UNIVERSITÀ
DEGLI STUDI DI MILANO-BICOCCA

COURSE SYLLABUS

Machine Learning for Multivariate Data Analysis

2324-1-124R013

Title

Machine Learning for Multivariate Data Analysis

Teacher(s)

Davide Ballabio

Language

English

Short description

This course is an introduction to different key aspects of machine learning and advanced multivariate data analysis in science. This includes mathematical and statistical methods able to face, analyse and describe complex systems, that is, systems characterised and influenced by several factors (variables). It is thus addressed to PhD students who want to acquire or intensify knowledge on machine learning from different disciplines (Chemistry, Physics, Biology, Geology, Environmental Sciences, etc.).

The intended learning outcomes will be the following: understanding of complex data structure, learning of the principles and operating conditions of the main machine learning approaches, capability to independently apply

suitable solutions to multivariate problems, choice of coherent and appropriate multivariate methods to deal with a specific issue.

The course will introduce principles and theory of the main multivariate modelling and machine learning approaches for data analysis. These can be useful for exploratory analysis, i.e. to find and visualise main patterns in complex data systems (Principal Component Analysis), as well as to relate a set of independent variables to a modelled qualitative or quantitative response (Partial Least Squares). Theory lessons will be supported with guided exercises and practical sessions on real data as case studies. Practical sessions will be based on available MATLAB statistical toolboxes for multivariate data analysis.

Evaluation: NO

CFU / Hours

2 CFU - 20 Hours (Lecture and informatic laboratory for practical session)

Teaching period

I semester: 12th, 13th and 14th of February 2024, (9:30 - 16:30)

Sustainable Development Goals