



SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

COURSE NAME :19CS407 DATA ANALYTICS WITH R
II YEAR /IV SEMESTER

Unit 1- Introduction

Topic : Data Analytics- Tools and Applications







Data Analytics Tools



- ✓ Microsoft Excel
- ✓ Python
- ✓ R
- ✓ Jupyter Notebook
- ✓ Apache Spark
- ✓ SAS
- ✓ Microsoft Power BI
- ✓ Tableau
- ✓ KNIME



Microsoft Excel



- **Type of tool:** Spreadsheet software.
- **Availability:** Commercial.
- **Mostly used for:** Data wrangling and reporting.
- **Pros:** Widely-used, with lots of useful functions and plug-ins.
- **Cons:** Cost, calculation errors, poor at handling big data.



Python



- **Type of tool:** Programming language.
- **Availability:** Open-source, with thousands of free libraries.
- **Used for:** Everything from data scraping to analysis and reporting.
- **Pros:** Easy to learn, highly versatile, widely-used.
- **Cons:** Memory intensive—doesn't execute as fast as some other languages.



R



- **Type of tool:** Programming language.
- **Availability:** Open-source.
- **Mostly used for:** Statistical analysis and data mining.
- **Pros:** Platform independent, highly compatible, lots of packages.
- **Cons:** Slower, less secure, and more complex to learn than Python.



Jupyter Notebook



- **Type of tool:** Interactive authoring software.
- **Availability:** Open-source.
- **Mostly used for:** Sharing code, creating tutorials, presenting work.
- **Pros:** Great for showcasing, language-independent.
- **Cons:** Not self-contained, nor great for collaboration.



Apache Spark



- **Type of tool:** Data processing framework.
- **Availability:** Open-source.
- **Mostly used for:** Big data processing, machine learning.
- **Pros:** Fast, dynamic, easy to use.
- **Cons:** No file management system, rigid user interface.



SAS



- **Type of tool:** Statistical software suite.
- **Availability:** Commercial.
- **Mostly used for:** Business intelligence, multivariate, and predictive analysis.
- **Pros:** Easily accessible, business-focused, good user support.
- **Cons:** High cost, poor graphical representation.



Microsoft Power BI



- **Type of tool:** Business analytics suite.
- **Availability:** Commercial software (with a free version available).
- **Mostly used for:** Everything from data visualization to predictive analytics.
- **Pros:** Great data connectivity, regular updates, good visualizations.
- **Cons:** Clunky user interface, rigid formulas, data limits (in the free version).



Tableau



- **Type of tool:** Data visualization tool.
- **Availability:** Commercial.
- **Mostly used for:** Creating data dashboards and worksheets.
- **Pros:** Great visualizations, speed, interactivity, mobile support.
- **Cons:** Poor version control, no data pre-processing.



KNIME



- **Type of tool:** Data integration platform.
- **Availability:** Open-source.
- **Mostly used for:** Data mining and machine learning.
- **Pros:** Open-source platform that is great for visually-driven programming.
- **Cons:** Lacks scalability, and technical expertise is needed for some functions.



APPLICATION OF ANALYTICS IN DIFFERENT FIELDS





Transportation



- ✓ Data analytics can be applied to help in improving Transportation Systems and intelligence around them. The predictive method of the analysis helps find transport problems like Traffic or network congestions.
- ✓ It helps synchronize the vast amount of data and uses them to build and design plans and strategies to plan alternative routes, reduce congestions and traffics, which in turn reduces the number of accidents and mis happenings.
- ✓ Data Analytics can also help to optimize the buyer's experience in the travels through recording the information from social media. It also helps the travel companies fixing their packages and boost the personalized travel experience as per the data collected



Logistics and Delivery



- ✓ There are different logistic companies like DHL, FedEx, etc that uses data analytics to manage their overall operations.
- ✓ Using the applications of data analytics, they can figure out the best shipping routes, approximate delivery times, and also can track the real-time status of goods that are dispatched using GPS trackers.
- ✓ Data Analytics has made online shopping easier and more demandable.
- ✓ **When a shipment is dispatched from its origin, till it reaches its buyers, every position is tracked which leads to the minimizing of the loss of the goods**



Web Search or Internet Web Results



The web search engines like Yahoo, Bing, Duckduckgo, Google uses a set of data to give you when you search a data.

