentially even need to. Indeed, even the AI-based recommended documents section in the Home screen uses machine learning in Microsoft Graph to present proposals and suggestions (caching them for faster and offline use). Timeliness and network connectivity are ever increasingly significant when we're in a hurry. Microsoft 365 general manager, Rob Howard insinuated the organization utilizing “AI and new form factors and new software and new smarter experiences” to close the gap between desktop and mobile. Microsoft has, to a great extent been porting over the desktop Office experience to mobile. Its emphasis was principally on making it simpler for users to get to their documents on the phone.

ADARSH K U (1928602)

1.7 How AI HELPS MERCEDES

AMG Petronas Motorsport F1 team take Pole position

SUMMARY:

Formula One (F1) race cars are among the most technically advanced land vehicles on the planet. Mercedes-AMG Petronas Motorsport has dominated the Sport since 2014. In 2017, the Mercedes team partnered with **analytics** specialist TIBCO Software to take its use of **data** to the next level. The solution has allowed the team to increase its efficiency and keep Mercedes at the top of the F1 leader board. **Data visualization, predictive analytics, and AI** played key roles in winning its fifth consecutive Formula One Championship in 2018.

CRITICAL ANALYSIS and PERSONAL VIEWPOINT:

F1 is incredibly dynamic as a sport. F1 cars are single-seat, open cockpit, open-wheel racing cars that must be built to exacting specifications by the teams themselves. Aerodynamics are a key part of the car's designs, the biggest F1 teams can have budgets in the hundreds of millions of dollars. The cars, capable of reaching top speeds of 225 miles per hour, are customized for every track and associated weather conditions.

Races can generate **terabytes of data** collected by more than 300 sensors on everything from the engines and tires to biometric sensors in drivers' gloves. In 2017, the Mercedes team partnered with **analytics specialist** TIBCO Software to take its use of data to the next level. The project brings together multiple **analytics technologies, including data visualizations, predictive analytics, and artificial intelligence (AI).** These technologies allow the team to collect and process massive volumes of **data in real-time**, giving it the ability to detect patterns of symptom failures or increased efficiency, and to understand how external factors like weather, competition, traffic, and safety cars can impact race results.

They have run millions of race **simulations** with TIBCO Spotfire to gain clear visibility into metrics during critical phases and assess how minor changes could affect the outcomes. Before the project, the team had no easy way to sift through the data generated during races to make clear, data-driven decisions. With the toolset TIBCO offered, the team was able to focus the process on finding the best and correct course of action during the upcoming races.

The solution has allowed the team to increase its efficiency and keep Mercedes-AMG Petronas Motorsport at the top of the F1 leader board. The insights generated by the solution have accelerated the development of its current car design.

Here we see technology being invaluable to a competitive team by gathering the most relevant information and analysing key elements efficiently. Similarly, IT leaders should seek to integrate data and data analytics into their organizations processes as early and consistently as possible. This will in turn help foster a data-centric culture that drives positive business outcomes. Regardless of what industry you're in, you will be able to **use data in a strategic way if you treat it as an asset.**

REFERENCE:

(31 July 2019 03:00 PT). Thor Olavsrud Senior Writer, CIO. Analytics helps Mercedes-AMG Petronas Motorsport F1 team take pole position. CIO United States from IDG on the Web. Retrieved on 7th August 2019, from https://www.cio.com/article/3428499/analytics-helps-mercedes-amg-petronas-motorsport-f1-team-take-pole-position.html

LIKHITH S (1928616)

2.1 GUEST LECTURE ON TRENDS IN DATA ANALYTICS

Our very first corporate interface was regarding trends in data analytics. The speaker discussed about various fields and opportunities in this particular field. Now a days each and every field is using analytics in some or the other way. Hence, it is important to have some insight into analytics to have knowledge about the plethora of opportunities for students in future.

