Final Group Project Presentation

Topic: Advances in Data Analytics Technologies & Application

IEDE 2023 Data Analytics Presentation

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Objectives

1

The First Objective

To provide an overview of recent advances in data analytics technologies and their applications.

2

The Second Objective

To examine the potential benefits and challenges of these technologies.

3

The Third Objective

To propose solutions to specific issues such as data privacy and security.

Introduction

Data analytics is the science of analyzing raw data in order to make conclusions about that information. Many of the techniques and process of data analytics have been automated into mechanical process and algorithms that work over raw data for human consumption.
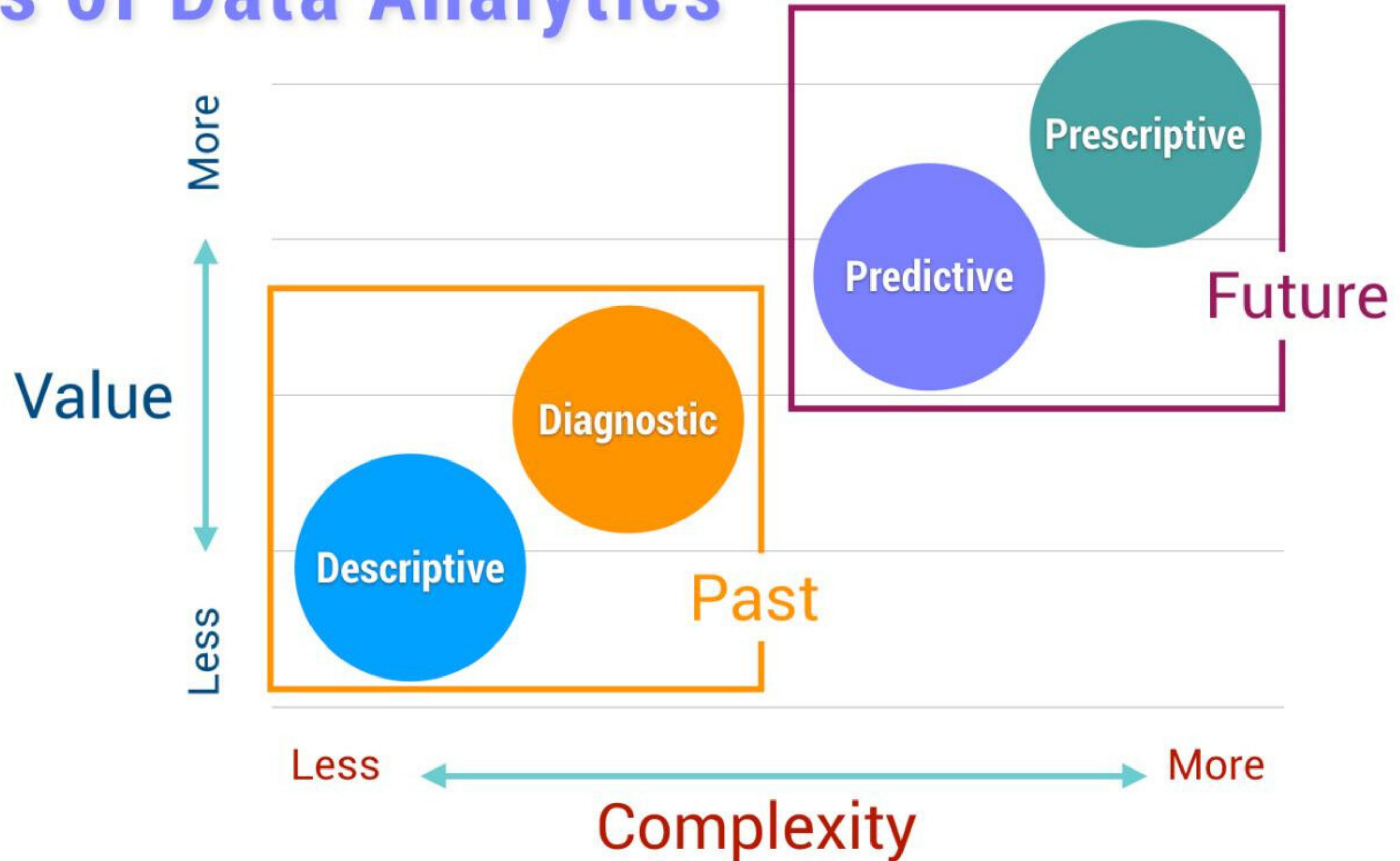
Background

