Introduction to Data Analytics

Evolution of Data Analytics

Learning Objectives

By the end of this lesson, you will be able to:

- Explain the impact of data analytics on accounting
- Explain data analytics and its life cycle
- Describe the various stages of data analytics
- Outline the benefits of data analytics

DATA AND
ARTIFICIAL INTELLIGENCE

Importance of Data Analytics

Data Analytics

- Data analytics is the science of extracting trends, patterns, and relevant information from raw data to draw conclusions.

- It has multiple approaches, multiple dimensions, and diverse techniques.

Why Data Analytics?

Data analytics helps in:

- Scientific decision making and effective business operations.
- Analyzing data, gaining profits, making better use of resources, and improving managerial operations.

DATA AND
ARTIFICIAL INTELLIGENCE

Problems with Traditional Accounting Methods

Problems with Traditional Accounting Methods

- Accounting was done in the form of notebooks. This was cumbersome and tedious.

- Use of excel sheets simplified accounting but did not solve all problems.

Problems with Traditional Accounting Methods

- SMBs and start-ups face issues in managing and tracking cash flow.
- A highly accurate and dependable solution is required for financial management in business.

Problems with Traditional Accounting Methods

- Difficulty in tracking small expenses such as one-time government tax and regular taxes.
- Requirement of a dedicated financial expert by SMBs and start-ups.
- Small business owners managing the role of an HR and payroll expert due to lack of resources or money.

Problems with Traditional Accounting Methods

- Interpreting and analyzing financial reports with traditional accounting methods was difficult.
- The available excel-based macros and pivot tables did not provide sufficient insight into the data.

Challenges in Traditional Accounting Methods

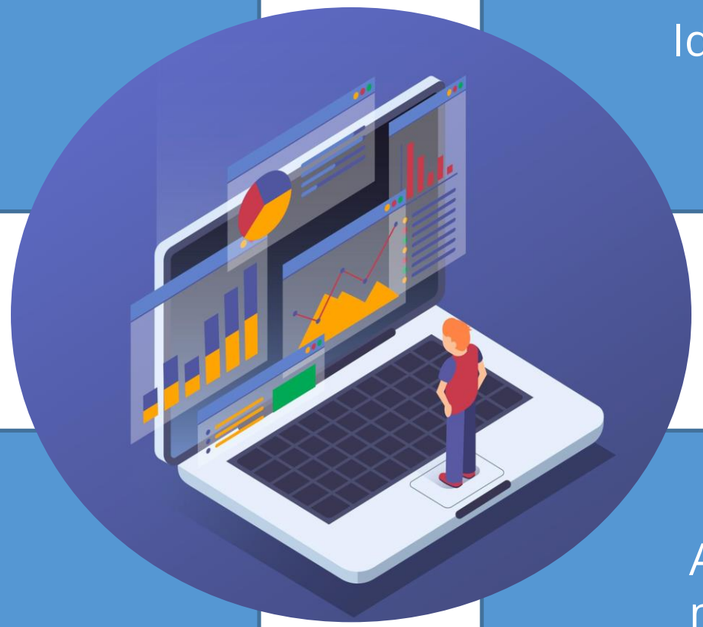
- How much inventory must be held?
- How many invoices are overdue?
- How much cash is tied up at work?
- How long does it take to get cash from the customers?

DATA AND
ARTIFICIAL INTELLIGENCE

Data Analytics: Impact on Accounting

Impact of Analytics on Accounting

- Uncovers valuable insights
- Identifies process improvements



- Helps in managing risks
- Adds value to the decision-making process

How Accountants Use Data Analytics

Auditors

- Deploy continuous monitoring
- Analyze and verify large data sets
- Few errors and precise recommendations

Tax accountants

- Use data science to analyze complex taxations
- Helps in faster investment decisions

Investment advisors

- Use big data to find behavioral patterns
- Identify investment opportunities
- Generate higher profit margins

DATA AND
ARTIFICIAL INTELLIGENCE

Data Analytics: Overview and Process Flow

Data Analytics: Definition

Data analytics is the process of examining and analyzing raw data sets to:

