MICRO-401 **Machine learning programming**

Billard Aude

Cursus	Sem.	Type
Financial engineering	MA1, MA3	Opt.
Mechanical engineering	MA1, MA3	Opt.
Microtechnics	MA1, MA3	Opt.
Robotics	MA1, MA3	Opt.

Language of teaching	English
Credits	2
Withdrawal	Unauthorized
Session	Winter
Semester	Fall
Exam	During the semester
Workload	60h
Weeks	14
Hours	**2 weekly**
TP	2 weekly
Number of positions	

Il n'est pas autorisé de se retirer de cette matière après le délai d'inscription.

Summary

This is a practice-based course, where students program algorithms in machine learning and evaluate the performance of the algorithm thoroughly using real-world dataset.

Content

This programming class complements courses on machine learning given in the school. It offers students the possibility to understand some machine learning algorithms in depth by programming them and testing them rigorously. Students will be offered a choice of methods to program. Programming can be done in matlab or C/C++. Proper evaluation of machine learning will be stressed out. Students will learn about various methods to evaluate machine learning methods (crossvalidation, grid search, F-measure, ROC curve, etc) and will be asked to put these in practice.

Keywords

Programming in matlab. Machine Learning. Statistics.

Learning Prerequisites

Required courses

Students must have taken a machine learning course or follow one during the same semester. This programming class is meant to complement the Applied Machine Learning course, but can also complement other machine learning courses given at EPFL.
Students have at their disposal videos presenting the theory of the pendant course Applied Machine Learning as supplementary material.

Recommended courses

Applied Machine Learning - MICRO-455
Pattern Classification and Machine Learning: CS-433
Data Analysis and Model Classification - EE-516

Important concepts to start the course

Basic notions in Machine Learning:
Supervised versus unsupervised learning
Classification, non-linear regression, clustering

Learning Outcomes

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

- Produce code for steps of ML algorithms
- Develop a reasoning process to transform an algorithm into programming code

Transversal skills

- Use both general and domain specific IT resources and tools

Teaching methods

Computer-based practice session. Some short ex-cathedra lectures will be given at the beginning of the class.

Expected student activities

Attendance to all sessions is necessary to progress rapidly and benefit from assistants' support.

Assessment methods

The students are evaluated on pieces of code handed out regularly throughout the course and through a mid-term exam. The mid-term exam is worth 50% of the overall grade. The semester submissions are worth the other 50%.

Supervision

Office hours	No
Assistant.e.s	Yes
Forum	No

Resources

Virtual desktop infrastructure (VDI)

No

Moodle Link

- https://go.epfl.ch/MICRO-401

Videos

- https://tube.switch.ch/channels/7e86d16d

Prerequisite for

Students must know how to program in Matlab (or C which is close and then be ready to learn Matlab).