

FIN-423

Financial machine learning projects

Ackerer Damien Edouard

Cursus	Sem.	Type
Financial engineering	MA1, MA3	Opt.

Language of teaching	English
Credits	3
Withdrawal Session	Unauthorized Winter
Semester	Fall
Exam	During the semester
Workload	90h
Weeks	14
Hours	3 weekly
Lecture	2 weekly
Project	1 weekly

Number of positions

It is not allowed to withdraw from this subject after the registration deadline.

Remark

MA3 only

Summary

The objective of this course is to acquire experience in financial machine learning by solving real-world problems. Different groups of students will work on different industry projects during the semester. Lectures will discuss best practices and tools.

Content

Projects:

- from local industry partners (bank, market maker, broker, asset manager, etc.)
- working in different asset-class (commodities, crypto-currencies, equity, FX, etc.)
- with distinct applications (trading signal, portfolio optimization, volatility prediction, factors extraction, etc.)
- each group of students will work on one dedicated project during the semester

Machine learning:

- review of standard methods (regularized linear regressions, tree methods, neural networks)
- study the challenges of applying data-driven algorithms in finance
- present various use-cases in financial engineering (model pricing and calibration, time-series simulation, etc.)
- transform text as data using natural language processing tools
- discuss selected advanced topics in reinforcement learning (e.g. derivatives hedging)

Keywords

- finance
- machine learning
- projects

Learning Prerequisites

Required courses

- Programming knowledge of Python
- Basic probability and statistical knowledge
- Basic knowledge of finance
- Basic knowledge of machine learning

Recommended courses

- Introduction to finance
- Financial econometric
- Derivatives
- Investments

Learning Outcomes

By the end of the course, the student must be able to:

- Choose an appropriate model to solve a problem in finance
- Assess / Evaluate and benchmark a model performance
- Design flexible models for financial applications
- Implement data processing and models in python code
- Develop a fast system to replace slow numerical methods
- Manipulate and transform data

Transversal skills

- Manage priorities.
- Make an oral presentation.
- Write a scientific or technical report.
- Demonstrate a capacity for creativity.
- Take feedback (critique) and respond in an appropriate manner.
- Continue to work through difficulties or initial failure to find optimal solutions.
- Demonstrate the capacity for critical thinking

Teaching methods

- Lectures, 2 hours per week for 14 weeks
- Project sessions, 1 hour per week for 14 weeks

Expected student activities

- Actively participate to the lectures and the presentations

Assessment methods

- Class participation 20%

- Project presentations 20%
- Project report 60%

Supervision

Office hours	Yes
Assistants	Yes
Forum	Yes