The guest Dr. Hari Bhaskar S has 20 years of industry experience with specialization in Big Data, Machine Learning applications. He has 25+ publications and holds 2 patents. He discussed the top 10 technology trends in the data and analytics and gave a clear view of AI, ML and Data Science and also explained the relationship between them. He made us understand the predictive, descriptive and prescriptive aspects of analytics. The speaker also explained the process view diagram and gave examples of movies where analytics has been explained like Moneyball. He gave us clarity on how to look into the data by removing the bias and also gave insights on how to deal with biases. He covered a wide range of topics like NLP, NLU, Quality and Governance. Dr. Hari also discussed the challenges and problems faced in Analytics and gave us comprehensive solutions on it. He also shared about the projects in which he has worked in during his long experience in the industry. Some projects are Service Quality Analysis of Airports and Predicting Social Media Trends. The session was very interactive and it gave new insight to students on the emerging field of analytics. We could also gather knowledge on the new technologies in the industry.

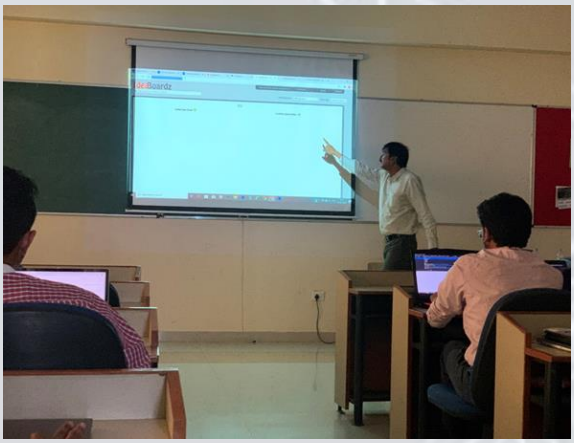
2.2 WORKSHOP ON INTERNET OF THINGS

The guest Mr. Deepesh Goel has an overall 24 years of experience and he is also a visiting faculty for various B-schools. He excels in Product Management, Six sigma, Marketing and Sales. He is the author of 2 books. He maintains a very balance between corporate life and his passion. He has a very comprehensive knowledge of IOT and its applications. He explained clearly about the Industrial IOT and the issues in that sector. Mr. Goel also played a video about Bill gates in 1985, in which he introduced the internet to the world and everyone was funny and sarcastic on his statement by saying that how it is even possible. He also discussed about the core components of IOT and the latest innovative technologies which drives industrial revolutions. He gave some facts on the world's most sustainable city which is Netherland which is 98% sustainable which surpassed New York which is 96% sustainable. We were shared some use cases of IOT in real world phenomena. The key message he gave to all students was that DISRUPTION IS THE NEW TREND.

2.3 CHATBOT WORKSHOP

Chatbot is mostly a piece of software which helps to conduct conversation by textual or auditory means. In the current era, every person who has an app in his/her mobile phone would have surely interacted with a bot. Hence, as students of analytics, it is very essential for us to have an understanding of the working of chatbot and how we can incorporate new and existing technologies to make the user experience better.

Our chatbot trainer Dr.Vaira Selvam is an expertise in chatbots and in the field of AI. He has worked in many prominent companies including Microsoft. The speaker has a very good knowledge in the concepts of Artificial Intelligence and Machine Learning. He started with the basic introduction of AI and explained the use cases of AI in our life. He gave some insights on the term intelligence and the agent. Then he gave an overall view about chatbots and explained how chatbots are disrupting the business. It decreases the human effort in answering queries to the customers and it saves time and cost. Dr. Selvam gave us a hands-on experience to create a chatbot. We used Dialogflow for creating a simple chatbot. Dialogflow is a Google owned developer of human computer interaction technology which is based on natural language conversations and it incorporates machine learning expertise. We mentioned the intent of the customer at first. In each intent we have to enter the training phrases and the text responses for the question asked by the customer. After entering we tried it with a chatbot and realized how it is responding. He also taught us how to insert the images and how to add follow up intents. In the hands on workshop we got a lot of practical knowledge about the chatbot and its applications. The chatbot workshop was something very new and interesting for students as we got know and work for the other side of the chatbots.



3.1 The Essentials of DATA CENTRES

Data centres are the centralized locations of an organization's IT operation and equipment and with major purpose of collecting, storing, processing, distributing or allowing access to large amounts of data. Data centres are the most critical element of network and dynamic to the continuity of daily operations. Therefore, the security and reliability of such data centres are with the information stored in them is the top priority for business organizations.