- ✓ Whenever you hit on the search button, the search engines use algorithms of data analytics to deliver the best-searched results within a limited time frame.
- ✓ The set of data that appears whenever we search for any information is obtained through data analytics.
- ✓ The searched data is considered as a keyword and all the related pieces of information are presented in a sorted manner that one can easily understand.
- ✓ For example, **when you search for a product on amazon** it keeps showing on your social media profiles or to provide you with the details of the product to convince you by that product



Manufacturing



- ✓ Data analytics helps the manufacturing industries maintain their overall working through certain tools like prediction analysis, regression analysis, budgeting, etc.
- ✓ The unit can figure out the **number of products needed to be manufactured according to the data collected and analyzed** from the demand samples and likewise in many other operations increasing the operating capacity as well as the profitability



Security



- ✓ Data analyst provides utmost security to the organization, **Security Analytics is a way to deal with online protection** zeroed in on the examination of information to deliver proactive safety efforts.
- ✓ No business can foresee the future, particularly where security dangers are concerned, yet by sending security investigation apparatuses that can dissect security occasions it is conceivable to identify danger before it gets an opportunity to affect your framework and main concerned



Education



- ✓ Data analytics applications in education are the most needed data analyst in the current scenario.
- ✓ It is mostly used in **adaptive learning, new innovations, adaptive content**, etc. Is the estimation, assortment, investigation, and detailing of information about students and their specific circumstance, for reasons for comprehension and streamlining learning and conditions in which it happens.



Healthcare



- ✓ Applications of data analytics in healthcare can be utilized to channel enormous measures of information in seconds to discover treatment choices or answers for various illnesses.
- ✓ This won't just give precise arrangements dependent on recorded data yet may likewise give accurate answers for exceptional worries for specific patients.



Military



- ✓ Military applications of data analytics bring together an assortment of specialized and application-situated use cases.
- ✓ It empowers chiefs and technologists to make associations between information investigation and such fields as **augmented reality and psychological science** that are driving military associations around the globe forward



Insurance



- ✓ There is a lot of data analysis taking place during the insurance process. Several data, such as actuarial data and claims data, help insurance companies realize the risk involved in insuring the person.
- ✓ Analytical software can be used to **identify risky claims** and bring them before the authorities for further investigation



Digital Advertisement



- ✓ Digital advertising has also been transformed as a result of the application of data science.
- ✓ Data analytics and data algorithms are used in a wide range of advertising mediums, including **digital billboards in cities and banners on websites.**



Fraud and Risk Detection



- ✓ Detecting fraud may have been the first application of data analytics. They applied data analytics because they already had a large amount of customer data at their disposal.
- ✓ Data analysis was used to **examine recent spending patterns and customer profiles** to determine the likelihood of default. It eventually resulted in a reduction in fraud and risk.



Travel



- ✓ Data analysis applications can be used to improve the traveler's purchasing experience by analyzing social media and mobile/weblog data.
- ✓ Companies can use data on recent browse-to-buy conversion rates to create customized offers and packages that take into account the preferences and desires of their customers.



Communication, Media, and Entertainment



- ✓ When it comes to creating content for different target audiences, recommending content, and measuring content performance, organizations in this industry analyze customer data and behavioral data simultaneously.
- ✓ Data analytics is applied to collect and utilize customer insights and understand their pattern of social-media usage.



Energy and Utility



- ✓ Many firms involved in energy management use data analysis applications in areas such as smart-grid management, energy distribution, energy optimization, and automation building for other utility-based firms.



Assessment 1





References



1. João Moreira, Andre Carvalho, Tomás Horvath – “A General Introduction to Data Analytics” – Wiley -2018

Thank You