The history of data analytics dates back to Babylonian astronomy, where data was collected and used for predictions. In the 17th century, John Graunt used statistical analysis to study mortality rates in London. In the 19th century, industries such as insurance and transportation used data for risk assessment and optimization. Data analytics has evolved and continues to be used for gaining insights and making better decisions.

4 Types of Data Analytics

The Four Types of Data Analytics

Optimtzation	"What is the best action?"	Prescriptive
Random Testing	"What if we try this?"	
Predictive Modeling	"What will happen next?"	Predictive
Statistical Modeling	"What is the pattern?"	

Future

Discovery & Alerts	"Where should we look?"	Diagnostic
Query & Drilldowns	"Why did it happen?"	
Ad Hoc Reporting	"How many, when, and where?"	Descriptive
Statistical Modeling	"What happened?"	

Past

Data analytics steps

1
Define why you need data analysis

2
Begin collecting data from sources

3
Clean through unnecessary data

4
Begin analyzing the data

5
Interpret results and apply them

Data Analytics Tech Advances & Usage

1. Big data and cloud computing

One of the biggest challenges in data analytics is managing and processing large amounts of data. Big data and cloud computing have emerged as solutions to this challenge. With the increasing amount of data being generated in various industries, it has become essential to have effective management and processing solutions. Big data and cloud computing provide a way to store and process large amounts of data quickly and efficiently. Many companies, such as Amazon and Netflix, have used these technologies to improve their operations.

2. Artificial intelligence and machine learning

Another exciting area of data analytics is artificial intelligence and machine learning. These technologies have the ability to analyze and learn from large amounts of data. Real-world applications of AI and machine learning can be found in healthcare, finance, and e-commerce. Companies such as Google and Microsoft have invested heavily in AI and machine learning technologies to gain insights and improve their operations.

Data Analytics Tech Advances & Usage

3. Natural language processing

Natural language processing is an important part of data analytics, especially when it comes to analyzing text data. This technology allows computers to identify patterns and sentiment in large amounts of text data. Real-world applications of natural language processing can be found in customer service and social media monitoring. Companies such as Airbnb and Zendesk have used natural language processing to improve their operations.

Data Analytics Tech Advances & Usage

4. Data visualization

Data visualization is an important tool in effectively communicating insights from data. Different types of visualizations can be used depending on the data and the message that needs to be communicated. Tools and technologies for creating effective data visualizations are widely available. Real-world examples of effective data visualizations can be found in many industries, including finance and healthcare.

Data Analytics Tech Advances & Usage

5. Predictive analytics

Predictive analytics is the use of statistical algorithms and machine learning techniques to identify the likelihood of future outcomes based on historical data. Real-world applications of predictive analytics can be found in healthcare, finance, and marketing. Companies such as Amazon and Walmart have used predictive analytics to gain insights and improve their operations.

6. Prescriptive analytics

Prescriptive analytics is a type of advanced analytics that uses algorithms and machine learning to identify the best course of action to take in a given situation. Real-world applications of prescriptive analytics can be found in supply chain management and customer service. Companies such as UPS and Coca-Cola have used prescriptive analytics to optimize their operations.