There is a significant difference between the data centres architecture and requirements. For example, a data centre built for cloud service provider like AmazonEC2 and data centre for Pentagon are poles apart in their respective requirements. The cloud data centre satisfies facility, infrastructure, and security requirements whereas Pentagon data centres are majorly dedicated for securing privacy data.

Every entity whether its business or government, either needs its respective data centres or need to have access to others. Some build and maintain them in-house, some rent servers at co-location facilities (also called colos) and some use public cloud-based services at hosts like Amazon, Microsoft, Sony and Google.

The colos and the other tremendous data centres started to jump up in the late 1990s and mid-2000s, at some point after Internet use became mainstream. The data centres of some huge organizations are dispersed everywhere throughout the planet to serve the consistent requirement for access to enormous measures of data. There are supposedly more than 3 million data centres of different shapes and sizes on the earth today.

Here are 12 fascinating data centre facts: -

1) There are **over 7,500** data centres worldwide, with over **2,600 in the top 20 global** cities alone, and data centre construction will grow 21% per year through 2018.

2) By 2020, at least 1/3 of all data will pass through the cloud.

3) The Natural Resources Defense Council (NRDC) estimates that data centres consume up to 3% of all global electricity production.

4) With just over 300 locations (337 to be exact), London, England has the largest concentration of data centres in any given city across the globe.

5) California has the largest concentration of data centres in the U.S. with just over 300 locations.

6) The average data centre consumes over 100x the power of a large commercial office building, while a large data centre uses the electricity equivalent of a small U.S. town.

7) The largest concentration of data centres in a U.S. city is within the New York-New Jersey metropolitan area (approximately 306 centres).

8) Data centres are increasingly using in-flight wire speed encryption, which keeps your data fully protected from the moment it leaves one data centre to the moment it arrives at another.

9) The largest data centre in the world (Langfang, China) is 6.3 million square feet—nearly the size of the Pentagon.

10) As much as 40% of the total operational costs for a data centre come from the energy needed to power and cool the massive amounts of equipment data centres require.

11) Google recently announced plans to build 12 new cloud-focused data centres over a 1.5-year period.

12) By 2020, nearly 8% of all new data centres will be powered by green energy.

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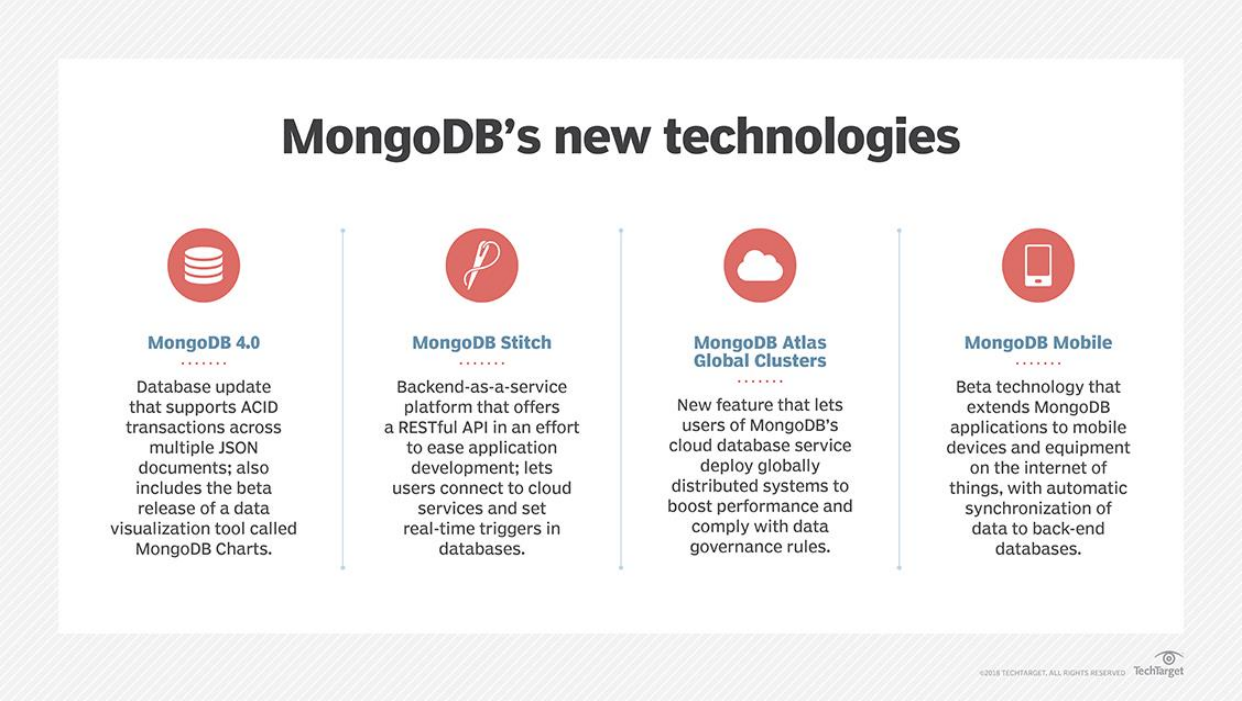
3.2 INTRODUCTION TO NOSQL DB-MONGO DB

