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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- Types







What Is Data Analytics?

- ✓ Data analytics is the science of analyzing raw data to make conclusions about that information.
- ✓ The techniques and processes of data analytics have been automated into mechanical processes and algorithms that work over raw data for human consumption.
- ✓ Data analytics help a business optimize its performance.



Understanding Data Analytics



- ✓ Data analytics is a broad term that encompasses many diverse types of data analysis.
- ✓ Any type of information can be subjected to data analytics techniques to get insight that can be used to improve things.
- ✓ Data analytics techniques can reveal trends and metrics that would otherwise be lost in the mass of information.
- ✓ This information can then be used to optimize processes to increase the overall efficiency of a business or system



Understanding Data Analytics



- ✓ For example, manufacturing companies often record the runtime, downtime, and work queue for various machines and then analyze the data to better plan the workloads so the machines operate closer to peak capacity.
- ✓ Data analytics can do much more than point out bottlenecks in production.
- ✓ Gaming companies use data analytics to set reward schedules for players that keep the majority of players active in the game. Content companies use many of the same data analytics to keep you clicking, watching, or re-organizing content to get another view or another click.



Understanding Data Analytics



- ✓ Data analytics is important because it helps businesses optimize their performances.
- ✓ Implementing it into the business model means companies can help reduce costs by identifying more efficient ways of doing business and by storing large amounts of data.
- ✓ A company can also use data analytics to make better business decisions and help analyze customer trends and satisfaction, which can lead to new—and better—products and services



How can data analytics improve business decisions?



- ✓ The ability to derive certain metrics or key performance indicators (KPIs) from data can be difficult. With data scattered throughout an organization, getting integrated information in a timely manner can also prove to be problematic.
- ✓ Typically, getting the desired information or insights your business needs to compete often takes too long and requires too much effort.
- ✓ This is often due to a probable lack of analytics capabilities. The data is readily available; but there is no available tool that provides fast access. If there were, data or business analysts could do rapid, self-service data visualization, and analysis. And again, the data is often scattered, which means staff must first manually gather the data before they can even start their analysis



What is self-service data preparation



- ✓ To get started using data analytics for your business, it's recommended that organizations begin by automating some of these processes using self-service data preparation. This is an integrated and built-in capability of analytics tools that document and automate the process so that it is repeatable—greatly reducing the time to analysis and results.
- ✓ With an autonomous solution, data-aware business analysts can spin up a secure and sharable data repository within minutes in just a few, simple steps. Businesses can then use the self-service data preparation capability within the analytics cloud platform to not only automate the data preparation process, but to also automatically populate a secure and sharable data repository. When data is updated, everyone will see those updates as they're made, solving the data consistency and security issue



History of data analytics and technology roadmap



- ✓ Historically, comparing statistics and analyzing data for business insights was a manual, often time-consuming exercise, with spreadsheets being the go-to tool.
- ✓ Starting in the 1970s, businesses began employing electronic technology, including relational databases, data warehouses, machine learning (ML) algorithms, web searching solutions, data visualization, and other tools with the potential to facilitate, accelerate, and automate the analytics process.



Data Analysis Steps



- ✓ The first step is to determine the data requirements or how the data is grouped. Data may be separated by age, demographic, income, or gender. Data values may be numerical or be divided by category.
- ✓ The second step in data analytics is the process of collecting it. This can be done through a variety of sources such as computers, online sources, cameras, environmental sources, or through personnel.
- ✓ Once the data is collected, it must be organized so it can be analyzed. This may take place on a spreadsheet or other form of software that can take statistical data.
- ✓ The data is then cleaned up before analysis. This means it is scrubbed and checked to ensure there is no duplication or error, and that it is not incomplete. This step helps correct any errors before it goes on to a data analyst to be analyzed





Predictive data analytics



- ✓ Predictive analytics may be the most commonly used category of data analytics. Businesses use predictive analytics to identify trends, correlations, and causation.
- ✓ The category can be further broken down into predictive modeling and statistical modeling; however, it's important to know that the two go hand in hand.



Predictive data analytics



- ✓ an advertising campaign for t-shirts on Facebook could apply predictive analytics to determine how closely conversion rate correlates with a target audience's geographic area, income bracket, and interests.
- ✓ From there, predictive modeling could be used to analyze the statistics for two (or more) target audiences, and provide possible revenue values for each demographic



Predictive data analytics



- ✓ **Examples**
- ✓ Risk Assessment
- ✓ Sales Forecasting
- ✓ Using customer segmentation to determine which leads have the best chance of converting
- ✓ Predictive analytics in customer success teams
- ✓ **Techniques**
- ✓ Linear Regression
- ✓ Time series analysis and forecasting
- ✓ Data Mining



Prescriptive data analytics



- ✓ Prescriptive analytics is where AI and big data combine to help predict outcomes and identify what actions to take.
- ✓ This category of analytics can be further broken down into optimization and random testing.
- ✓ Using advancements in ML, prescriptive analytics can help answer questions such as “What if we try this?” and “What is the best action?” You can test the correct variables and even suggest new variables that offer a higher chance of generating a positive outcome



Diagnostic data analytics



- ✓ Diagnostic data analytics help answer why something occurred. Like the other categories, it too is broken down into two more specific categories: discover and alerts and query and drill downs.
- ✓ Query and drill downs are used to get more detail from a report. For example, a sales rep that closed significantly fewer deals one month. A drill down could show fewer workdays, due to a two-week vacation.



Diagnostic data analytics



- ✓ Discover and alerts notify of a potential issue before it occurs, for example, an alert about a lower amount of staff hours, which could result in a decrease in closed deals.
- ✓ You could also use diagnostic data analytics to “discover” information such as the most-qualified candidate for a new position at your company.



Diagnostic data analytics



- ✓ Business applications of diagnostic analysis include:
- ✓ A freight company investigating the cause of slow shipments in a certain region
- ✓ A SaaS company drilling down to determine which marketing activities increased trials



Descriptive data analytics



- ✓ Descriptive analytics are the backbone of reporting—it's impossible to have business intelligence (BI) tools and dashboards without it. It addresses basic questions of “how many, when, where, and what.”
- ✓ Once again, descriptive analytics can be further separated into two categories: **ad hoc reporting** and **canned reports**.
- ✓ A **canned report** is one that has been designed previously and contains information around a given subject. An example of this is a monthly report sent by your ad agency or ad team that details performance metrics on your latest ad efforts.



Descriptive data analytics



- ✓ **Ad hoc reports**, on the other hand, are designed by you and usually aren't scheduled. They are generated when there is a need to answer a specific business question.
- ✓ These reports are useful for obtaining more in-depth information about a specific query. An ad hoc report could focus on your corporate social media profile, examining the types of people who've liked your page and other industry pages, as well as other engagement and demographic information.
- ✓ Its hyper specificity helps give a more complete picture of your social media audience. Chances are you won't need to view this type of report a second time (unless there's a major change to your audience)



Descriptive data analytics



- ✓ Business applications of descriptive analysis include:
- ✓ KPI dashboards
- ✓ Monthly revenue reports
- ✓ Sales leads overview



Business-driven insights and dealing with a fast-paced market



- i. Who your customers are and how to reach them
- ii. The market, including competitors
- iii. What has happened in the past
- iv. What's happening now
- v. What the future holds for your business



Assessment 1



you can drive better decisions by getting deeper insights about the previous problem





References



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

Thank You