

Machine learning

Academic Year: (2024 / 2025)

Review date: 25-04-2024

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: SAEZ ACHAERANDIO, YAGO

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Basic knowledge of statistics and programming

OBJECTIVES

This course covers the main fundamentals of machine learning, from a very practical approach we are going to work for making a computer to be able to build models that allows it to learn concepts or recognize patterns, and to be able to define them and/or predict new incoming instances, and all this without being programmed explicitly.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to machine learning and inductive learning
2. Supervised Learning I: Trees and Decision Rules
3. Evaluation and validation of learning models
4. Machine learning methodology
5. Supervised Learning II: Regression Trees, Instance-Based Learning, and Ensembles of Classifiers
6. Unsupervised and semi-supervised learning techniques
7. Relational machine learning

LEARNING ACTIVITIES AND METHODOLOGY

Formation activities

AF1 - Theoretical class

AF2 - Practical classes

AF3 - Theoretical and practical classes

AF5 - Tutorials

AF6 - Group work

AF7 - Individual student work

AF8 - Partial and final exams -> Presentations and/or partial and final dissertations

teaching methodology

MD1 - Presentations in the teacher's class with the support of computer and audiovisual media, in which the main concepts of the subject are developed and the bibliography is provided to complement the learning of the students.

MD2 Critical reading of texts recommended by the professor of the subject: articles, reports, videos, tutorials, etc., either for later discussion in class, or to broaden and consolidate knowledge of the subject.

MD3 Resolution of practical cases, problems, etc. raised by the teacher individually or in groups

MD5 Preparation of work and reports individually or in groups

ASSESSMENT SYSTEM

% end-of-term-examination:	0
% of continuous assessment (assignments, laboratory, practicals...):	100

The assessment methodology has been designed for a complete applied and practical approach to the subject and it consists of going through a series of incremental assignments along the course.

- SE1 (5%) - Participation in class and in the forums of the subject
- SE2 (90%) - Individual or group work carried out during the course
- + Jobs:
 - (35%) Practice Machine Learning
 - (55%) Final Challenge

In the extraordinary call, the evaluation will be carried out entirely by means of a face-to-face exam that may be oral and/or written.

BASIC BIBLIOGRAPHY

- Aurélien Geron Hands-on Machine Learning with Scikit-Learn, Keras, and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems, O'Reilly, 2017
- Crish Bishop Pattern Recognition and Machine Learning, Springer, 2006
- Murphy, K.P.. Machine Learning. A Probabilistic Perspective, MIT Press, 2012

BASIC ELECTRONIC RESOURCES

- David Cournapeau, Matthieu Brucher, Fabian Pedregosa, et al. . Scikit-Learn: <https://scikit-learn.org/stable/index.html>