The NoSQL database is a way to store data in a different way other than the relational database. A NoSQL database is a type of non-relational database that is capable of processing structured, semi-structured, and unstructured data. These databases are increasingly used in big data and real-time web applications. NoSQL provides high scaling out capability. It also enables us to add any data in a database because it is flexible. It provides distributed storage and high availability of the data. NoSQL also accepts streaming because it can handle a high volume of data that is stored in a database.

MongoDB is an open-source management system for databases) developed by Mongo incorporated that uses a document-oriented database model. It is written in C++. MongoDB uses its own binary storage objects and stores data in flat files. This implies that data storage is very compact and efficient and is perfect for high data volumes. MongoDB stores data in JSON-like documents, which makes the database very scalable and flexible.



This technology resolved one of the most significant drawbacks of the traditional database systems, which is scalability. With the ever-increasing complex needs of businesses, their database systems also have to be upgraded periodically. MongoDB has exceptional scalability.

It provides continuous and automatic integration and makes it easy to fetch the data and. Besides these benefits, there are a couple of other reasons why MongoDB is in demand- Performs in-memory processing, no downtime. At the same time, the application is scalable, economical, text search, graph processing, and global replication.

MongoDB provides some powerful and advanced features which offer to define all semi-structured and unstructured data. There are a large number of organizations like LinkedIn, Adobe, SAP, MacAfee, etc. who use MongoDB as a database. New York Times is using MongoDB NoSQL, and this application is deployed for form-building for photo submission. MongoDB NoSQL is available in the commercial and community versions through vendor MongoDB Inc.

With all the given advantages, MongoDB is a very promising solution. It may be instrumental in creating applications like discussion forums, advertisements, bug tracking, and the like. However, this may not be able to cater to all the needs that a relational database supports. For example, joins are not possible, which an advantage in relational DBs is. The data model that MongoDB follows can store data of multivariate types without having to give up on the powerful indexing options, data access, and validation rules and is a highly elastic one that helps to combine.

