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DIFFERENT SECTORS USING DATA SCIENCE

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DATA BASE INTRODUCTION

A **database** is a collection of data which is stored and accessed from a computer system. A **database** is one of the essential components for many applications and is used for storing a series of **data** in a single set. Usually Database is large collection of data collected from rapidly searched information. Access to the data in database is usually provided by DATA Base Management System(DBMS). DBMS provides various functions that allow users to access and store the large amount of information, and also to manage the data stored in the database. The huge amount of data is stored in servers which contains the   Databases. This servers are computer which have the capability of holding the actual databases and run the DBMS commands. This Database Servers are usually multiprocessor computers with high processing speed for stable-storage. DBMS depends on the operating system to provide the functions according to the database model ,query language which affects the performance, scalability and security of the database and the functions are like create, modify, Delete , update and manage.

ADVANTAGES of DATABASE :

- Ability to store huge amount of data
- Allows user to access data quickly
- Allows to share information
- provides security to the data
- and DATABASE can be easily maintained.

DISADVANTAGES of DATABASE :

- It takes lot of time to designed
- Databases are difficult to design
- requires huge amount of hardware support for storae
- Database Administrator requires training
- Damage to data in the database effect all the applications depends on it

Big data analytics

Big data analytics is the process of collecting, organizing and analyzing large data sets of data to discover similar patterns and other useful information.

Big data analytics helps organization to understand the information contained within the data and   also help to identify the important data to the future business decisions. it examines the large amount of data to uncover hidden patterns, correlations in the data.

To improve the Business outcomes based on previous information data analytics is used. This analysis process is based on customer computerization for fraud detection,risk mitigation,and internal operations analysis etc.

Now a days it's possible to analyze your data and get answers from it is simple with the developed technologies

Advantages of big data analytics :

- Helps in identifying errors within the organization
- To implement new strategies in Business
- To reduce the cost savings
- To detect fraud in the organization
- To improve customers

Disadvantages of big data analytics :

- violation of customer privacy like online transactions
- Data analytic tools are complex and require training to use them
- The obtained data can be misused which effects the privacy of the user
- Difficult to select the correct data analytic tool

DATA MINING

Data mining is a process of collecting useful information and patterns from huge data. It is also called as knowledge discovery process, knowledge mining from data, knowledge extraction or data /pattern analysis.

The goal of Data Mining is to find patterns that are similar. Once these patterns are found they can further be used to take decisions for development of business applications.

Nowadays corporate and organizations are gathering huge amount of data from a very broad variety of sources such as customer transactions, credit card transactions, bank cash withdrawal to hourly weather data. A lot of relational database servers have been built to store such massive quantities of data. To put the data into the database servers, online transactional process (OLTP) systems have been developed .

Data mining process

☐

1. Data comes from variety of sources is integrated into a single data store called target data

2. Then the data is pre-processed and transformed into the standard format.

3. The *data mining* algorithms process the data to the output in the form of patterns or rules.

Advantages of Data mining :

- Helps in decision making
- Helps to predict the future trends
- Increases the company revenue
- It classifies the customer needs
- and also helps in fraud detection

Disadvantages of Data mining :

- Administrator requires the training
- unnecessary data may be gathered
- chance of occurring security issues
- chance of occurring privacy issues

DATA SCIENCE

Data science is a study field that uses scientific methods,processes,algorithms and systems to extract knowledge and awareness from structured and unstructured data. Data

science is related to data mining and big data. It is about extracting , analyzing, visualizing, managing and storing data .

Data science is a concept of whole statistics, data analysis, machine learning and their related methods in order to understand and analyze actual phenomena with data.

Data Science is successfully adding value to all the business models by using statistics and deep learning to make better decisions and improve hiring. It is also being used to crunch the previous data and predict possible situations and risk so that we can work on avoiding them.

