Data Mining OGSA Data Use Case

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Data Mining

Data Mining is the automated discovery of hidden patterns and information in large volumes of data using techniques from statistics and pattern recognition.

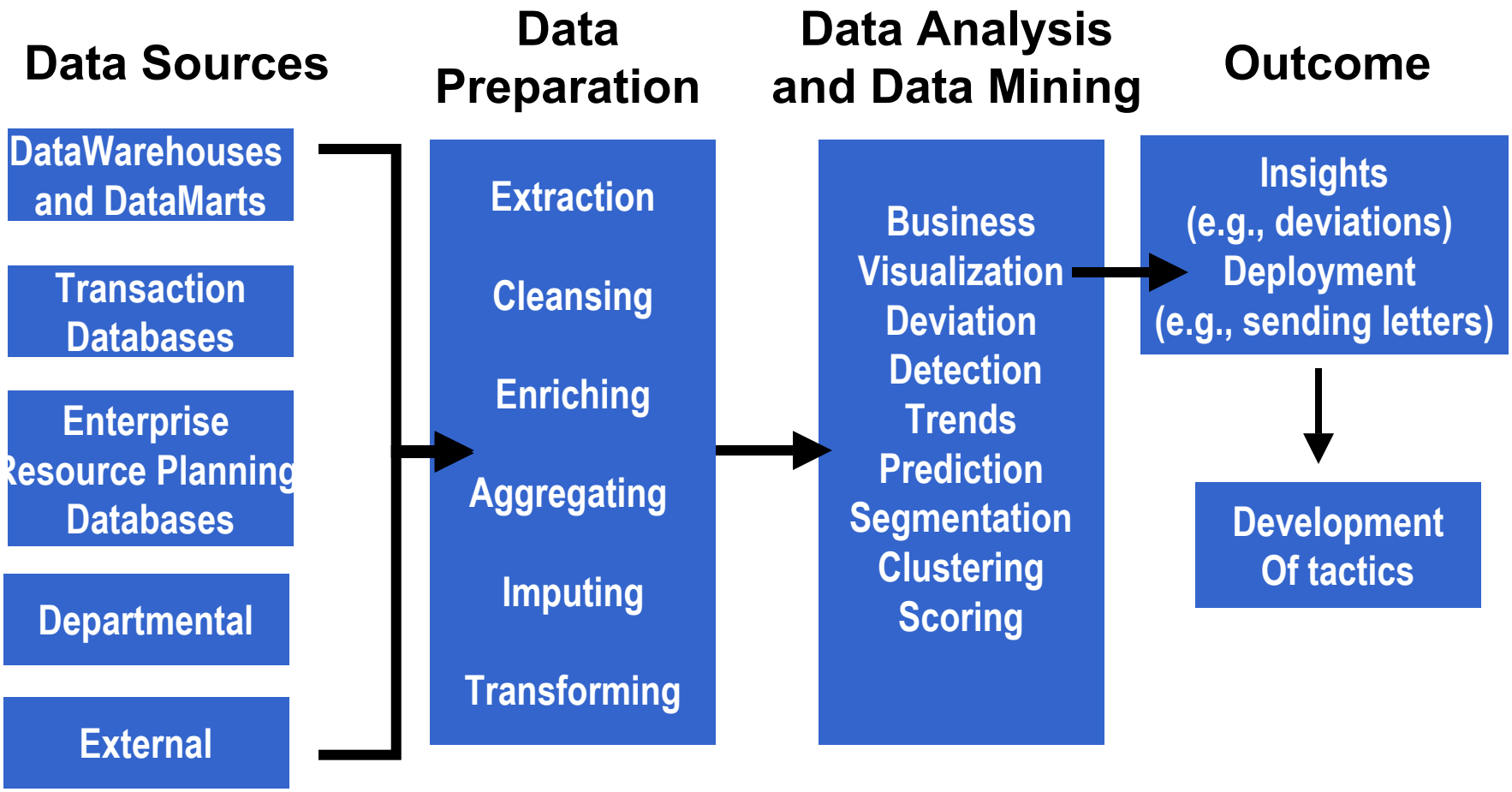
An example of a Data Mining Application:

Database marketing is a technique where you use all information available within your company's database as well as any external information to improve your marketing efforts.

Data Mining in Distribution

- Retailers often ask
  - How do I predict (forecast) demand – so as to reduce stock-outs?
  - Which new products will appeal to my established customers?
  - To whom should I target promotions for specific products or offerings?
  - Which products are likely cross-sell candidates for a given product?
  - Which products are potential (and profitable) substitutes for a given product?
  - How can we detect shrinkage reliably enough to warrant investigation?
- In recent years, data mining techniques have been developed that augment statistical analysis to address these questions

A Data Mining Process



Mining identifies key indicators

Data Mining Methods
Discovering

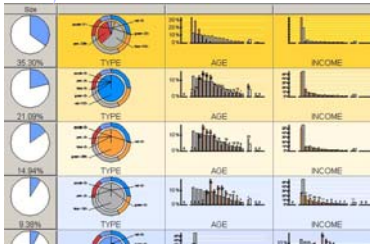
- Discovering unknown Patterns
  - Clustering
    - Grouping data records into subsets where items in subsets are more similar to one another – Demographics techniques
      - e.g., Most males get married between the ages of 30 to 35
  - Association Discovery
    - Complementary behavior where one action leads to another action at the same time.
      - e.g., shoppers who purchase milk will also purchase bread or cheese
  - Sequential Pattern Discovery
    - One action will lead to another action within a time frame.
      - e.g, applicants of Citibank VISA card will apply for ReadyCredit within 30 days of applications.