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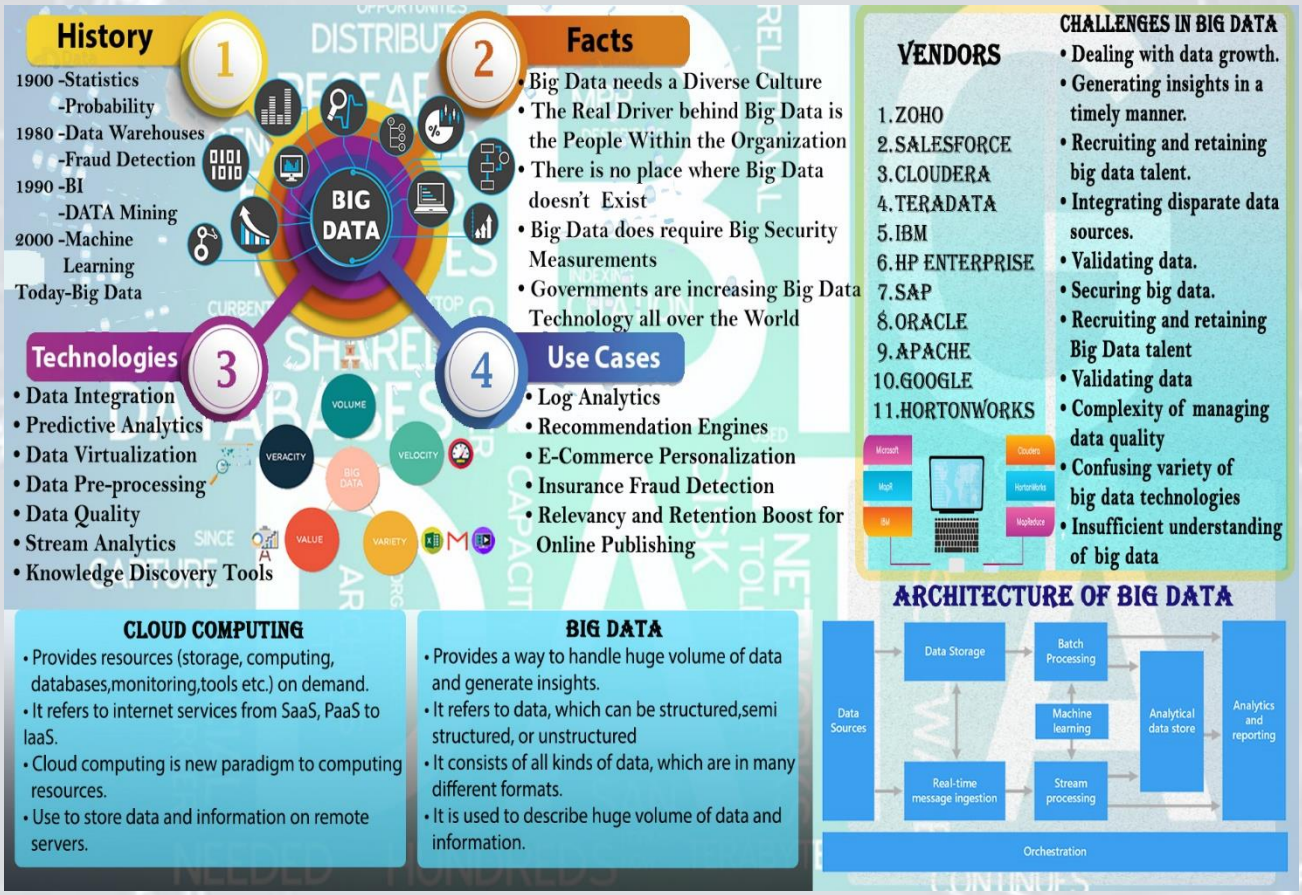
3.3 BIG DATA

Big data is a field that analyses and extracts insights from the data that are too big in size or complex to deal with by traditional data processing. The term big data most often refers to value from information and rarely refers to a particular size of the information set. The feature in big data may lead to confident and better decision making and this aid in developing greater operational efficiency, reduction in the cost and reduction in the risk.



The big data includes the data sets which are larger than what the commonly used by software tools to capture, curate and manage and process the information within a defined time. The size of big data is continuously increasing as it has increased from a few terabytes to petabytes. The big data represents the data assets characterized by high volume, velocity, and variety to need specifically applied science and analytical ways for its change into value.

Feni Martina Fernando (1927958), Ancy Rose Thomas (1927962)

