

TASK NO: 1A

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Introduction to Data Analytics

Analysing unprocessed data to make inferences about the information it has is known as data analytics. It uses a variety of approaches and strategies to find trends, correlations, patterns, and insights that may be used to problem-solving and decision-making. Data analytics is becoming more and more important in a variety of businesses in the twenty-first century because of the growth of digital data and technological advancements.

Data

Raw facts and figures are gathered, stored, and then examined. This is known as data. Forms of data that might be encountered include semi-structured data (somewhat ordered, like XML files), unstructured data (without having a predetermined data model, like text documents or social media postings), and structured data (arranged in a predetermined manner like databases). With the introduction of the internet, social media, sensors, and other digital technologies, there has been a notable rise in the volume, velocity, and diversity of data, (Manyika et al., 2011).

Data Science

In order to extract knowledge and insights from data, data science is an interdisciplinary profession that combines programming abilities, statistical understanding, domain experience, and data analysis methodologies. It includes every step of the data lifecycle, from gathering data to cleaning and preparing it to analysing, visualizing, interpreting, and communicating the outcomes. To analyse data and provide insights that can be put to use, data scientists employ a variety of tools and algorithms (Provost & Fawcett, 2013).

Data Cleaning

Data cleaning is the process of identifying and correcting errors, inconsistencies, and inaccuracies in datasets to enhance data quality. It is also referred to as data cleansing or data scrubbing. Duplicate record removal, missing value filling, typo correction, format

standardization, and addressing discrepancies across various data sources are some of the activities involved. In order to guarantee that the conclusions drawn from the data are correct and trustworthy, data cleaning is an essential stage in the data analysis process.

Types of Data

Different criteria can be used to categorize different sorts of data.

1. **Structured Data:** Data that is arranged according to a set format and is usually kept in spreadsheets or databases. CSV files, relational databases, and tabular data are a few examples.
2. **Unstructured Data:** Unorganized data that is challenging to examine since it doesn't follow a predetermined model. Documents including text, photos, audio files, videos, and social media postings are a few examples.
3. **Semi-Structured Data:** data that is partially arranged and does not follow a set data model. Log files, JSON documents, and XML files are a few examples.
4. **Quantitative Data:** numerically expressed data that may be measured and subjected to statistical analysis. Sales numbers, stock prices, temps, and survey results are a few examples.
5. **Qualitative Data:** Non-numerical, descriptive data that is usually presented through words or graphics. Screenshots, audio files, films, and written explanations are a few examples.

Types of Data Analytics

Depending on the goals, methods, and strategies employed, there are several forms of data analytics. These include

1. **Descriptive Analytics:** The goal of descriptive analytics is to comprehend the past by summarizing historical data. It uses methods like dashboarding, reporting, and data visualization to highlight important metrics, patterns, and trends in the data. Descriptive analytics helps pinpoint areas that require development by offering insights into historical performance.
2. **Diagnostic Analytics:** Through the identification of underlying causes and linkages in the data, diagnostic analytics seeks to explain why specific events occurred in the past.

To find patterns and correlations between variables, it uses methods including correlation analysis, hypothesis testing, and root cause analysis. Diagnostic analytics may assist in decision-making and problem-solving processes by illuminating the variables that influence certain results.

3. **Predictive Analytics:** Forecasting future events or trends using statistical modelling techniques and historical data is the main goal of predictive analytics. To find patterns and forecast future occurrences, it uses methods like machine learning, regression analysis, and time series analysis. Numerous applications exist for predictive analytics, including as risk assessment, consumer segmentation, and demand forecasting (Chen et al., 2012).
4. **Prescriptive Analytics:** Beyond forecasting future events, prescriptive analytics makes recommendations for choices or activities that might maximize performance or accomplish certain goals. It includes analysing many courses of action and choosing the optimal one based on predetermined criteria using techniques like simulation, optimization, and decision analysis. Prescriptive analytics can lead to better results and increased efficiency by directing decision-making processes (Davenport & Harris, 2007).

Data Analytics in the 21st Century

In the 21st century, the widespread use of data analytics has been fuelled by the digital revolution and the rapid expansion of data across many businesses and sectors. The growing significance of data analytics in the contemporary day may be attributed to a number of factors:

1. **Big Data:** The proliferation of digital technologies has led to the generation of massive volumes of data from various sources, including social media, sensors, mobile devices, and the internet of things (IoT). Big data technologies and analytics tools enable organizations to capture, store, and analyse large datasets to extract valuable insights and drive informed decision-making.
2. **Advanced Analytics:** The development of machine learning algorithms and data science methodologies has created new avenues for the analysis of complex and unstructured data. Organizations may extract meaningful insights from a variety of data sources and forecast future events with precision by utilizing techniques like deep learning, natural language processing, and predictive modelling.

3. **Real-time Analytics:** Real-time analytics has become indispensable in today's hectic corporate world for tracking and reacting to events as they happen. Organizations may examine data in real-time and act immediately on the insights gained thanks to technologies like in-memory databases and stream processing. In sectors where prompt decision-making is essential to success, including banking, e-commerce, and telecommunications, real-time analytics is especially useful.
4. **Data-driven Decision Making:** Businesses are depending more and more on data-driven decision-making procedures to boost innovation and obtain a competitive edge. Organizations may make strategic decisions that support their growth and commercial objectives by using data analytics to detect market trends, consumer preferences, and new opportunities.
5. **Personalization and Customer Insights:** Through data analytics, businesses may learn more about the requirements, tastes, and behaviour of their consumers. Organizations may improve customer happiness and loyalty by personalizing their goods, services, and marketing initiatives by evaluating consumer data and utilizing strategies like segmentation and predictive modelling.

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