Data Mining Methods
Predicting

- Predicting the future based on past patterns
  - Classification
    - Deducing the class of groups who will behave in a certain way. Using decision tree deductions.
      - e.g., Young urban professional tends to buy expensive sports cars, while luxury sedans are purchased by the elderly wealthy person.
  - Value Prediction
    - Detect and account for interesting sequence of information in data records.
      - e.g., Sales of car increases sharply before the Chinese New Year period
  - Similar Time Sequence Discovery
    - One action cause a reaction at the same time
      - e.g.,: prices of hot chocolate increases, if the prices of milo reminds the same, its sales increases. (Price wars, discounting)

A Data Mining Process

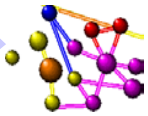
[2] Define model and run the analysis (CPU Intensive)



[3] Visualize

Models & scores used in Business Intelligence Tools

Models & scores used in Applications



Models

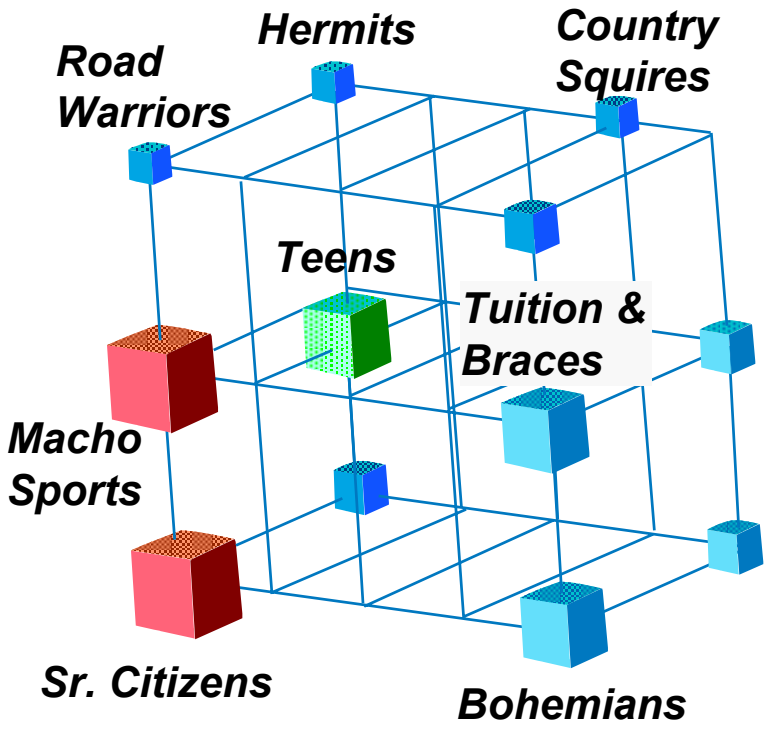
[4] Score (IO intensive)
XML (PMML)

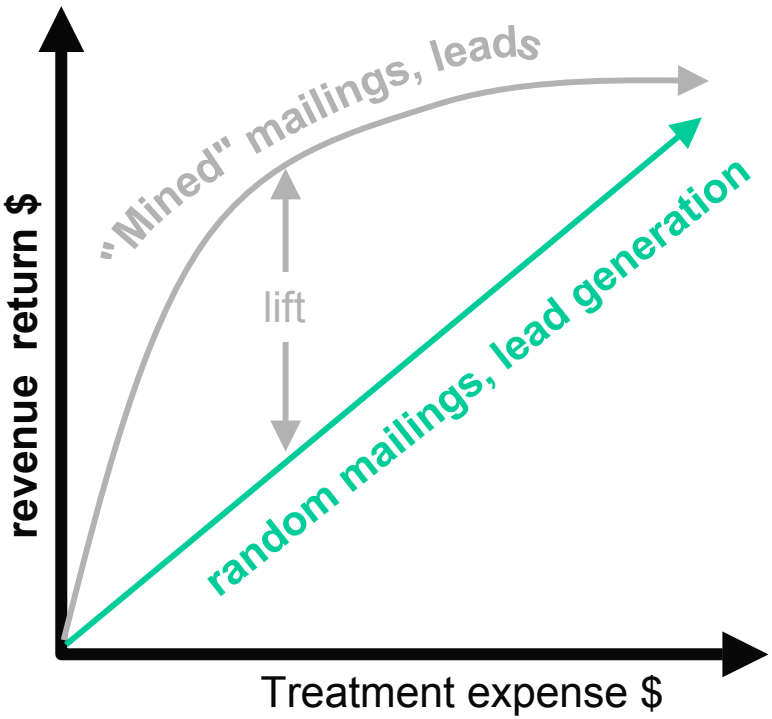
[1] Extract and prepare data

Data Warehouse

For info on PMML see http://www.dmg.org/

Typical Business Uses





Clustering & Segmentation (Group similar behavior)

Prediction (e.g., Need info about previous mailing campaigns)