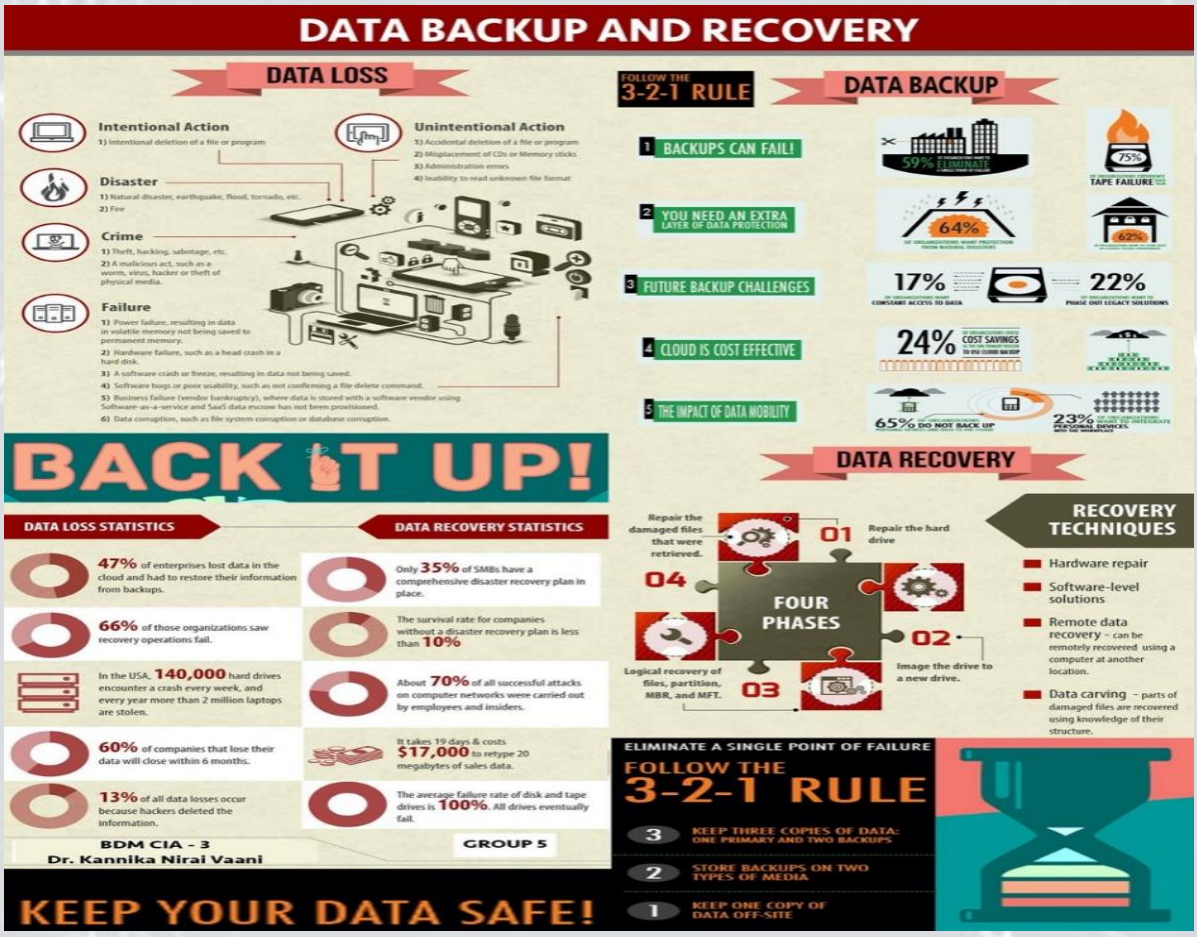
Avinash Parashar (1928004), Aiswarya K H (1928028)

Keerthivasini R (1928036), Abirhotra Sinha (1928101)

Renuka Dutta (1928144)

3.4 DATA BACKUP AND RECOVERY

Backup copies allow data to be reinstated from an earlier point in time to help the organisation recover from an unplanned event. Primary data failures can be the outcome of hardware or software failure, data exploitation, or a human-caused event, such as a malevolent attack (virus or malware), or unintentional deletion of data. Storage of the replica of the data on separate medium is critical to protect against primary data loss or corruption. This extra medium can be as simple as an outside drive or USB stick, or something more extensive, such as a disk storage



system, cloud storage ampule, or tape drive. Retaining numerous copies of data provides the assurance and elasticity to restore to a point in time not affected by data exploitation or malicious attacks. For best outcomes, backup copies are made on a constant, consistent basis to reduce the amount data lost between backups.

