# Artificial Intelligence and Machine learning

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***COURSE AIMS AND INTENDED LEARNING OUTCOMES***

Artificial Intelligence and, in particular, Machine Learning techniques are nowadays applied to solve complex data analysis problems. The objective of this course is twofold: to provide the theorical background of the basic techniques as well as some application scenarios using the state-of-the-art frameworks. In details, about 50% of lectures will be dedicated to the analysis of AI applications based on python packages.

At the end of the course students are expected to understand the principal learning approaches applied to AI and to design and perform data analyses using popular frameworks such as, scikit-learn and keras.

***COURSE CONTENT***

* Artificial Intelligence and Machine Learning approaches
* Liner regression and learning approaches
* Regularization methods
* Logistic regression
* Probabilistic models and Bayesian networks
* Optimization techniques (analytical and numerical)
* Gradient Descent methods (mini batch and stochastic)
* Artificial Neural Networks for classification and regression problems
* Deep Neural Network and their application for image processing
* Introduction to Recurrent/Reinforcement Neural Networks
* Basic Tensorflow and keras applications
* Introduction to evolutionary computation methods focusing to Genetic Programming

 ***READING LIST***

* Textbooks will be recommended at the begin of the course
* Lecture notes and online contents

***TEACHING METHOD***

The course will include lectures and class exercises based on traditional teaching and teach by example principles. It is strongly advised to attend to lectures for working on case studies and examples, and for revising materials.

The course also involves lectures and exercise sessions using PC-labs. Active participation, and ongoing personal study are required.

***ASSESSMENT METHOD AND CRITERIA***

An oral interview aimed at assessing students' understanding of machine learning techniques and applications. The evaluation is also based on

The assessment will also consider the active participation in the course, as well as a brief dissertation about an assigned project that accounts for 6/30 of the final grade.

***WARNINGS AND PRE-REQUISITES***

Basic knowledge on statistical techniques and python programming language skills.

Attendance is strongly recommended.