Data Analytics

Lesson 06.

Predictive Analytics

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Scholar: https://scholar.google.com/citations?user=kHZvlTkAAAAJ&hl=en&oi=ao

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Learning materials

- Textbook
  - Evans, J. (2016) Business Analytics. 2nd edn. Pearson.
  - Runkler, T. (2016) Data Analytics: Models and Algorithms for Intelligent Data Analysis. 2nd edn. Vieweg+Teubner Verlag.

- Online reference materials
  - archive.ics.uci.edu/ml/
  - powerbi.microsoft.com
  - https://github.com/topics/data-analysis-python
  - https://media.pearsoncmg.com/ph/esm/esm_evans_eba3e_20/tools/eba3e_analytic_solver.html
  - https://data.imf.org/

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Agenda

- Lesson 1: Understanding Data Analytics Terminologies.
- Lesson 2: Foundation of Business Analytics
- Lesson 3: Visualizing and Exploring data
- Lesson 4: Applying Descriptive Analytic Techniques
- Lesson 5: Data Modeling
- Lesson 6: Predictive Analytics
- Lesson 7: Regression, Classification and Clustering
- Lesson 8: Forecasting Techniques
- Lesson 9: Investigating Predictive Analytic Techniques
- Lesson 10: Introduction to Data Mining
- Lesson 11: Demonstrating Prescriptive Analytic Methods
- Lesson 12: Recap and advanced topics

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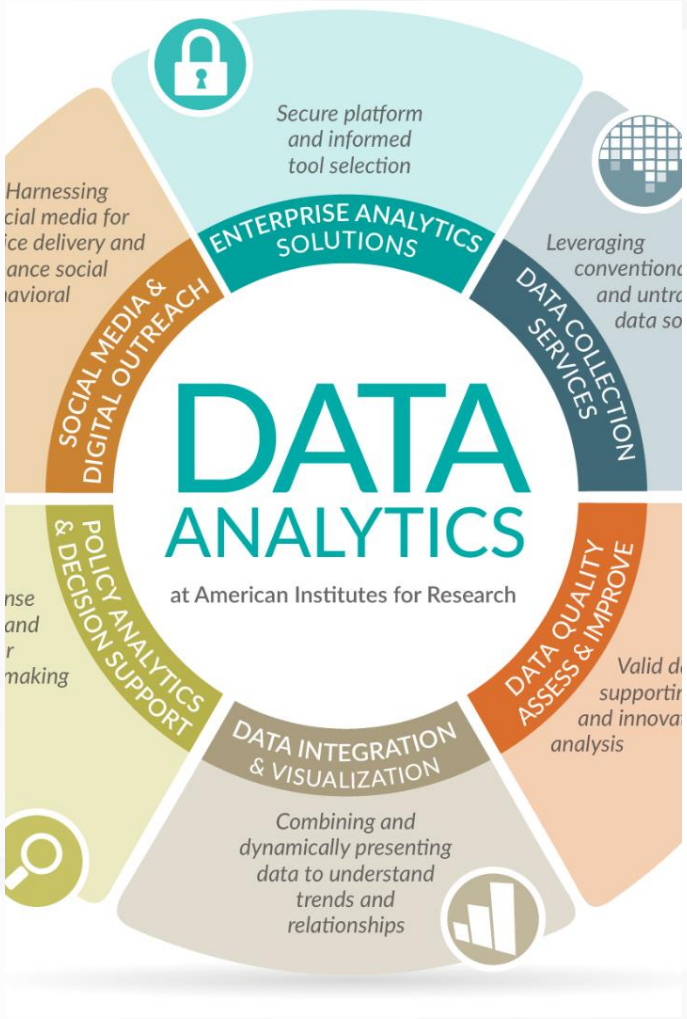

Predictive data analytics is the practice of extracting valuable insights from data to make informed decisions and improve outcomes. Discover the power of data-driven decision-making.

Definition & Importance

1 Definition

Predictive data analytics involves using historical data to identify patterns and trends, and using that information to predict future outcomes.