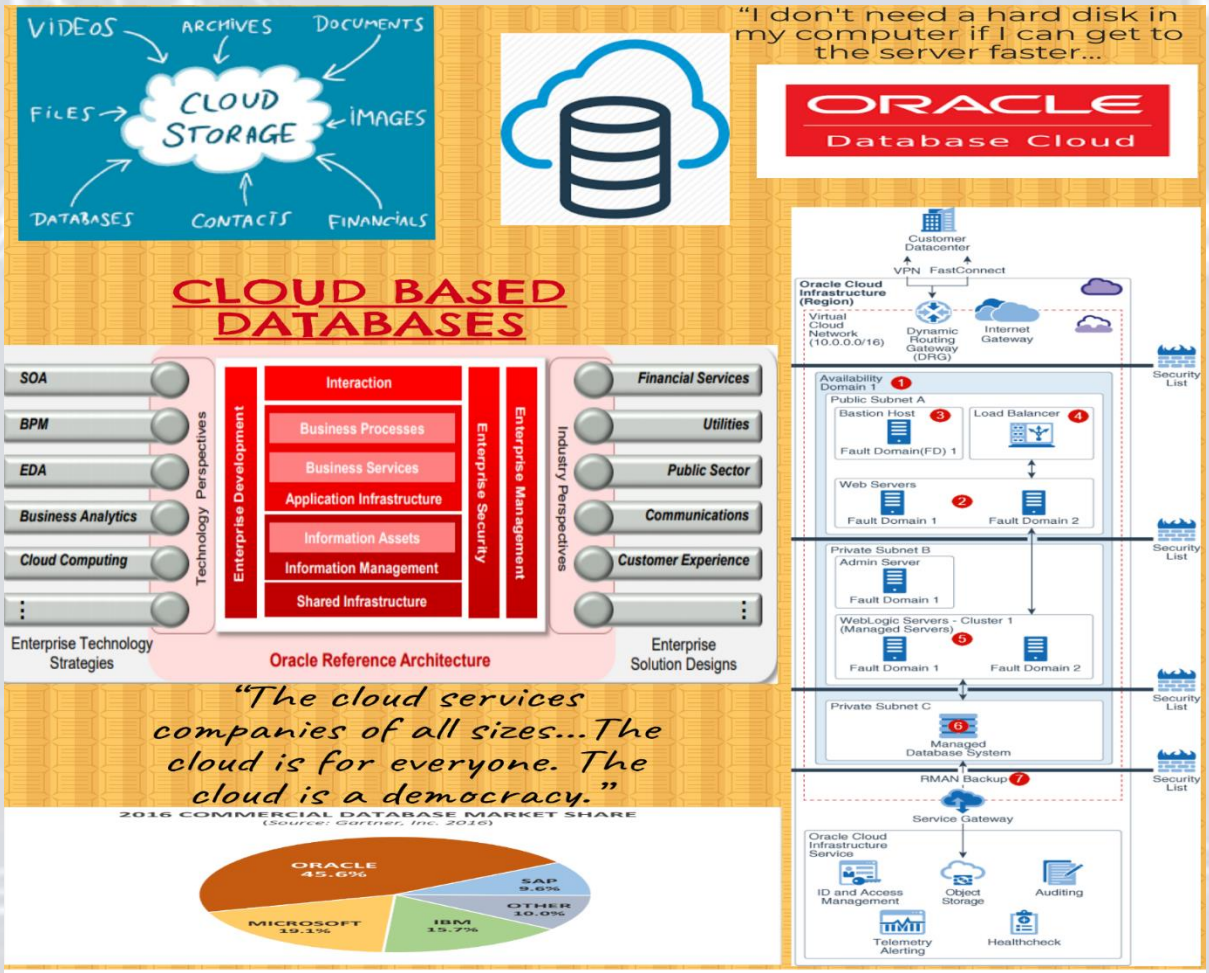
Karthik Raja A (1928615), Likith S (1928616), Pranav. P (1928622)

M Lalith Madhav (1928617) , Manpreet Singh (1928618)

Palash Pratim Devnath (1928620) , Paritush (1928621)

3.5 CLOUD BASED DATABASES

A cloud database is a database package built and accessed through a cloud platform. It assists many of the same purposes as a traditional database with the extra elasticity of cloud computing. Users install software on a cloud structure to implement the database. A cloud database consists of variety of information which have useful information. The data here are structured or unstructured, that exist in on a private, public or hybrid cloud computing infrastructure platform. From the perspective of structural and design, a cloud database is no different than one that are used on an organisation's own on-premises servers. The critical difference lies in where the database exists in.