Data Analytics Tech Advances & Usage

Data Analytics Tech Advances & Usage

7. Real-time analytics

Real-time analytics is the ability to analyze data as it is generated. Real-time analytics is important in today's fast-paced world, where decisions need to be made quickly. Real-world applications of real-time analytics can be found in transportation and e-commerce. Companies such as Uber and Amazon have used real-time analytics to improve their operations.
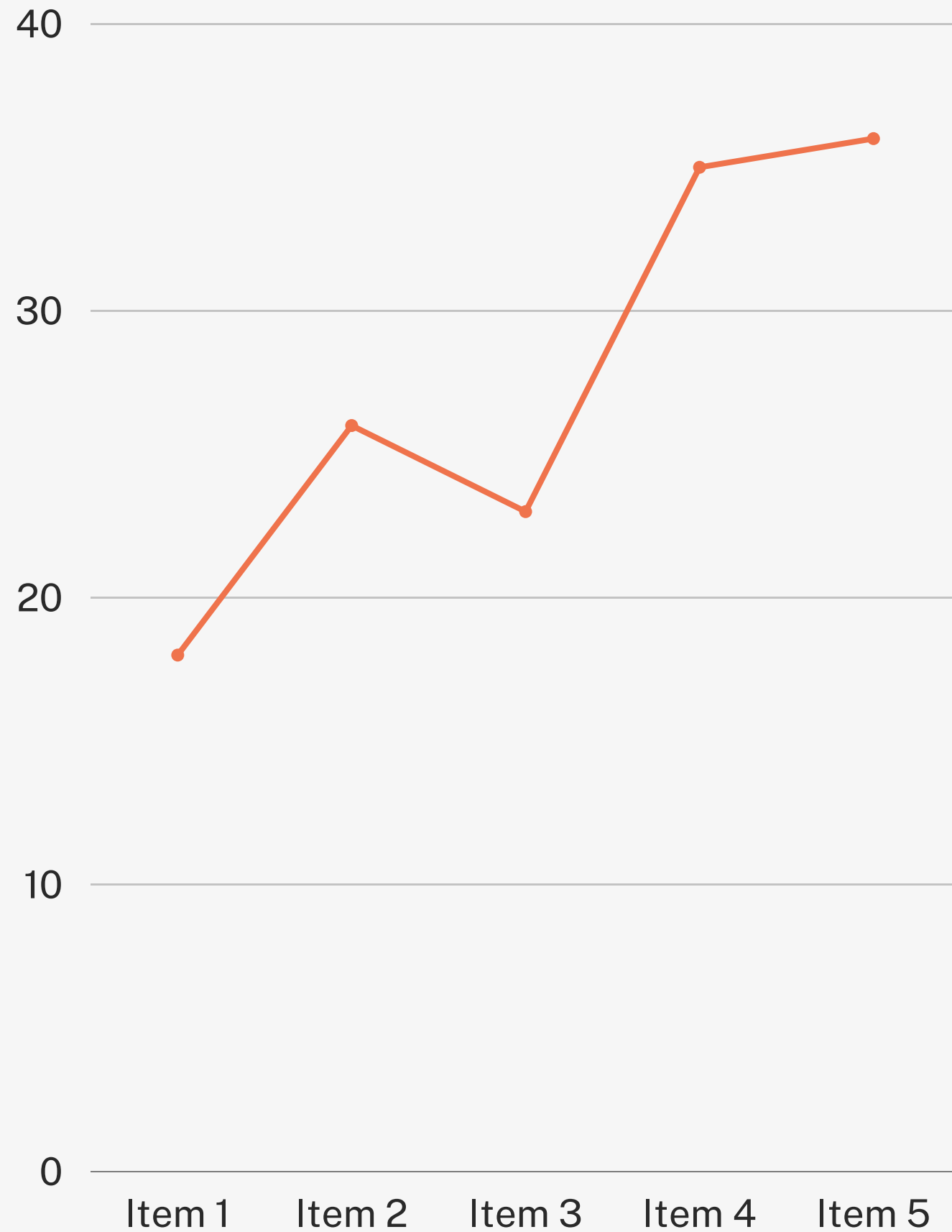
Data privacy and security

Data privacy and security is an important consideration in data analytics. The risks and challenges of data breaches and cyber attacks are real and can have serious consequences. Emerging technologies for data privacy and security, such as blockchain and differential privacy, are being developed to address these challenges. Real-world examples of companies implementing effective data privacy and security measures can be found in many industries.