2 Importance

Predictive data analytics enables organizations to gain a competitive edge by making data-driven decisions, uncovering hidden opportunities, and mitigating risks.

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Predictive Analytics

Benefits

Improved Forecasting

Predictive data analytics allows businesses to forecast future trends and behaviors accurately, enabling effective planning and decision-making.

Enhanced Decision-Making

By leveraging data insights, decision-makers can make informed choices, leading to more successful outcomes and optimized performance.

Increased Efficiency

With predictive analytics, businesses can streamline operations, reduce costs, and optimize resource allocation, resulting in improved efficiency and productivity.

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Implementation Steps

1 Data Collection & Preprocessing

Identify relevant data sources, gather data, and preprocess it by cleaning, transforming, and integrating various datasets.

2 Model Selection & Training

Choose appropriate predictive models based on the data characteristics and train them to identify patterns and make accurate predictions.

3 Evaluation & Validation

Assess the performance of the predictive models using evaluation metrics and validate their accuracy by testing them on new data.

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Predictive Analytics

Real-World Applications

Sales & Marketing

Predictive analytics helps businesses optimize marketing campaigns, understand customer behavior, and identify potential sales opportunities.

Finance & Investment

Predictive analytics aids in portfolio management, fraud detection, risk assessment, and improving investment decision-making.

Healthcare & Medicine

Predictive analytics plays a crucial role in patient diagnosis, predicting disease outbreaks, and optimizing treatment plans.

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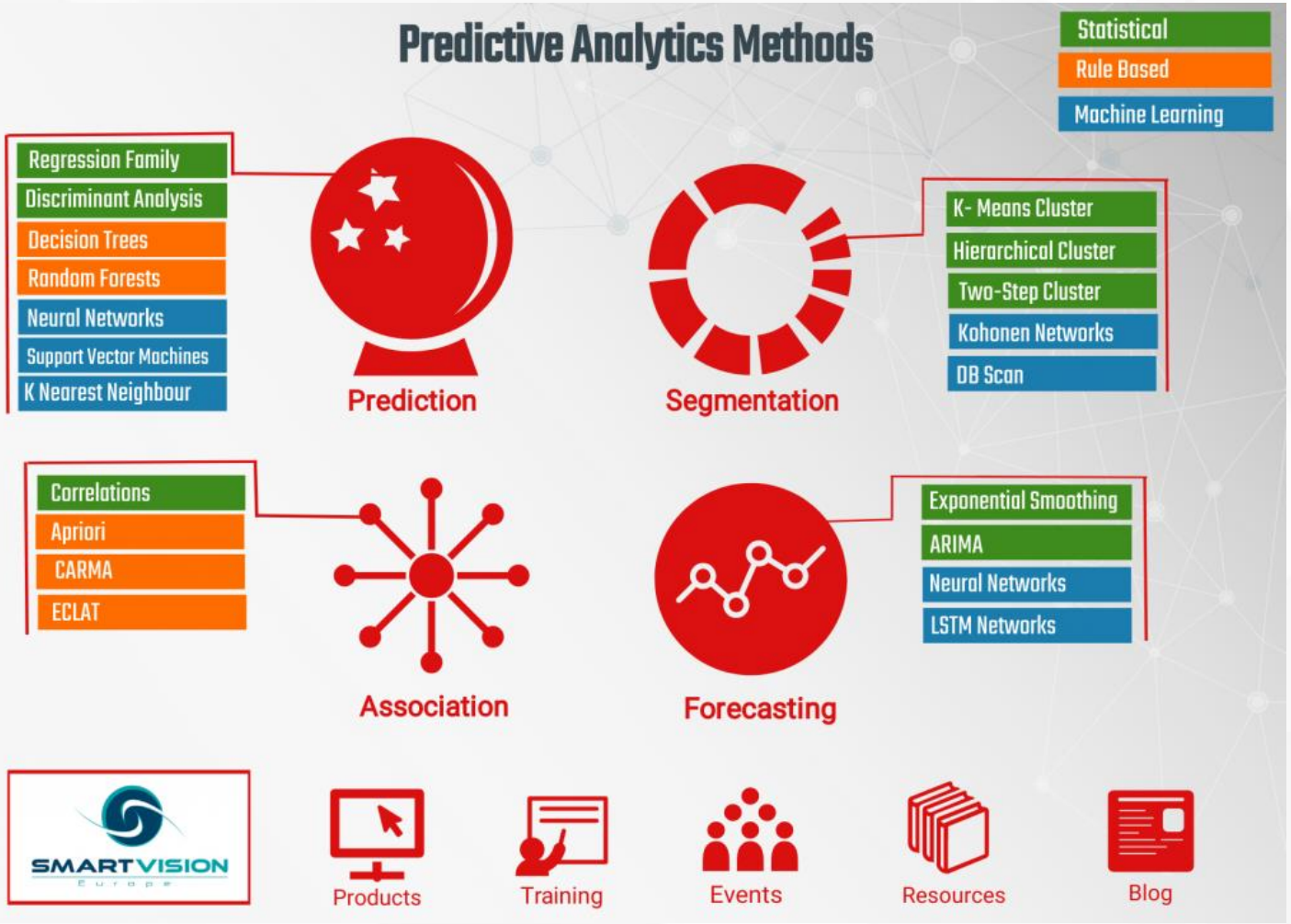
Predictive Analytics

