INTRAIN TECH
ITT

DATA ANALYTICS WITH   DATA SCIENCE

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Session - 1

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TABLE OF CONTENT

- **Introduction to Data Analytics:**
- **Why is Data Analytics Important?**
- **Key Steps in Data Analytics**
- **Tools and Technologies**
- **Career for data analys**
- **Power BI Overview:**
- **Different components of power bi**
- **Power bi interface**
- **Data sources**
- **Connecting to Data Sources in Power BI**

INTRODUCTION TO DATA ANALYTICS

Data analytics is the process of examining, cleaning, transforming, and interpreting data to derive meaningful insights and support decision-making. It is a critical component of modern business and scientific processes, as it helps organizations and individuals make informed choices, identify trends, and solve complex problems.

It plays a central role in data-driven decision-making, helping organizations gain a competitive edge, optimize processes, and better understand their customers and operations.

data analytics is becoming increasingly essential in many aspects of our daily lives.

WHY IS DATA ANALYTICS IMPORTANT

Data analytics is crucial in today's world as it enables organizations to make informed decisions by collecting, analyzing, and interpreting data effectively.

It helps identify patterns and trends, gain insight into customer behavior, and understand market trends, leading to optimized processes, improved customer experiences, and increased profits.

Data analytics is also help researchers and scientists to analyze large datasets. It is used in various fields, including healthcare, finance, marketing, and more.

In summary, data analytics is essential for making data-driven decisions

ESSENTIAL STEPS IN DATA ANALYTICS

Data analytics is make informed decision-making. To use data effectively, define the problem, collect and clean data, analyze it, and communicate results for actionable insights to solve business problems.

TO MAKE THE MOST OF DATA ANALYTICS,

- Firstly, define the problem you are trying to solve.
- This will help you identify the data you need to collect and the analysis you need to perform.
- Once you have collected the data, you need to clean and prepare it for analysis.
- This step is critical to ensure that the data is accurate and reliable.
- Once the data is clean, you can start analyzing it.
- There are a variety of tools and techniques that can be used to analyze data, from simple charts and graphs to complex machine learning algorithms.
- Finally, it is important to communicate the results of your analysis in a clear and concise manner. This will help you to identify actionable insights that can be used to solve business problems and drive growth.

TOOLS AND TECHNOLOGIES FOR DATA ANALYTICS

Microsoft Excel: Excel is a widely used tool for basic data analysis and visualization. It's user-friendly and readily available, making it accessible to many users.

Python: Python is a versatile and popular programming language for data analytics. Libraries like NumPy, Pandas, Matplotlib, and Seaborn provide robust capabilities for data manipulation, analysis, and visualization.

SQL (Structured Query Language): SQL is essential for managing and querying relational databases. Tools like MySQL, PostgreSQL, and Microsoft SQL Server are commonly used for data retrieval and manipulation.

Power BI: Microsoft Power BI is another popular data visualization and business intelligence tool that connects to various data sources, enabling interactive and visually appealing reports and dashboards.

The cloud provides the infrastructure, services, and tools needed to efficiently and effectively manage and analyze data, making it an essential part of modern data analytics strategies.

JOBS FOR DATA ANALYS

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JOBS IN DATA ANALYSIS ROLES LIKE:

Data Analyst: Collects, cleans, and interprets data to provide actionable insights for decision-making.

Business Analyst: Focuses on analyzing business processes and data to improve operations and strategy.

Data Scientist: Utilizes advanced statistical and machine learning techniques to extract insights and build predictive models.

Quantitative Analyst (Quant): Works in finance to analyze data and develop mathematical models for risk assessment and trading strategies.

Market Research Analyst: Gathers and analyzes market data to help organizations understand customer behavior and trends.

Financial Analyst: Examines financial data to guide investment decisions, assess risk, and forecast financial performance.

Healthcare Data Analyst: Analyzes healthcare data to improve patient outcomes and optimize healthcare processes.

