Data Analytics

Lesson 11.

Demonstrating Prescriptive Analytic Methods

Dr. Hai Tran

hai.tran@sbsuni.edu.vn

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

Co-Founder: XAI - https://xai.foo/

Saigon Business School

In partnership with

Saigon Business School

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/

Saigon Business School

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

Saigon Business School

Demonstrating Prescriptive Analytic Methods

Prescriptive analytics is a powerful approach that enables organizations to optimize decision-making processes. In this presentation, we will explore the definition, key concepts, real-world applications, benefits, and challenges of prescriptive analytics. Join us on this journey!

Companies desire to layer prescriptive analysis on top of predictive methods. The idea is to maximize the use of data to predict what might occur and then act upon that prediction to deliver the optimized outcome for the business.

https://www.arcweb.com/industry-best-practices/how-prescriptive-analytics-defined

Prescriptive analytics is a form of advanced analytics that examines data or content to answer the question "What should be done?" or "What can we do to make __ happen?", and is characterized by techniques such as graph analysis, simulation, complex event processing, neural networks, recommendation engines, heuristics, and machine learning.

Saigon Business School

Demonstrating Prescriptive Analytic Methods

Real-World Applications

Supply Chain Optimization

Prescriptive analytics helps organizations optimize their supply chain operations, improving efficiency and reducing costs.

Pricing and Revenue Management

Prescriptive analytics enables companies to set optimal pricing strategies, maximizing revenue and profit.

Risk Analysis and Mitigation

Prescriptive analytics assists in identifying and mitigating potential risks, enabling proactive decision-making.

Saigon Business School

Demonstrating Prescriptive Analytic Methods

- Some Prescriptive Analytics examples in real life are as follows:
- **American Airlines:** American Airlines uses prescriptive analytics to optimize its flight scheduling and crew assignments. By analyzing historical flight data, weather patterns, and crew availability, the airline can make informed decisions on flight routes, departure times, and crew assignments. This helps them minimize delays, reduce costs, and improve customer satisfaction by ensuring efficient flight operations.
- **Starbucks:** Starbucks utilizes prescriptive analytics to optimize its store locations and staffing levels. By analyzing data on customer demographics, foot traffic, sales patterns, and local market trends, Starbucks can determine the most suitable locations for new stores and optimize staffing schedules to align with customer demand. This enables the company to enhance customer experience and maximize profitability.
- **Amazon:** Amazon utilizes prescriptive analytics in its fulfillment centers to optimize inventory management and order fulfillment. By analyzing real-time data on customer orders, inventory levels, and warehouse operations, Amazon can determine the most efficient picking routes, storage locations, and inventory replenishment strategies. This helps them reduce delivery times, minimize stockouts, and improve overall operational efficiency.

Saigon Business School

Demonstrating Prescriptive Analytic Methods

Prescriptive Analytics Benefits

Ultimately, prescriptive analytics helps you make better decisions about what your next course of action should be. This can involve any aspect of your business, such as increasing revenue, reducing customer churn, preventing fraud, and increasing efficiency. Here are the key benefits in more detail:

Make data-driven, not instinct-driven decisions. Through advanced algorithms and machine learning, prescriptive analytics recommends a specific course of action based on a wide variety of factors including historical and current performance, available resources, and probability-weighted projections and scenarios. This lowers the chance for human bias or error.

Simplify complex decisions. Prescriptive analysis simulates a variety of scenarios and provides the probability of different outcomes, both immediate to long term. This makes it much easier for you to not only understand the specific recommendation from the tool but also know the probability of a worst-case scenario and incorporate that into your plans.

Focus on execution rather than making decisions. Your organization is likely flooded with data from a wide variety of sources. And the pace of business today requires you to move fast. The best prescriptive analytics tools first break down data silos to analyze an integrated data set and then provide instant, specific recommendations on your best course of action. This allows you to focus your effort on executing the plan.