Case study

- Walmart

Walmart, the American multinational retail company, generates an exponential amount of data - over 2.5 petabytes of data from 1 million customers every hour. To make sense of all this information, Walmart created 'Data Café,' a state-of-the-art analytics hub where over 200 streams of internal and external data, including 40 petabytes of recent transactional data, can be analyzed. Using modern tools and technologies like Python, SAS, and NoSQL databases such as Cassandra and Hadoop, Walmart manages its supply chain, optimizes product assortment, personalizes the shopping experience, and gives relevant product recommendations.

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Item 1   Item 2   Item 3   Item 4   Item 5

Challenges

- Data quality and integration challenges
- Ensuring privacy and security of customer data
- Difficulty in implementing real-time analytics
- Integrating data analytics with traditional decision-making processes
- Hiring and retaining data science talent

Proposed solutions

- ✓ Implementing a comprehensive data governance framework

- ✓ Investing in secure data storage and management systems

- ✓ Incorporating real-time data analytics tools

- ✓ Developing a data-driven decision-making culture

- ✓ Offering competitive compensation packages to attract and retain data science talent.

Importance of data analytics

1. Better Decision Making
2. Improved Efficiency and Productivity
3. Cost Savings
4. Increased Customer Satisfaction and Loyalty
5. Competitive Advantage
6. Innovation and New Business Models
7. Risk Mitigation and Fraud Detection
8. Personalization and Customization
9. Improved Supply Chain Management
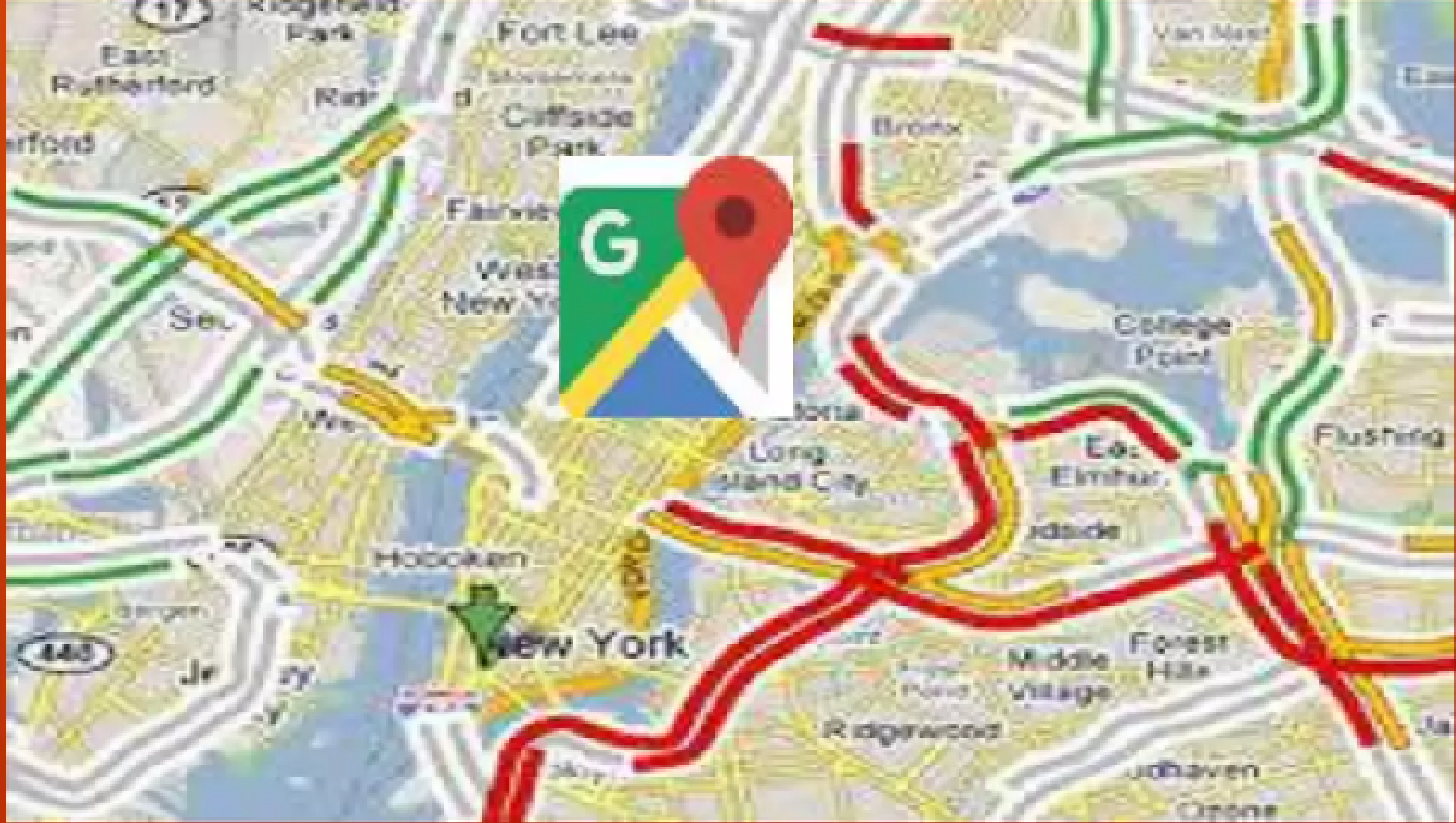10. Predictive Maintenance and Quality Control.
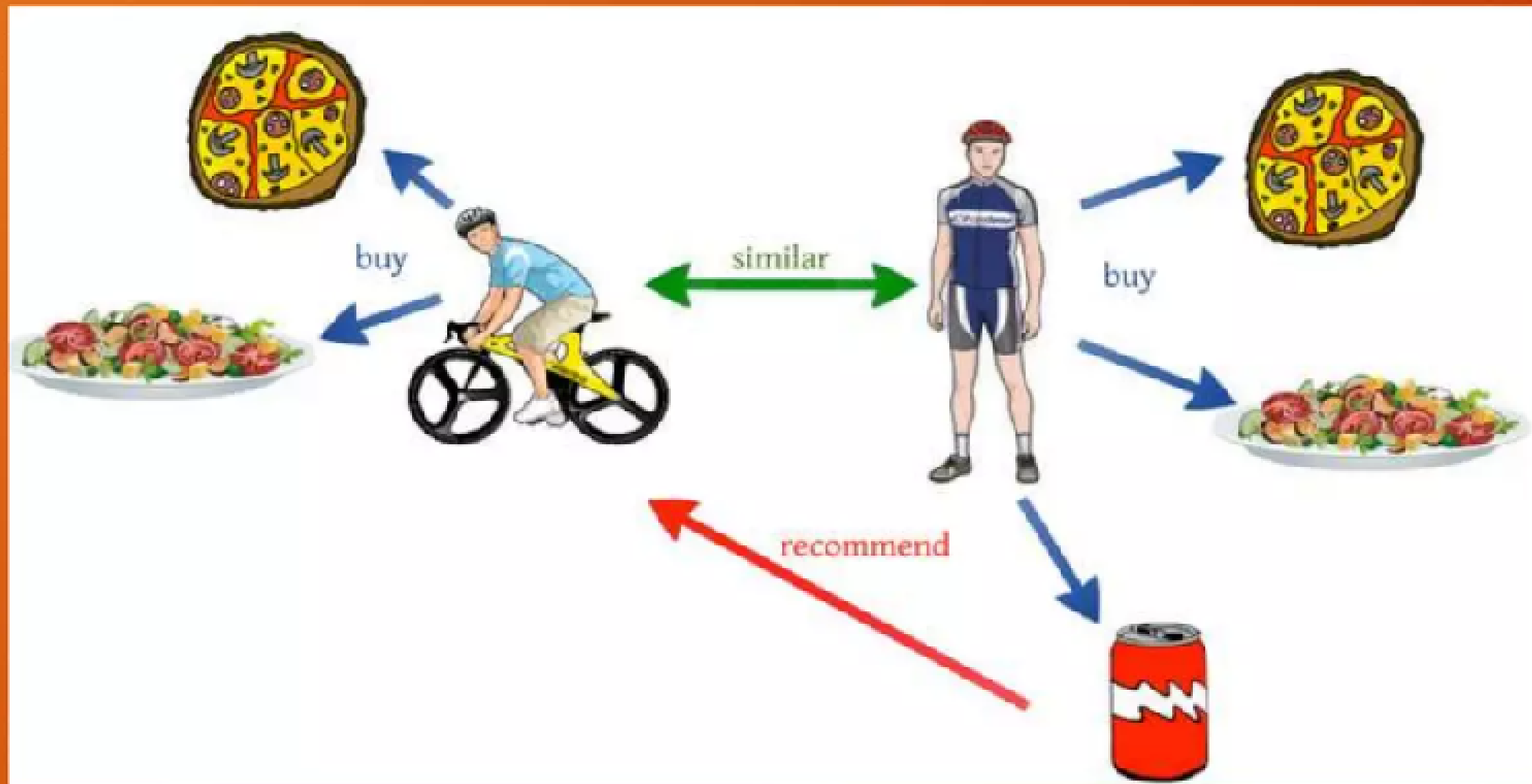
Applications of Data Analytics
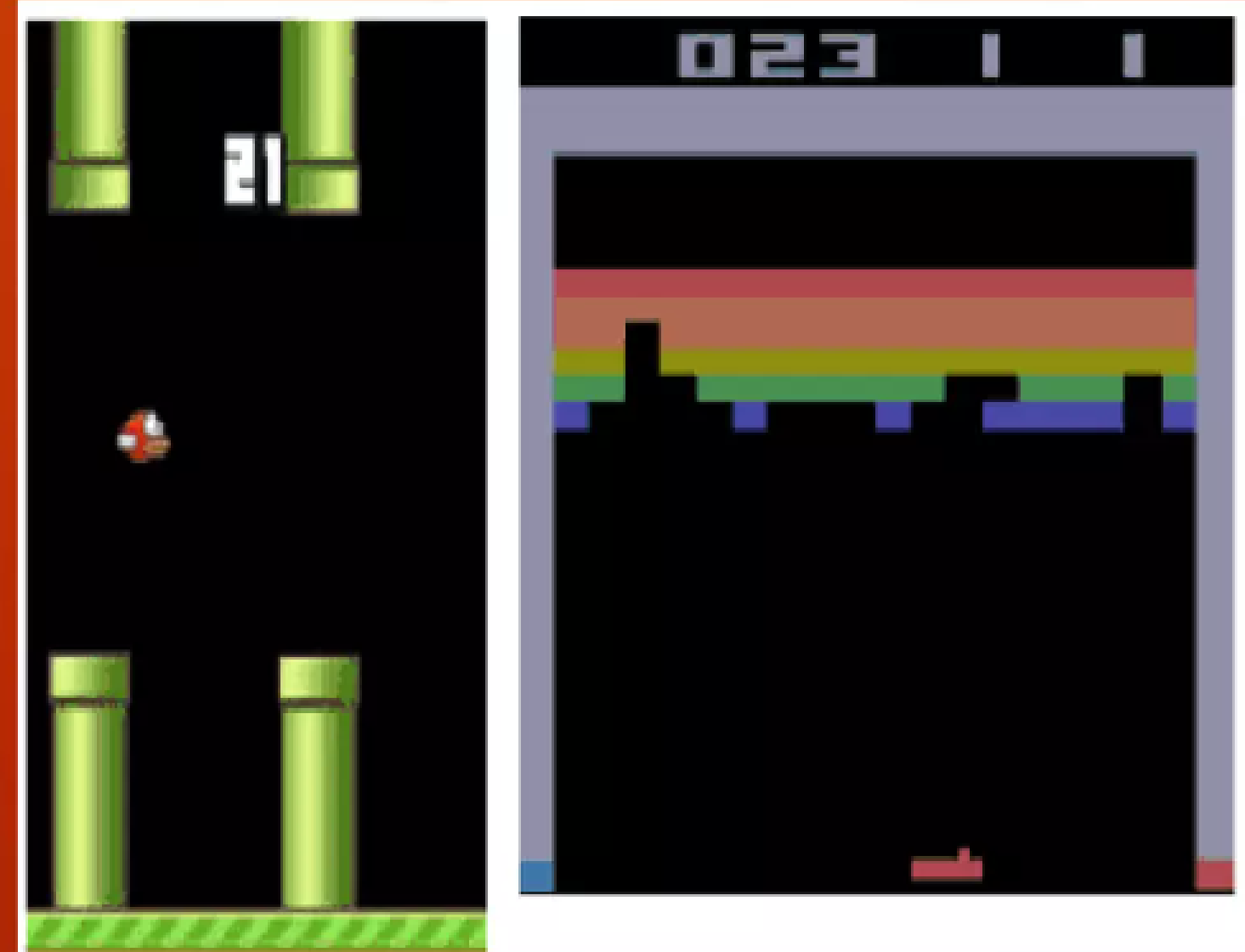
Self Driving Cars

