Dipartimento di Sociologia e Ricerca Sociale
Anno accademico 2022/2023

Introduction to Machine Learning [145684]

No class division

Corso di studio Data Science
Ordinamento Data Science
Percorso standard

Docenti: PAOLO ROTA (Tit.), CIGDEM BEYAN, ELIA PERUZZO

Numero ore: 48

Periodo: Second semester

Crediti: 6

Settori: ING-INF/05

Course objectives and learning outcomes
The course intends to provide a broad introduction to machine learning techniques. The course includes theoretical lessons and computer exercises to learn the basics of algorithms for different application cases.
 The course, therefore, provides a practical "hands-on" approach that includes all topics from data acquisition, training process management, and inference software development. During the course, students will learn how to decide the path to follow for the solution of a machine learning project. Students will be able to evaluate the type of machine learning method to follow (supervised, unsupervised, classification or regression, etc.), assess the results by hand, learning to work towards objectives. The practical lessons will be carried out in Python using open-source libraries. The project topics will range over topics mainly related to computer vision and Natural Language Processing

Entrance requirements
A smattering of basic algorithms, linear algebra, python programming is preferable.

Contents

 The course provides an overview of machine learning and different inference methods. The topics that will be touched on are the following:
 Introduction to Machine Learning;
Evaluation of learning models;
Traditional learning models;
Dimensionality reduction and feature space concept;
Artificial Nural Networks (MLP, Convolutional, Recurrent, Transformers);
Applications in Vision and Natural Language Processing

Teaching and learning methods and activities
The lectures will be in class with slides, the exercises require students to use a pc and Google Collaboratory.

Tests and assessment criteria
The exam consists of an oral test (60% of the final mark) plus one of the following options: - Project in progress during the course with a group challenge. Written report and discussion (40% of the final grade) - Individual project with report and discussion (40% of the final mark).

Bibliography /study materials
C. Bishop, Pattern Recognition and Machine Learning, Springer, 2006 Goodfellow, Ian, et al. Deep learning. Vol. 1. Cambridge: MIT press, 2016.
Tunstall et al, Natural Language Processing with

Transformers, 2022

Other information

Stampa del 19/02/2023