Data science process goes through Discovery, data preparation , model planning , model building, communication results.
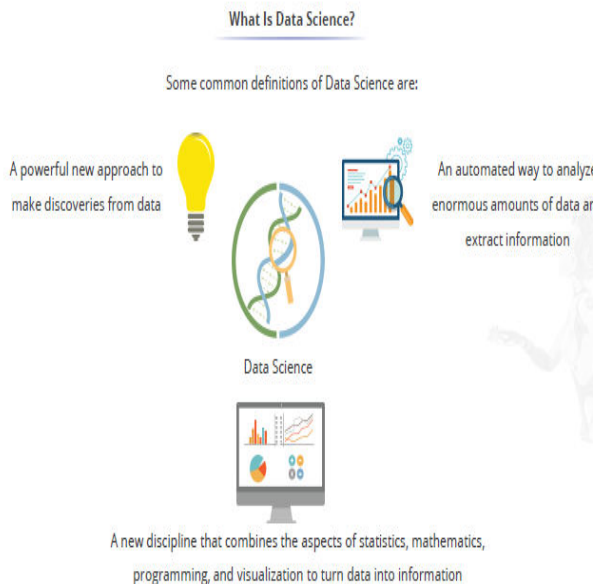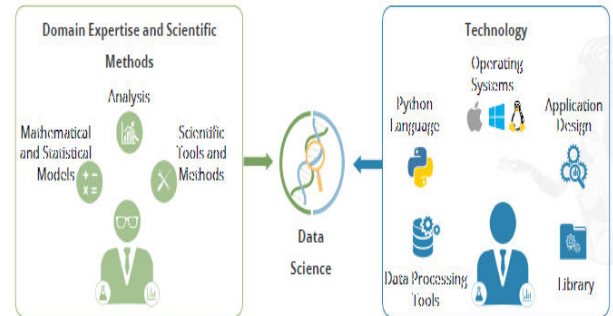

Figure:1

Figure:2

Advantages of Data science :

- Helps to deliver a product at right place at the right time
- Helps to make faster and better decisions
- Makes easy to sort data and look for best of candidates for an organization

Applications of Data science :

- Fraud and risk detection
- Healthcare
- Internet search
- Website Recommendations
- Speech Recognition
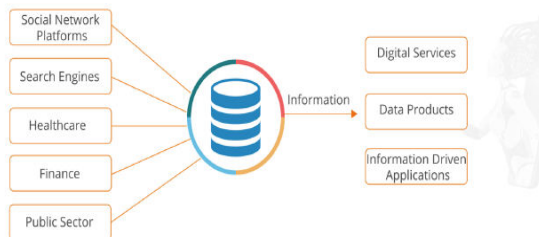- Uber and Amazon
- Social Network Platforms
- Finance
- Public sector

Figure:3

Healthcare

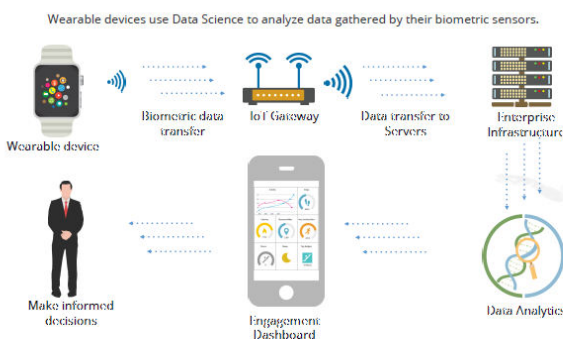The healthcare sector, especially receives great benefits from data science applications .

Figure:4

1. Medical Image Analysis

Procedures such as detecting tumors, artery stenosis, organ delination employ various different mentods and frameworks like map reduce to find optimal parameters for tasks like lng texture classification. It applies machine learning methods, support vector machines (SVM), content-based medical image indexing, and wavelet analysis for solid texture classification.

2. 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.