Google Maps

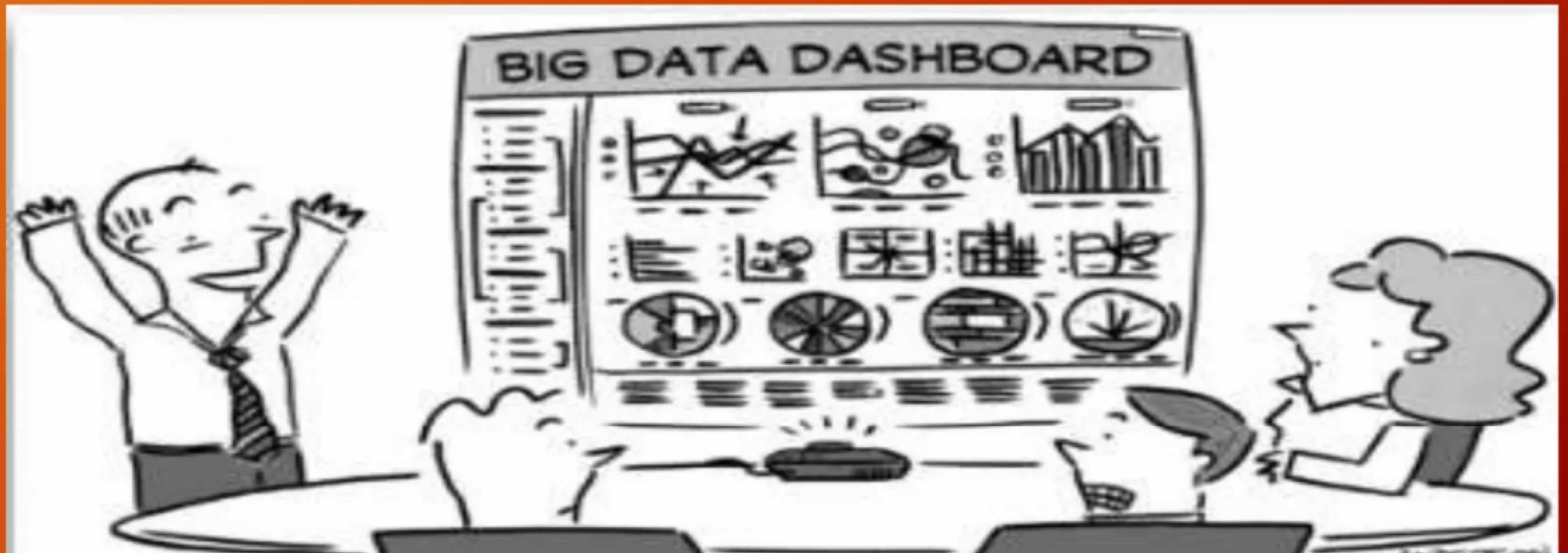# Applications of Data Analytics

Recommendation Engine

Games

Applications of Data Analytics

Decision Making

Conclusion

In conclusion, data analytics technologies can revolutionize industries like healthcare and e-commerce. By leveraging these technologies, companies can improve operations and gain valuable insights. However, it is important to address data privacy and security issues to ensure sustainable benefits. Thank you for your attention and we look forward to discussing advancements in data analytics further.

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Thank You