- **Prediction** encompasses applications that aim to estimate or predict the values of a key target field.
- **Segmentation** refers to techniques such as cluster analysis which attempt to find the most ‘naturally occurring” groups within a dataset.
- **Association** modelling discovers groups of categories that are likely to co-occur such as items in a shopping basket.
- **Forecasting** refers to methods that extrapolate time trends such as sales of products so businesses can anticipate future demand.



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Steps in Data Modeling

1

Requirement Gathering

Understand business needs, data sources, and user requirements before starting the data modeling process.

2

Conceptual Data Modeling

Create a high-level view of entities, relationships, and attributes to capture business concepts.

3

Logical Data Modeling

Translate business concepts into a detailed data structure using entity-relationship diagrams.

4

Physical Data Modeling

Implement the logical model by defining data types, constraints, and physical storage considerations.

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Google classroom task

- **What is predictive analytics? Transforming data into future insights**
  https://www.youtube.com/watch?v=cVibCHRSxB0.
  - Watch and investigate.
  - Submit your answer:
    - YouTube Link
    - List down predictive analytic techniques/ model and application
    - Short explain Decision Tree, Regression..

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Predictive Analytics

1.What is Predictive Analytics?

A. Analyzing past events B. Anticipating future outcomes

C. Summarizing current data D. Describing historical trends

2. What is a "Predictive Model" in Predictive Analytics?

A model that explains past events B. A model for visualizing data

C. A statistical model used for making predictions D. A model used for data aggregation

3. What is "Feature Engineering" in the context of Predictive Analytics?

A. Building physical models B. Creating new data features

C. Selecting predictive algorithms D. Analyzing historical data

4. Define "Overfitting" in Predictive Analytics.

A. Model fits the data too closely B. Model is too simple

C. Model fails to generalize D. Model predicts accurately

5.What is the purpose of "Cross-validation" in Predictive Analytics?

A. Validating historical data B. Testing a model's performance on new data

C. Analyzing data from different sources D. Selecting features for a model

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Learning Mission

60 mins

Brief Evaluation Exercise: Utilize Excie.org, julius.ai, Python, Google Data Studio, and Word Cloud for the analysis of Superstore_Sales and an additional dataset. Respond to the following prompts:

1. Produce 5 charts utilizing Excie.org and 5 charts with Julius.ai, accompanied by your interpretations.
2. Develop a dashboard using Google Data Studio.
3. Implement Python code for computing mean, median, mode, variance, and standard deviation, and provide an explanation of their significance in this context.
4. Craft Python code to generate 5 charts.
5. Create a word cloud.

Compile all responses into a comprehensive document for submission.

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Learning Mission

30 mins

Reading Business Analytics textbook: Chapter 10, page 301 – 340.

Discussion and answer:

What is data mining and its application?