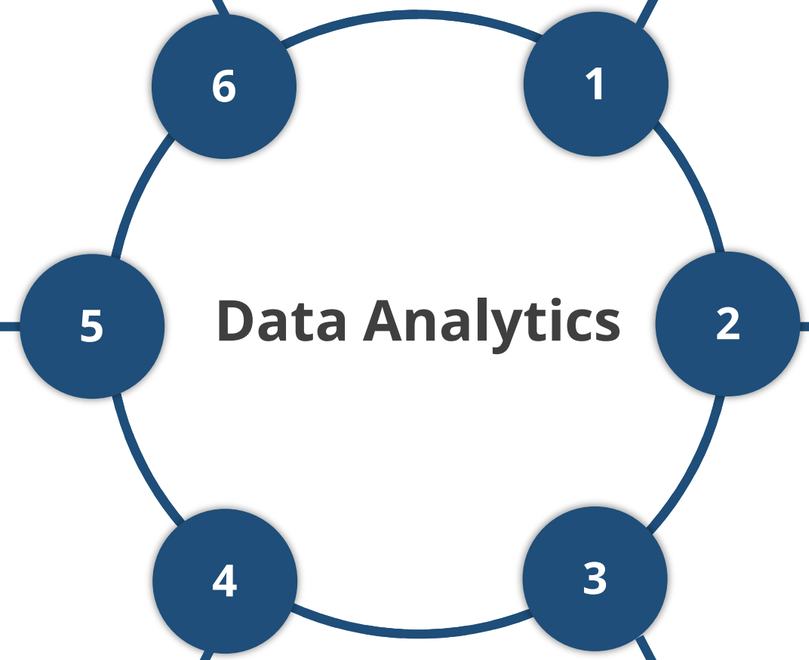
- Draw conclusions
- Derive more information
- Improve businesses, products, and services

In addition to making business decisions, it is used by data scientists and researchers to verify scientific models and theories.

Data Analytics: Process Flow

1. Define goals
2. Identify measurable metrics
3. List, collect, and extract data from sources
4. Explore and analyze data
5. Interpret and visualize data
6. Infer data for decision-making

Data Analytics Life Cycle



Discovery

Learn about business domain and assess available resources.

Data Preparation

Execute ELT (extract, load, and transform).

Model Planning

Identify techniques and data to understand variables relationship.

Model Building

Develop data sets for testing, training, and production.

Communicate Results

Identify key findings, business values, and develop narratives for stakeholders.

Operationalize

Deliver final reports, briefs, codes, and technical documents.

DATA AND
ARTIFICIAL INTELLIGENCE

Types of Data Analytics

Types of Data Analytics

The four main types of analytics based on the workflow and requirements of data analytics:

DATA AND
ARTIFICIAL INTELLIGENCE

Descriptive Analytics

Descriptive Analytics

- Descriptive analytics is designed to access information about the past.
- It focuses on the summarized view of facts.

- It is the conventional form of analytics.
- Its purpose is to summarize the findings.

Descriptive Analytics

- Data aggregation is the process of gathering and expressing information in a summarized form.
- Tools used for data aggregation include MS Excel, MATLAB, SPSS, and STATA.
- Company report is an example of descriptive analytics.

DATA AND
ARTIFICIAL INTELLIGENCE

Diagnostic Analytics

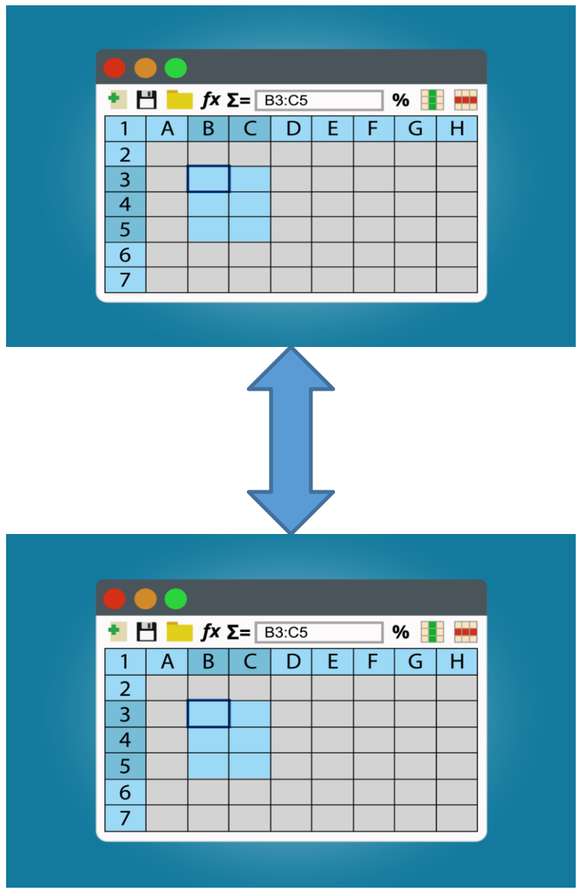
Diagnostic Analytics

- Diagnostic analytics helps you identify why something happened in the past.
- It takes a deeper look at data to understand the root cause of events.
- It has a limited ability to provide actionable insights.
- It provides an understanding of causal relationships and sequences.