Marketing Analyst: Analyzes marketing data to measure campaign effectiveness and customer behavior.

Operations Analyst: Focuses on optimizing processes and operations by analyzing data to increase efficiency.

Quality Assurance Analyst: Ensures product and service quality by analyzing and improving processes.

Social Media Analyst: Analyzes social media data to understand audience engagement and sentiment.

Retail Analyst: Examines sales and customer data to improve inventory management and customer satisfaction.

Sports Analyst: Analyzes sports data for performance evaluation, strategy development, and fan engagement.

Environmental Data Analyst: Analyzes environmental data to assess impact and develop sustainable solutions.

Government Data Analyst: Works with government agencies to analyze data for policy-making and program evaluation.

Educational Data Analyst: Analyzes educational data to improve student performance and educational programs.

Supply Chain Analyst: Optimizes supply chain operations by analyzing data related to logistics and inventory.

Fraud Analyst: Identifies and prevents fraudulent activities by analyzing transaction and behavior data.

Agricultural Data Analyst: Analyzes agricultural data for crop management and resource optimization.

THESE ROLES ARE IN HIGH DEMAND ACROSS VARIOUS INDUSTRIES DUE TO THE INCREASING IMPORTANCE OF DATA-DRIVEN DECISION-MAKING.

POWER BI OVERVIEW

Power BI is a business analytics service that allows you to visualize and analyze data. It provides a suite of tools that enable you to create interactive reports, dashboards, and visualizations that can be easily shared with others.Its user-friendly interface and powerful features make it a popular choice for businesses of all sizes.

Power BI can connect to a wide range of data sources, including Excel spreadsheets, cloud-based,databases and and on-premises data sources, and popular business applications. Once connected, you can transform and clean the data to prepare it for analysis.

Power BI also offers a wide range of features for data preparation, including data cleansing, transformation, and modeling. This makes it easy for users to clean and transform raw data into a format that is ready for analysis.

One of the key benefits of Power BI is its ability to quickly uncover insights and trends within data. Users can create custom calculations and measures, and use machine learning algorithms to gain deeper insights into their data.

DIFFERENT COMPONENTS OF POWER BI

Power BI Desktop: Power BI Desktop is the primary authoring and design tool. Users can connect to various data sources, build data models, create reports, and design interactive visualizations within this desktop application. It's where most of the report creation and data modeling work happens.

Power BI Service (Power BI Online): Power BI Service is the online counterpart to Power BI Desktop. It allows users to publish and share reports and dashboards created in Power BI Desktop. It offers cloud-based collaboration, sharing, and report consumption features. Users can access Power BI Service through a web browser.

Power BI Mobile: Power BI Mobile is a set of mobile applications for various platforms (iOS, Android, Windows) that allow users to access and interact with Power BI reports and dashboards on their mobile devices. It provides a responsive and touch-friendly experience.

Power Query: Power Query is an ETL (Extract, Transform, Load) tool that is integrated into Power BI. It enables users to connect to various data sources, transform and shape data, and load it into Power BI for analysis. Power Query helps clean, merge, and reshape data.

Power Pivot: Power Pivot is an in-memory data modeling component that allows users to create relationships between tables, perform data calculations, and build complex data models within Power BI. It's particularly useful for handling large datasets.

Power View: Power View is a component for creating interactive data visualizations within Power BI. While it's less commonly used than Power BI Desktop, it offers simple drag-and-drop capabilities for basic report building

POWER BI INTERFACE

Power BI Desktop:

When working in Power BI Desktop (the application for building reports and data models), you'll find the following main areas:

TITLE BAR	displaying the name and controls for managing the window or application.
MENU BAR	The menu bar is a graphical user interface element that displays a list of commands
RIBBON:	a ribbon is a graphical control element in the form of a set of toolbars placed on several tabs.
CANVAS:	where you create and design visualizations, reports, and dashboards by adding elements such as charts, tables, and images.
FILTERS PANE	Filters Pane in Power BI allows users to apply filter conditions to the data
VISUALIZATIONS PANE:	where you select and configure different types of visual elements, such as charts and graphs, to build interactive reports and dashboards.

