CIS 635 - Knowledge Discovery & Data Mining

Introduction to Data Mining

What is Data Mining?

- **Process of extracting and discovering patterns in large datasets**
- Involves methods: ML, Statistics, DBMS
- Interdisciplinary field: CS, Statistics
- Overall goal:
    - Extracting information from dataset
    - Transform into a comprehensive structure for further use
- Data mining is the analysis step of
    - The KDD
    - Aside from raw analysis, it also involves
        - Database and data management aspects
        - Data preprocessing
        - Modeling and inference considerations
        - Evaluation and metrics
        - Post processing of discovered structures and visualizations

Wikipedia

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Knowledge Discovery Process (KDP) Models

Academic Research Models

- Introduced in mid 1990s
- Several models available
- Suggested steps are similar

Data Mining - A Knowledge Discovery Approach by Cis Pedrycz, and Swiniarski

9 steps: Fayyard et al KDP model:

1) Understanding the application domain
2) Creating a target dataset
3) Data cleaning and preprocessing
4) Data reduction and projection
5) Choosing the data mining task
6) Choosing the algorithm
7) Data mining
8) Interpreting mined patterns
9) Consolidating discovered patterns

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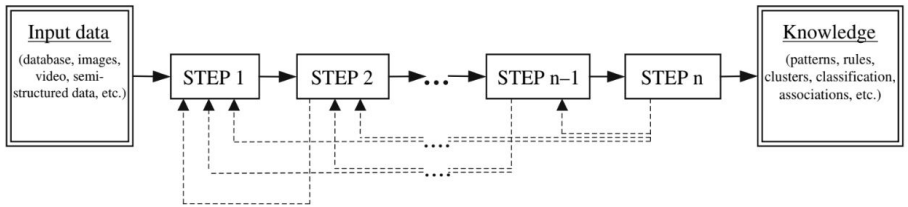

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Knowledge Discovery Process (KDP) Models

Industrial Models

- Business understanding
- Data Understanding
- Data preparation
- Modeling
- Evaluation
- Deployment

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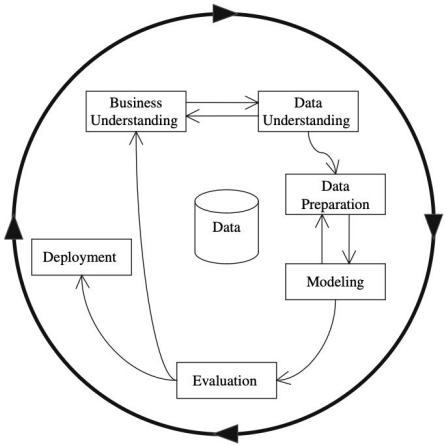

The CRISP-DM KD process model (source: http://www.crisp-dm.org/).

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Data mining is the process of extracting and discovering patterns in large data sets involving methods at the intersection of machine learning, statistics, and database systems.[1] Data mining is an interdisciplinary subfield of computer science and statistics with an overall goal of extracting information (with intelligent methods) from a data set and transforming the information into a comprehensible structure for further use.[1][2][3][4] Data mining is the analysis step of the "knowledge discovery in databases" process, or KDD.[5] Aside from the raw analysis step, it also involves database and data management aspects, data pre-processing, model and inference considerations, interestingness metrics, complexity considerations, post-processing of discovered structures, visualization, and online updating.[1]