Muhilgunalan N (1927513), Sahitya Setu (1927519)

Prachi Agrawal (1927539), Shivangi S (1927544)

Aadarsh Malhotra (1927556), Varun Wilson (1927559)

Gokul G Nair (1927607)

4. CAPSTONE PROJECTS Review

Seniors of Business Analytics in their fifth and sixth trimesters carried out capstone projects successfully which is a mode of experiential learning, carried out. It gives the students an opportunity to apply what they have learnt about how to make data-driven decisions to a real business challenge faced by various companies.

The students have to choose a reputed organization and study a specific business problem associated with it. The specific role that the student will be playing in the organization and the scope of their work in the company will have to be finalized in consultation with the corporate mentor and with the approval of the academic mentor.

Some of the high lights of Capstone projects:

Title	Technology used
Improving The Customer Satisfaction In Banking Sector Using ML And NLP	Python
Fantasy Premier League: Team Prediction Using ML And Algorithm	Python
Mapping Of Customer Reviews On Amazon To Their Respective Products Based On The Sentimental Analysis And Development Of Recommender System For The Products	Python
Predicting Song Popularity By Audio Features From Spotify Music Data	Python, R
Prediction Of Taxi Time At BIAL	Python, Excel
Scrutinizing The Quality Of Products Using Natural Language Processing	Python
Multivariate Cluster Analysis For The New York Taxi And Limoucine Commission (TLC) Taxi Trips.	Pyspark And Sparkr
Demand Analysis	Python
Sentiment Analysis Of Customer Reviews For Electronic Ecommerce	Python
Pollution Forecast Of U.S Using Historical Data	Python, R

Analysis Of Zoom Call Quality	Python
Sentiment Analysis Of Existing Restaurants To Recommend Cuisines For New Restaurant	Python, R
A Customer Behaviour Predictive Model Based On The Purchase Patterns	Python
Prediction Of Infrastructure Damage In A Post-Earthquake Scenario	Python, Spss, Microsoft Azure Ml Studio
Classification Model For Credit Risk Analysis	Python
Analysing Customer Reviews In The Hospitality Industry Using Sentiment Analysis	Python
Leads And Keyword Analysis	R, Excel
Anomaly Detection In Airline Customer Reviews	Python
Analysis Of Zoom Call Quality	Python
Opinion Mining Of Real-Time Data Of Hotel Reviews	Python, Pyspark
Classification Of Voice Messages Using Machine Learning Techniques	R, Sublime, Html, Azure, Google Colab
Face Detection And Attendance Management System	Python, GUI Haar Cascade Trainer, Excel Worksheet

5. QUIZ CORNER

1. What is Artificial Intelligence?

a. Making a machine intelligent

b. Programming your known language

c. Putting your memory into computer

d. Putting your intelligence into computer

2. What decade did the formal AI research begin?

a. 2000s

b. 1980s

c. 1950s

d. 1960s

3. The area of AI that investigates methods of facilitating communication between people and computers is

a. Robotics

b. Natural Language Processing

c. Decision Support

d. Symbolic Processing

4. The practice of using algorithms to parse data, learn from it, and then make a determination or prediction about something is

a. Deep Learning

b. Natural Language Processing

c. Machine Learning

d. Decision Support

5. Software designed to facilitate a conversation between a computer and a human end-user is called a

a. Real-time Messaging

b. Walkie-Talkie

c. Interactive Voice Response

d. Chatbot

6. Which of the following is an example of AI?

a. Reformatting a Hard Drive

b. Offering Augmented Reality (AR) information in headsets for service technicians

c. Finding the CPU on server

d. Software changing from one network to another when it detects a problem

7. What task/tasks can AI perform?

a. Act as virtual assistant

b. Analyze unstructured data

c. Generate Ideas

d. Automate Manual Process

e. All of the above

8. What year does futurist Ray Kurzweil believe AI will meet adult human intelligence?

a. 2082

b. 2035

c. 2024

d. 2029

9. AI has a conscience

a. True

b. False

10. The intelligence displayed by humans and other animals is termed?

a. Constance

b. Ability

c. Cognition

d. Natural intelligence

6. DATA GEEK CREW

SAILJA BEHERA

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