- Data mining concept
- Data mining application
- Data mining process
- Give an example
- Classification vs. Clustering

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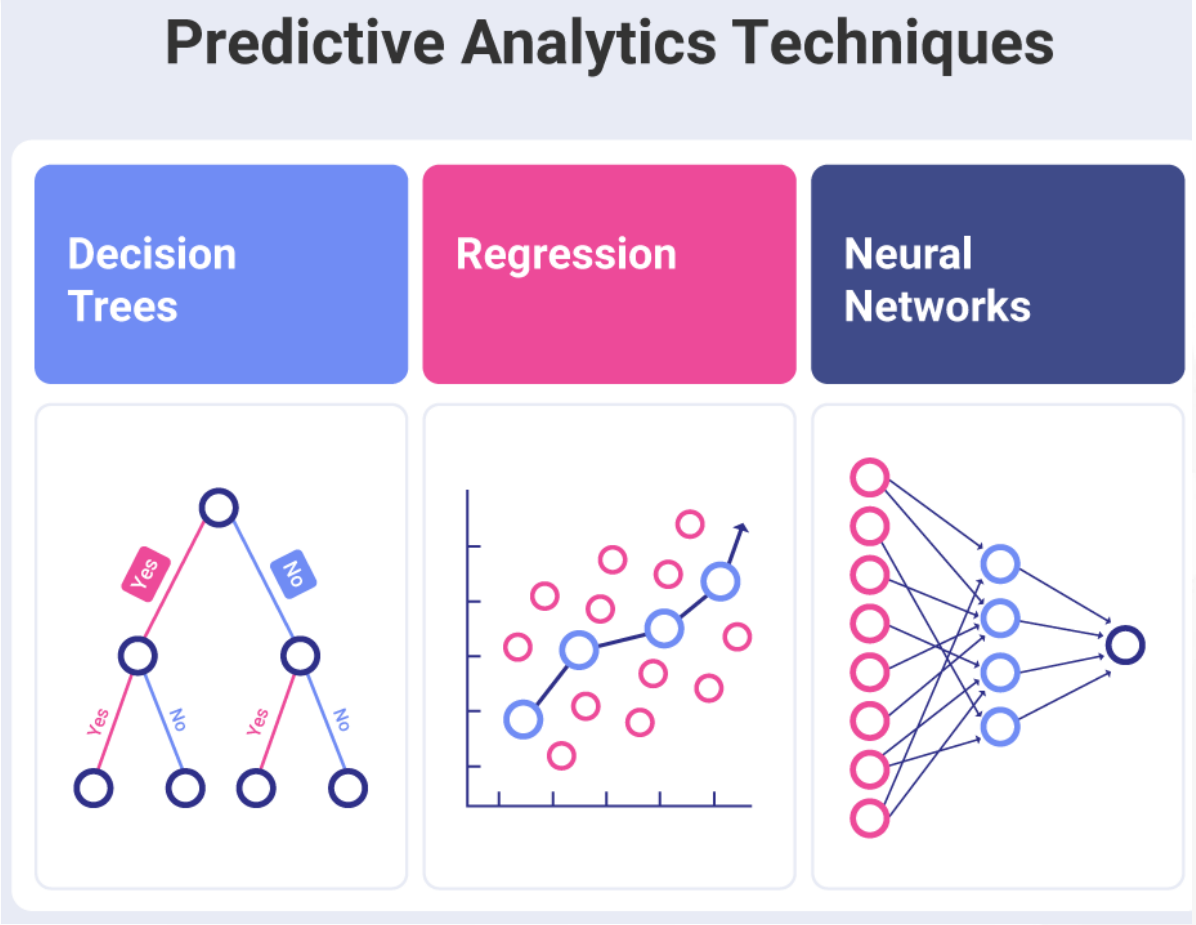
Conclusion and Questions

- Predictive Analytics
- Predictive analytics. A component of business analytics that seeks to predict the future by examining historical data, detecting patterns or relationships in these data, and then extrapolating these relationships forward in time.
- Prescriptive analytics. A component of business analytics that uses optimization to identify the best alternatives to minimize or maximize some objective



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Thank you