1993

BAŞKENT UNIVERSITY
FACULTY OF COMMERCIAL SCIENCES
DEPARTMENT OF MANAGEMENT INFORMATION SYSTEMS

COURSE: DATA MINING

INSTRUCTOR: Dr. Ali Serhan KOYUNCUGİL

SUGGESTED BOOKS

- KOYUNCUGIL, Ali Serhan ve OZGULBAS, Nermin (Eds.). **Surveillance Technologies andEarly Warning Systems: Data Mining Applications for Risk Detection**. IGI Global, USA, 2010.

- HAND, David, MANNILA, Heikki and SMYTH, Padhraic. **Principles of Data Mining**. MITPress, London, 2001.

- WITTEN, Ian H. and FRANK, Eibe. Data Mining: **Practical Machine Learning Tools andTechniques** (Second Edition), The Morgan Kaufmann Series in Data Management Systems), 2005.

HASTIE, Trevor, TIBSHIRANI, Robert and

- FRIEDMAN, Jerome. **The Elements of Statistical Learning: Data Mining, Inference, andPrediction** (Second Edition). Springer Series in Statistics, 2009.

COURSE TOPICS

1. INTRODUCTION TO DATA MINING

1.1. Data Mining and Knowledge Discovery in Databases
1.2. Data Warehouse

1.3. Definition of Data Mining
1.4. History of Data Mining
1.5. Application Domains of Data Mining
1.6. Statistical Learning

2. DATA MINING TASKS

- 2.1. Characterization (Description)
- 2.2. Clustering
- 2.3. Classification
- 2.4. Rule and Tree Induction
- 2.5. Association
- 2.6. Modelling

3. COMPONENTS OF DATA MINING

- 3.1. (Multivariate) Statistical Data Analysis
- 3.2. Machine Learning
- 3.3. Pattern Recognition
- 3.4. Artificial Intelligence
- 3.5. Databases
- 3.6. Expert Systems
- 3.7. Data visualization
- 3.8. High Performance (Speed) Computing

4. COMPARISON OF DATA MINING AND THE OTHER ANALYTICAL METHODS

- 4.1. Statistical Data Analysis
- 4.2. On Line Analytical Processing (OLAP)
- 4.3. Structured Query Language (SQL) or Database Query
- 4.4. Comparison of Statistical Analysis and Data Mining
- 4.5. Comparison of OLAP and Data Mining
- 4.6. Comparison of SQL and Data Mining
- 4.7. Method Determination According to Type of Knowledge Will Be Discovered

5. DECISION PROCESS, BUSINESS INTELLIGENCE and DATA MINING

- 5.1. Decision Process and Data Mining
- 5.2. Business Intelligence and Data Mining

6. DATA MINING METHODOLOGY

- 6.1. CRoss Industry Standard Process for Data Mining (CRISP-DM)
- 6.2. SEMMA
- 6.3. Other Data Mining Methodologies
- 6.4. General Evaluation of Data Mining Methodologies

7. CLASSIFICATION OF DATA MINING METHODS

- 7.1. Distinction Between Supervised and Unsupervised Methods
- 7.2. Classical and New Generation Data Mining Methods
- 7.3. Descriptive and Explorative Data Mining Methods

8. STATISTICAL INFRASTRUCTURE OF DATA MINING

- 8.1. Basic Definitions and Concepts
- 8.2. Descriptive Statistics
- 8.3. Varibles and Their Properties
- 8.4. Measurement Levels of Variables
- 8.5. Hypothesis Testing
- 8.6. Data Type and Statistical Analysis Methods
- 8.7. Normal Distribution
- 8.8. Normality Test

9. DATA MINING METHODS AND APPLICATIONS

- 9.1. Linear Regression Analysis
- 9.2. Logistic Regression Analysis
- 9.3. K-nearest Neigbour
- 9.4. K-means Clustering Analysis
- 9.5. Hierarchical Clustering Analysis
- 9.6. Decision Trees
- 9.7. Association Rules
- 9.8. Other Data Mining Methods