UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Machine Learning for Finance

2526-1-F1602M003

Learning objectives

Knowledge and understanding:
The course aims to provide students with the skills to use Python and to provide the fundamental concepts and tools, based on computational methods, to represent learning, knowledge and reasoning under conditions of uncertainty.

Applied knowledge and understanding:
At the end of the course, the student will be able to design and develop software tools based on machine learning techniques to solve simple data analysis and decision support problems in the presence of uncertain or incomplete information in his/her field of specialization.

Making judgments:
The student will learn to independently choose the most suitable tools and techniques among those learned to solve practical problems of moderate complexity related to the manipulation and analysis of data in the financial field.

Communication skills:
The student will develop effective communication skills in the context of programming and machine learning.
He will be able to express technical concepts related to code, algorithms and artificial neural networks in a clear and understandable way, both orally and in writing.

Learning ability:
The student will develop the fundamental skills for autonomous and continuous learning in the field of data analysis with machine learning techniques.
He/she will be able to quickly acquire new knowledge and skills, to use external resources to deepen specific machine learning topics,
and to independently solve complex problems through the application of the principles learned.

Contents

The course will provide in-depth knowledge of Python programming and an introduction to neural networks as a tool to support the analysis of financial data.

Detailed program

- Introduction to PyCharm:
- Python programming:
  variables and data types (integers, decimals, booleans, lists, tuples, sets and maps)
  arithmetic, relational, and logical expressions
  basic function
  elementary instructions: assignment, return, break, continue, import
  compound statements: if, for, while, with
  reading and writing instructions: input, print, text file
  functions, parameter passing;
  classes;
  NumPy library;
  Pandas library;
  -Neural Networks: Perceptron, Perceptron Learning Algorithm, Gradient Descent Concept, Multilayer Perceptron, Backpropagation Algorithm
- Deep Neural Networks: Introduction

Prerequisites

Mathematical-logical knowledge as acquired during high-school, linear algebra and basic concepts on algorithms.

Teaching methods

Frontal lessons. Lessons take place in computer science lab to allow students to immediately apply the concepts explained.

Assessment methods

Learning assessment includes a written exam. The exam will take place in the teaching laboratories to evaluate the student's skills in using Python and their competence in solving simple problems.

Textbooks and Reading Materials

Paul J. Deitel, Harvey M. Deitel, Intro to Python for Computer Science and Data Science. Pearson, 2020

Semester

First semester

Teaching language

Italian

Sustainable Development Goals

QUALITY EDUCATION