

Machine Learning In Quantitative Finance

Rationale

Because of their greater power than classical statistical methodologies, machine learning techniques for classifying and evaluating risk, have an important place in the world of quantitative finance. This course combines relevant material from quantitative finance and sets up its interface to machine learning methodologies.

Course Description

This course studies the application of machine learning techniques in various quantitative finance problems. Contents include basics of financial instruments, basics of quantitative trading, machine learning and their applications in quantitative finance.

Topic List

Topics may include but are not limited to:

- Financial Instruments
 - Equities
 - Bonds
 - Futures
 - Options
 - Derivatives
- Trading Algorithms
 - TWAP
 - VWAP

- Percent of Volume
- Minimal Impact
- Implementation Shortfall
- Adaptive Shortfall
- Market On Close
- Pairs Trading Algorithms
- Machine Learning
 - Time Series Prediction
 - Neural Networks
 - Genetic Algorithms
 - Reinforcement Learning

Learning Goals

The specific learning goals of this course are:

- To become familiar with the the different kinds of financial investments
- To understand basics of market and trading, including different types of trade executions, orders, and financial markets
- To study basic trading algorithms as well as portfolio and multiasset trading
- To learn machine learning methods and their applications to various financial market prediction problems

Assessment

Class participation (5%) and homework assignments (45%) will assess the theoretical part of the learning goals. Each student will do a project and that will satisfy the algorithm and programming aspects of the learning goals.(50%)