

FINC 410 Data Mining and Machine Learning

This course will enable students to gain critical knowledge and understanding of data mining and machine learning. Data mining and machine learning focuses on developing algorithms to automatically discover patterns and utilize models of large datasets. This course introduces students to the process and main techniques in data mining and machine learning.
(Prerequisite: FINC 231) (3 credits)

Course Learning Outcomes:

By the end of the course, students will be able to:

1. Demonstrate critical knowledge and understanding of the principles of data mining and machine learning in the field of finance.
2. Identify and apply appropriate data mining concepts and techniques in the field of finance.
3. Identify and use a range of approaches and techniques to solve a given problem for big financial data.
4. Critically analyze real-world financial data sets to solve complex problems.
5. Apply and practice advanced data mining techniques using range of software to evaluate algorithms and make informed recommendations
6. Demonstrate effective oral and written communication skills, including the ability to develop sound and coherent arguments to present complex ideas relating to data mining and machine learning in a succinct and clear manner.
7. Demonstrate ability to work independently and in groups to conduct and present data mining experiments in the field of finance.

Textbook & Course Materials:

- D. Hand, H. Mannila, P. Smyth (2001). *Principles of Data Mining*. MIT Press.
- Mehryar Mohri, Afshin Rostamizadeh, and Ameet Talwalkar (2018), *Foundations of Machine Learning*

Course Content:

1. Machine Learning Overview
2. Probability and Statistics Review
3. Exploratory Data Analysis
4. Predictive Modeling
5. Deep Learning
6. Learning Theory
7. Ethics Issues in AI
8. Descriptive Modeling
9. Further Topics
10. Cross Validation and Other Resampling Methods
11. Model Selection and Regulation