Saigon Business School

Demonstrating Prescriptive Analytic Methods

1. What distinguishes prescriptive analytics from descriptive and predictive analytics in the data analytics hierarchy?

a. Historical analysis b. Future predictions

c. Proactive decision recommendations d. Real-time monitoring

2. How does prescriptive analytics contribute to decision-making processes within an organization?

a. Identifying patterns in historical data b. Offering insights into future trends

c. Providing actionable recommendations for optimal outcomes d. Summarizing current business performance

3. What is the primary goal of prescriptive analytics in terms of business strategy?

a. Analyzing past performance b. Automating routine tasks

c. Suggesting the best course of action to achieve desired outcomes d. Predicting market trends

4. In prescriptive analytics, what role do optimization algorithms play in decision support?

a. Identifying patterns b. Recommending actions

c. Finding the best possible decisions based on constraints and objectives d. Predicting future events

5. How does prescriptive analytics contribute to risk management in business operations?

a. Assessing historical trends b. Anticipating future market changes

c. Recommending risk mitigation strategies d. Describing current market conditions

Saigon Business School

Learning Mission

30 mins

Reading Business Analytics textbook: Chapter 16, page 556– 569.

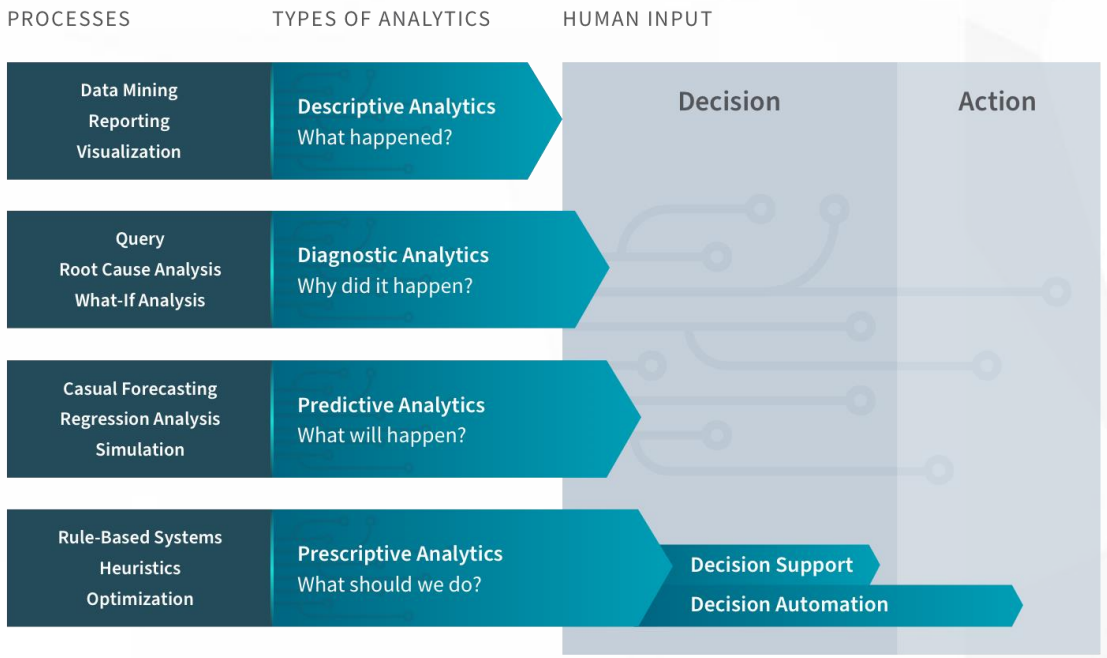
Discussion and answer: present in the table format.

Decision strategies without outcome probabilities vs.
Decision strategies with outcome probabilities

Saigon Business School

Conclusion and Questions

- **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



https://www.qlik.com/us/augmented-analytics/prescriptive-analytics

Saigon Business School

Thank you