Universidad Zaragoza

Academic Year/course: 2023/24

69721 - Machine Learning

Syllabus Information

Academic year: 2023/24
Subject: 69721 - Machine Learning
Faculty / School: 110 - Escuela de Ingeniería y Arquitectura
Degree: 633 - Master's Degree in Biomedical Engineering
ECTS: 3.0
Year: 1
Semester: Second semester
Subject type: Optional
Module:

1. General information

The purpose of this subject is for the student to acquire the necessary knowledge to understand the fundamentals and applications of a machine learning system in biomedical data, such as probabilistic models, decision trees, support vector machines (SVMs), multilayer perceptron (MLP) and convolutional networks. The main objective is to provide the student with an overview of the technologies related to machine learning on biomedical data.

These approaches and objectives are aligned with the Sustainable Development Goals (SDGs) of the United Nations Agenda 2030(https://www.un.org/sustainabledevelopment/es/) and certain specific targets, such that the acquisition of the learning results of the subject will contribute to some extent to the achievement of Objective 8.2 of Goal 8, and Objective 9.5 of Goal 9.

2. Learning results

- To learn the basics of pattern recognition and machine learning.
- To know the use of probabilistic models such as Naive Bayes and Bayesian Networks in machine learning.
- To know the use of decision tree models in machine learning.
- To know the use of linear models and SVMs in machine learning.
- To know the use of MLP and convolutional neural networks in machine learning.
- To know the methodology to design and implement a basic pattern recognition system.

3. Syllabus

Topic 1. Introduction to pattern recognition

Topic 2. Probabilistic models: Naive Bayes, Bayesian Networks

Topic 3. Decision trees

Topic 4. Linear models and SVMs

Topic 5. Neural networks

4. Academic activities

Master classes: 18 hours

Theoretical-practical sessions in which the contents of the subject will be explained.

Laboratory practices: 8 hours

Model programming and simulation.

Practical work: 14 hours

Writing of a subject project based on the concepts learned.

Personal study: 47 hours

Assessment tests 3 hours**.**

5. Assessment system

The subject will be assessed by the continuous assessment system by means of the following activities:

-**Test 1: Individual written test** of short questions and solving of exercises (50% of the grade, minimum 4 out of 10).

Assessment criteria are as follows:

- Mastery of content, use of terminology, accuracy of concepts, justification of arguments.

- Test**2: Delivery of individual practice reports** of the subject. (25% of the grade, minimum 4 out of 10)

Assessment criteria are as follows:

- Solution: Correct solution based on the practice script.
- Comments and reports: use of terminology, application of subject concepts, justification of arguments.

-**Test 3: Delivery of the practical group work** done in the subject. (25% of the grade, minimum 4 out of 10)

Assessment criteria are as follows:

- Solution: complexity of the proposed solution, inclusion of elements of the subject.
- Comments and reports: use of terminology, application of subject concepts, justification of arguments.
- Oral presentation of the team project: use of terminology, application of the concepts of the subject, time limit.