Diagnostic Analytics Techniques

- Drill-down
- Data Discovery
- Data Mining
- Correlation

Diagnostic Analytics Techniques



- They can be used to discover a causal relationship between two or more data sets.
- Diagnostic analytics is helpful for those concerned with day-to-day operations.
- For example, It helps identify why a sales representative has sold fewer items than usual.

DATA AND
ARTIFICIAL INTELLIGENCE

Predictive Analytics

Predictive Analytics

Predictive analytics is used in:

- Predicting future outcomes in terms of probability of an event to occur
- Analyzing sentiments where all opinions posted on social media are collected to predict a person's sentiment
- Identifying target audience for a promotional campaign
- Forecasting weather, plan-failure prediction, and travel products recommender system

A predictive model is built on the preliminary descriptive analytics stage.

Predictive Analytics Tools

Machine learning algorithms such as random forests, SVM and statistics.

Trained data scientists and machine learning experts building these models

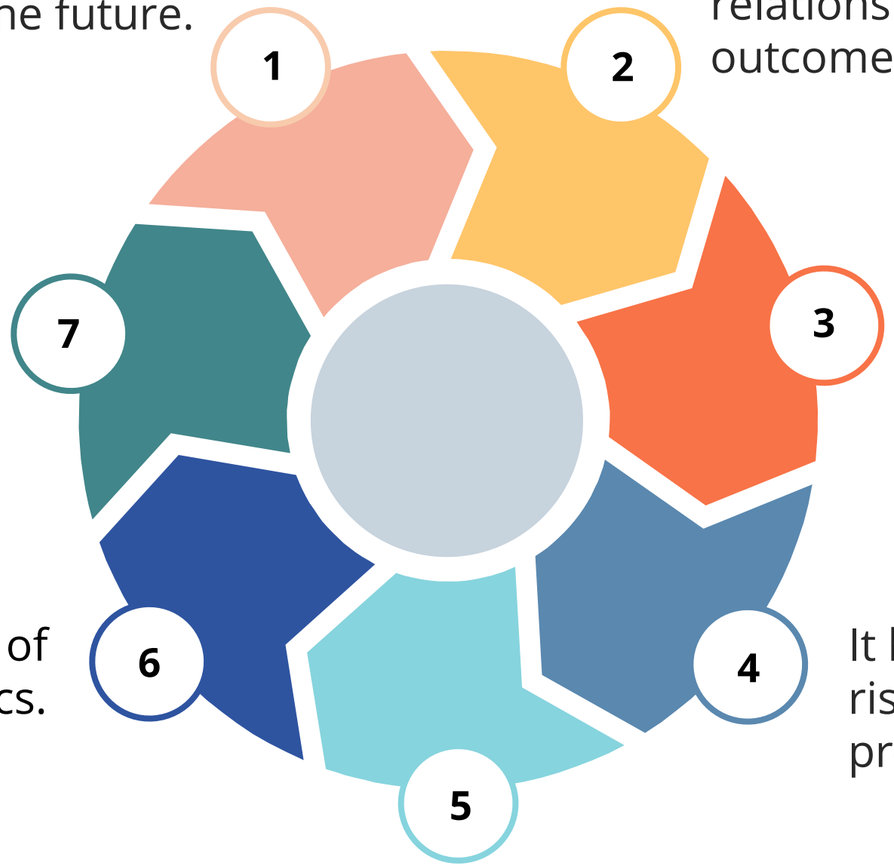
Popular tools for predictive analytics: Python, R and RapidMiner.

DATA AND
ARTIFICIAL INTELLIGENCE

Prescriptive Analytics

Prescriptive Analytics

1. Prescriptive analytics provides the solution for a prediction in the future.
2. It creates and updates the relationship between action and outcome using a feedback system.
3. It helps in making optimal recommendations during the decision-making process.
4. It helps in mitigating the possible risks based on the available predictive analytics.
5. It has the power to suggest favorable solutions and ease the decision-making process.
6. It is the final frontier of advanced analytics.
7. It is used by recommendation engines in companies.



