30231 - Machine Learning

Syllabus Information

Academic year: 2023/24
Subject: 30231 - Machine Learning
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 439 - Bachelor's Degree in Informatics Engineering
ECTS: 6.0
Year: 3
Semester: Second semester
Subject type:
Module:

1. General information

The objective of this subject is to study the main machine learning techniques, to understand their mathematical and algorithmic foundations, and to be able to apply them in real examples.

The subject requires the use of some concepts acquired in previous subjects, specifically:

- **Discrete Mathematics**, mandatory of the basic training module: concepts related to graphs.

- **Statistics**, compulsory of the basic training module: calculation of probabilities, sampling estimation techniques.

- **Artificial Intelligence**, mandatory of the common training module: machine learning.

Acquisition of the learning outcomes of the subject will contribute to some extent to the Sustainable Development Goals (SDGs), in particular to the Sustainable Development Goals (SDGs), in particular to the achievement of targets 3.4 of Goal 3, target 8.4 of Goal 8, and targets 10.2 and 10.3 of Goal 10.

2. Learning results

In order to pass this subject, the students shall demonstrate they has acquired the following results:

- Learn about the basic machine learning techniques and explain their differences

- Determine which learning technique is most appropriate for a given problem

- Implement simple algorithms for supervised learning, reinforcement learning and unsupervised learning on real problems.

- Characterize the state of the art in machine learning, its achievements and limitations

3. Syllabus

1. Supervised learning. Regression

2. Regularization and model selection

3. Logistic regression

4. Generative Models. Naive Bayes

5. Anomaly detection

6. Unsupervised learning. PCA

7. Clustering

8. Recommenders

9. Non-parametric methods. Gaussian Processes

10. Big Data

4. Academic activities

The student's dedication is estimated at 150 hours distributed as follows:
- Lectures 30 hours.
- Laboratory practices: 27 hours
- Assignments 3 hours
- Study: 83 hours
- Assessment tests. 7 hours

In addition to the grading function, the evaluation is also a learning toolwith which the student checks the degree of understanding and assimilation achieved.

5. Assessment system

In each call, the assessment will consist of two parts:

1. Individual written test (60%), graded between 0 and 10 points (T). It will be held on the date of the call. The student will be assessed on the set of learning results of from a theoretical and problem-solving point of view.

2. Practical laboratory tests (40%), graded between 0 and 10 points (L). The objective of these tests is to evaluate the acquired ability to implement and apply machine learning techniques in practical cases. It will be made on the date of the call. Optionally, each student will be able to deliver during the semester, in the dates indicated by the teachers, the solutions implemented for each one of the exercises proposed for these sessions. The timely delivery of these solutions will exempt you from taking the final practical test in the laboratory.

Passing the subject requires grades in T and L greater than or equal to 4. In that case, the overall rating will be: 0.40*L + 0.60*T. Otherwise, the overall grade will be the minimum between 4 and the result of applying the formula above. The subject is passed with an overall grade of 5 out of 10.