Business Analytics Using R

IIT Hyderabad

Imagine how much we can gain
If we can answer the following questions?

| Which customers are thinking of leaving? | Which insurance claims are fraudulent? | Which loan applicant will default | How much inventory we need to maintain |

Imagine how much we can gain
If we can answer the following questions?

Which critical machine part is about to fail?

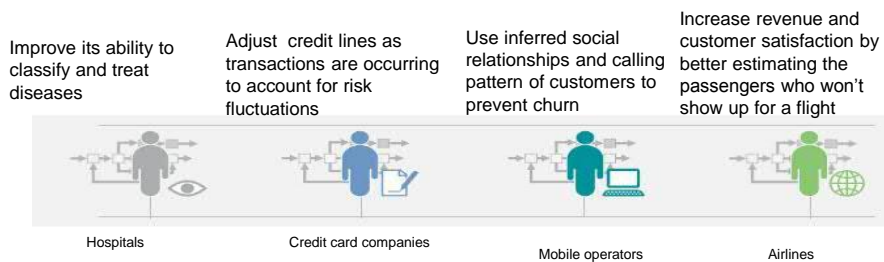Which flight will be delayed and expected delay

Imagine how much we can gain
If we can answer the following questions?

➢ Predict the buying behavior of a person **before your competitor?**

➢ Predict likely failures of **critical equipment?**

➢ Improve customer experience that **reduce attrition?**

➢ Predict the spending behavior of a person **quote the right price for flight ticket?**

Where you can use this technology?

Customer behaviour understanding
- Churn prediction
- Identifying the prospective customer
- Identifying the possible defaulters

Real-Time Decision making
- Fraud Detection
- Health Monitoring
- Stock Trading

Business decision making
- Inventory management
- Pricing of a product
- Customer service

Some More Applications

Improve its ability to classify and treat diseases

Adjust credit lines as transactions are occurring to account for risk fluctuations

Use inferred social relationships and calling pattern of customers to prevent churn

Increase revenue and customer satisfaction by better estimating the passengers who won't show up for a flight

Hospitals

Credit card companies

Mobile operators

Airlines

Success Stories

NETFLIX

A movie delivery company

➢ By analyzing customer behavior and buying patterns created a recommendation engine which can recommend movies to user according to their taste.

➢ From $5 million revenue in 1999 reached $3.2 billion revenue in 2011 as a result of becoming an analytics competitor

➢ This technology optimized customer satisfaction

Credit: Paul Sakuma / Associated Press

amazon Amazon

- ➢ Amazon.com use recommendation algorithms to personalize the online store for each customer.
- ➢ It use input about a customer's interests to generate a list of recommended items.
- ➢ The store radically changes based on customer interests, showing programming titles to a software engineer and baby toys to a new mother

What is Business analytics
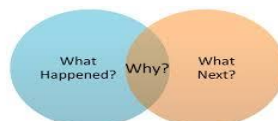
What is Business/Predictive Analytics?

- ➢ It is a forward looking science, using past events(data) to anticipate the future

- ➢ It uncovers patterns within large volumes of past data, which can be used to predict behavior and events

- ➢ It encompass a range of techniques for collecting, analyzing, and interpreting past data in order to reveal patterns

- ➢ It is a set of applied mathematical techniques which offer *data-driven insight for better decisions*

Proven use cases of Predictive Analytics

- ❖ Identify cross selling opportunities
- ❖ Predict cancellations of subscription services
- ❖ Predict responders and non-responders
- ❖ Predict riskiness of a customer
- ❖ Predict the disease
- ❖ Predict the expected sale
- ❖ Predict the expected delay

Aim of this course

Nontrivial extraction of

> ➢ implicit
> ➢ previously unknown
> ➢ potentially useful

information from data.

Focus of this course
Information extraction techniques and their efficiency concerns

What you will take home

➢ Prediction : Learning a function which maps a data item to a real valued prediction variable

➢ Classification : Learning a function that maps (classifies) a data item into one of several predefined classes

➢ Market basket analysis and its variants

➢ Clustering : Common descriptive task where one seeks to identify a finite set of categories or clusters to describe the data

➢ Time series analysis

➢ Text analytics

➢ Data Exploration, Visualization, Transformation and Reduction

Steps in predictive analytics

- Developing an understanding of the application domain and the goals of the end user

- Creating a target data set:
  - ➢ Selecting a data set
  - ➢ Focusing on a subset of variables and data samples on which discovery is to be performed

- Data cleaning and preprocessing:
  - ➢ Removal of noise or outliers
  - ➢ Strategies for handling missing data fields

- Data reduction
  Using dimensionality reduction(PCA) to reduce the effective number of variables under consideration

- Choosing the particular predictive analytics method :
  Selecting method to be used for searching for patterns in the data.

- Interpreting mined patterns

- Consolidating discovered knowledge

Overview of Predictive Analytics
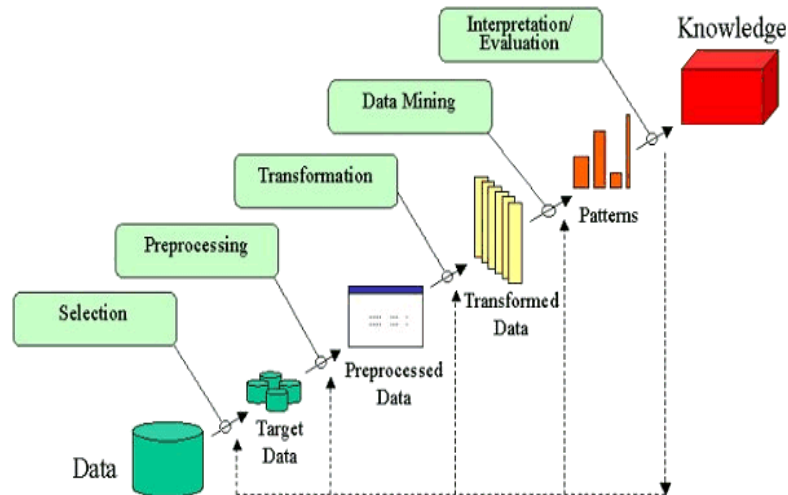
Regarding the contents, we have drawn heavily on various books and other sources

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