Prescriptive Analytics

- Predictive analytics is at the budding stage of implementation and firms have not used its full potential.

- Advancements in predictive analytics is paving the way for its development.

DATA AND
ARTIFICIAL INTELLIGENCE

Types of Analytics: Example

Types of Analytics: Amazon Example

Diagnostic Analytics

- Amazon’s revenue increased in the West Coast during the past one year
- Increased spending on sales training

Predictive Analytics

- Purchase factors: price, time, weather, and festive seasons
- Predicted 10–12 percent increase in revenue

Types of Analytics: Amazon Example

Descriptive Analytics

- Spent $20M in different sales training the previous year

Prescriptive Analytics

- Sales trainings fetched good ROI
- Implemented a suitable optimization plan to maximize revenue

DATA AND
ARTIFICIAL INTELLIGENCE

Data Analytics Benefits: Decision-Making

Data Analytics Benefits: Decision-Making

- Companies use business analytics to enable faster and facts-based decision making.
- Data-driven organizations make better strategic decisions.
- Companies enjoy high operational efficiency, improved customer satisfaction, robust profit and revenue level.

Data Analytics Benefits: Decision-Making

Data analytics helps you define your target audience based on:

- Customer age group
- Customer preferences
- Location-based purchases
- Popular brands or products people seek

Data Analytics Benefits: Decision-Making

Data analytics in e-commerce helps:

- Manage inventory
- Forecast demands
- Identify shopping seasons
- Analyze customer sentiment
- Decide optimum prices

DATA AND
ARTIFICIAL INTELLIGENCE

Data Analytics Benefits: Cost Reduction

Data Analytics Benefits: Cost Reduction

- Data analytics helps understand shopper behavior by monitoring their browsing interest.
- Seller identifies shopping pattern and customer demand.
- Customer data helps companies minimize failed campaigns and reduce cost associated with them.

Data Analytics Benefits: Cost Reduction

Data analytics helps in reducing marketing and logistics cost.

Marketers use technologies to evaluate customer behavior and make strategic decisions.

Marketing campaigns use measured activities to plan campaigns.

Predictive analytics is used for better performance, higher ROI, and faster success.

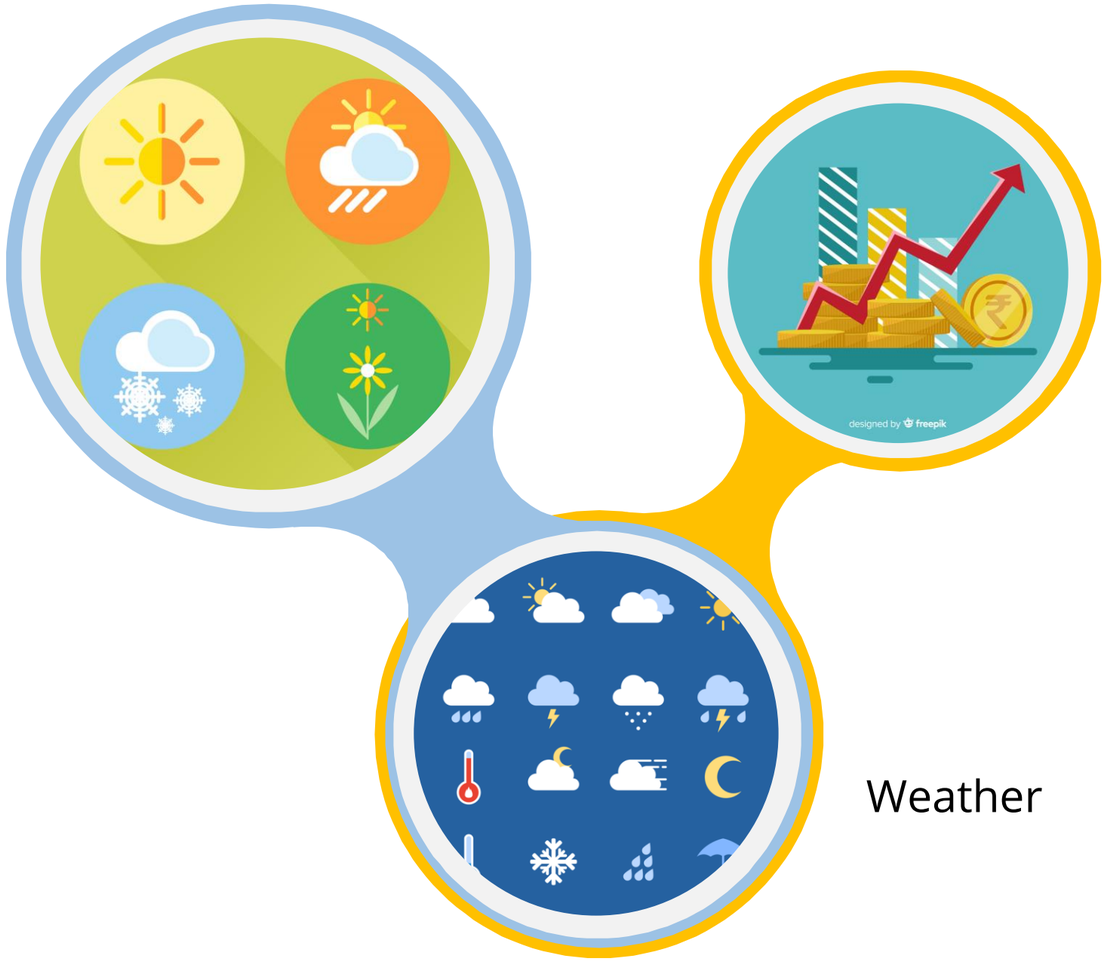
Use of Predictive Analytics for Logistics Management