FIELDS PANE: its displays the available data fields and measures from your dataset, making it easy to drag and drop them onto your report canvas for visualization and analysis.

REPORT VIEW   the report view is the section where users interact with and explore data through visualizations and dashboards.

DATA VIEW/TABLE VIEW   tabular representation of your data, displaying rows and columns, making it easy to examine, filter, and manipulate the data within your report.

MODEL VIEW   displays the underlying data model, including tables, relationships, and measures, allowing users to manage and customize their data structure for analysis and reporting.

FORMULA BAR: the Formula Bar in Power BI allows you to input and view DAX formulas in a single line, and you can expand or collapse the Formula Bar as needed to see more or less of your formula.

PAGE TABS: page tabs are a user interface element used to organize and navigate between different pages or sections within a repor

DATA SOURCES

DATABASES

SQL Server,MySQL,Oracle Database,PostgreSQL,IBM Db2,Amazon Redshift,Snowflake,Teradata,Google Big Query,Many other relational databases

ONLINE SERVICES

SharePoint Online,Dynamics 365,Salesforce,Google Analytics,Adobe Analytics,Azure Data Lake Storage,Azure SQL Database,Azure Cosmos DB,AWS services (e.g., Amazon S3, Amazon RDS)

FILES

Excel workbooks,CSV files,XML files,JSON files,Text files,PDF files (using Power Query for PDF)

WEB DATA

Web pages (HTML),Web services and APIs (e.g., REST APIs) OData feeds

ON-PREMISES DATA SOURCES

On-premises SQL Server,On-premises Oracle Database,On-premises file shares

BIG DATA AND NOSQL

Hadoop HDFS,Spark,MongoDB,Cassandra,Hive

CLOUD STORAGE

Azure Blob Storage,Amazon S3

DATA WAREHOUSES

Azure Synapse Analytics (formerly SQL Data Warehouse),Snowflake

WEB SERVICES

SharePoint Online lists,SharePoint Server lists,Web services and APIs

ONLINE SERVICES AND CONTENT PACKS:

Online services like Google Analytics and Salesforce often offer pre-built content packs for Power BI that simplify data connection and reporting.

POWER PLATFORM

Data from Power Apps and Power Automate (formerly Flow) can be easily connected to Power BI.

CUSTOM DATA CONNECTORS

Power BI allows developers to create custom data connectors for specialized data sources or APIs.

CONNECTING TO DATA SOURCES IN POWER BI

To connect with data sources in Power BI, you typically follow these steps. These steps may vary depending on the specific data source and your version of Power BI:

OPEN POWER BI DESKTOP:

Start by launching Power BI Desktop, which is the application used for creating reports and data models.

CLICK ON "GET DATA"

On the Home tab of Power BI Desktop, click the "Get Data" button. This opens the Get Data window, where you can choose your data source.

SELECT A DATA SOURCE

In the Get Data window, you'll see a list of data source categories, such as "Database," "File," "Online Services," and more. Select the category that matches your data source. For example:

If you are connecting to a SQL Server database, choose "Database" and then "SQL Server."
If you are loading data from an Excel workbook, choose "File" and then "Excel."

CONFIGURE CONNECTION DETAILS:

Depending on your choice, you will need to configure the connection details. This may include specifying the server name, database name, file path, or other connection parameters. Enter the required information and, if necessary, provide credentials (username and password) to access the data source.

LOAD DATA OR TRANSFORM DATA:

After establishing the connection, you'll see a Navigator window that displays available tables, views, or files within the data source. Select the data you want to use and click "Load" to bring it into Power BI. Alternatively, you can choose "Transform Data" to apply data transformations in Power Query before loading the data.

Thank You