

Program on Machine Learning

Valentina Colla

This module is part of the course on **Neural Networks and Machine Learning**.
To acquire 3 credits, students have to attend the two modules:

1. “Deep Neural Networks” (given by Giorgio Buttazzo)
2. “Machine Learning” (given by Valentina Colla)

and give the two written tests.

Objectives

The aim of the course is to provide the basic concepts and methodologies on the main models and paradigms of existing neural networks, and explain how to use them for pattern recognition, data classification, signal prediction, system identification, and adaptive control.

Program

1. **Fuzzy Logic.** Fundamentals of fuzzy logic. Fuzzy Inference Systems. Neuro-fuzzy systems, Sample applications.
2. **Genetic Algorithms.** Fundamentals concepts of evolutionary computation and genetic algorithms, applications of GA to standard optimization and multi-objective optimization.
3. **Hybrid systems.** Advantages and limitations of AI-techniques, possibility to merge the AI-based approaches to standard approaches, exemplar applications of hybrid systems.

Required Knowledge

Basic mathematics and matrix calculus.

Teaching material

Slides provided by the teacher.

Final Exam

Written test