Predictive analytics helps companies in logistics management by:

- Analyzing current and historical facts to make predictions
- Procuring products based on purchase history
- Organizing customers from shopping patterns and demographic details
- Planning inventory and offloading excess stock

Factors to Consider in Logistics Planning

Seasons



Economic conditions

Weather

Data provides several insights such as identifying products that people tend to buy in a particular season.

Data Analytics Benefits: Case Study

According to a study by IHL group, footwear and clothing worth $642.6 billion are returned to stores every year.

- Products are returned as consumers miss important information during the purchase.
- Critical information provided through a detailed product specification or product video can reduce the return rate.
- Data analytics help companies assess the possibility of reducing product return rate.

DATA AND
ARTIFICIAL INTELLIGENCE

Case Study: Amazon

Case Study: Amazon

Amazon uses data analytics to improve efficiency and reduce cost.

Predictive analytics helps to:

Predict what you buy

Anticipate shipping

Such predictions help increase sales and reduce shipping, inventory, and supply chain costs.

Case Study: Amazon

- Amazon has more than 200 fulfillment centers worldwide.
- Supply chain and logistics optimization help companies reduce cost and improve performance.
- Amazon uses data analytics for choosing the warehouse closest to the customer and reduces shipping costs by 10–40 percent.

Case Study: Amazon

- Amazon uses data analytics to attract customers and increase profits by an average of 25 percent annually.
- Prices are set based on customer activity on a website, competitors' pricing, and product availability.
- Product prices typically change every 10 minutes as data is updated and analyzed.
- Amazon typically offers discounts on the best-selling items and earns larger profits on less popular items.

DATA AND
ARTIFICIAL INTELLIGENCE

Data Analytics: Other Benefits

Data Visualization Tools

Power BI

Tableau

Logi

Visualization allows decision makers to see connections between multidimensional data.

It provides new ways to interpret data through graphical representations.

Other Benefits of Data Analytics

- Data analytics helps in Identifying potential opportunities to streamline operations.
- It identifies potential problems and gives time to take actions.
- It allows companies to identify operations that yield the best results.
- It identifies and improves error-prone operational areas.

Other Benefits of Data Analytics

- Organizations implement data analytics in product or service development.
- Data analytics helps in understanding current state of business.
- It provides valuable insights to predict future outcomes.
- It helps businesses align new process or products with market needs.
- Data analytics tools are capable of handling heterogeneous data and providing insights.

Key Takeaways

- Data analytics is the process of examining and analyzing raw data sets to derive information and improve business.
- Discovery, data preparation, model planning, model building, communicate results, and operationalize are the six steps of data analytics life cycle.
- The four stages of data analytics are descriptive analytics, diagnostic analytics, predictive analytics, and prescriptive analytics.