3. Drug Development

The drug discovery process is highly complicated and involves many disciplines. The greatest ideas are often bounded by billions of testing, huge financial and time expenditure. On average, it takes twelve years to make an official submission.

Data science applications and machine learning algorithms simplify and reduce this process, adding a perspective to each step from the initial screening of drug compounds to the prediction of the success rate based on the biological factors. Such algorithms can forecast how the compound will act in the body using advanced mathematical modeling and simulations instead of the lab experiments. The idea behind the computational drug discovery is to create computer model simulations as a biologically relevant network simplifying the prediction of future outcomes with high accuracy.

4. Virtual assistance for patients and customer support

Optimization of the clinical process builds upon the concept that for many cases it is not actually necessary for patients to visit doctors in person. A mobile application can give a more effective solution by *bringing the doctor to the patient instead*.

The AI-powered mobile apps can provide basic healthcare support, usually as chatbots. You simply describe your symptoms, or ask questions, and then receive key information about your medical condition derived from a wide network linking symptoms to causes. Apps can remind you to take your medicine on time, and if necessary, assign an appointment with a doctor.

This approach promotes a healthy lifestyle by encouraging patients to make healthy decisions, saves their time waiting in line for an appointment, and allows doctors to focus on more critical cases.

Data science and robotics :

Data Science in robotics has definitely improved to an a great extent.During the development of initial days,main two major challenges -one,predicting every action of a robot, and two, reduce the complexity in real-time vision tasks were faced by scientists specific functions perform robots, it is impossible to predict their next move,For every new functionality, a robot may have to be reprogrammed every time by using of machine learning is to solve these issues in robotics. robots can acquire new behavior patterns through labeled data. Handwriting recognition is an excellent example. In handwriting recognition,computers are fed with labeled data both positive and negative. ML algorithms powered by tons of data that computers are now able to perform handwriting recognition much more accurately than they were ten years ago.

Reinforcement learning, the branch of ML that is "the closest that machine learning can get to the way how humans learn" teaches computers and robots to perform specific functions according to their environment to generate outcomes that fetch either rewards or penalties lists of online portals such as Amazon and Netflix are the best examples of reinforcement learning. This wasn't possible ten years ago.

As data scientists continue to develop smart machines in an AI and ML, in the process, they are gaining a deeper insight into the world of data science itself. Using AI and ML, Data scientists at the NuMedii Labs used network-based data mining algorithms to identify the correlations between the disease information and the drug composition Thus, data science, AI, and robotics have a pretty much symbiotic relationship. Each enhances the other to power innovative machines and technologies that are making our lives more convenient than ever. The collaboration between data science, AI, and ML has given us things like self-driving cars, smart assistants, robo-surgeons and nurses, and so much more. In the future, more is to come

Uber :

Data science is an integral part of Uber's products and philosophy. Uber does an exceptional job of hiring data-oriented people throughout the company through its exclusive Uber Analytics test v3.1. Any

individual applying a job at Uber that requires analysing back-end extract from the application, has to take the Uber Analytics Test.

Uber's data is collected in a Hadoop data lake and it uses spark and hadoopto process the data. Uber's data comes from a range of data types and databases like SOA database tables, schema less data stores and the event messaging system, Apache Kafka.

Uber stores historic information about its system and capabilities to ease doing data science for its data scientists down the road. Keeping the change logs, versioning of database schemas helps data scientist answer every question on-hand. With the data Uber has, data scientists can answer questions like what did the Uber system look like at a particular point of time from a customer perspective, supply behaviour perspective, from inter-server communication perspective or even to the state of a database.

With a huge database of drivers, as soon as a user requests for car, their algorithms match a user with the most suitable driver within a 15 second window to the nearest driver. Uber stores and analyses data on every single trip the users take which is leveraged to predict the demand for cars, set the fares and allocate sufficient resources. Data science team at Uber also performs in-depth analysis of the public transport networks across different cities so that they can focus on cities that have poor transportation and make the best use of the data to enhance customer service experience.

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