Neural Networks

Academic Year: (2023 / 2024)   **Review date: 31-05-2023**

Department assigned to the subject: Signal and Communications Theory Department

Coordinating teacher: MARTÍNEZ OLMOS, PABLO

Type: Electives ECTS Credits : 3.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

The students are expected to have basic knowledge of
- Calculus
- Programming skills
- Numerical optimization

OBJECTIVES

The fundamental objective is that the student learns to design decision machines based on neural networks for basic learning problems in tabular and multimedia data, paying special attention to regularization and validation techniques. Likewise, the student will learn to use automatic differentiation software packages for model training and experimental simulation.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Neural Networks and Backpropagation
2. Regularization and explainability
3. Architectures for high-dimensional correlated data: images, time series and graphs

LEARNING ACTIVITIES AND METHODOLOGY

AF1 Theoretical class
AF2 Practical classes
AF3 Theoretical and practical classes
AF4 Laboratory practices
AF5 Tutorials
AF6 Group work
AF7 Individual student work
AF8 Partial and final exams

ASSESSMENT SYSTEM

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

The continuous evaluation will consist of partial exams, carrying out practices and programming projects and presentation of works.

SE 2 Individual or group work carried out during the course

The extraordinary evaluation will consist of a final exam.

SE 3 final exam

BASIC BIBLIOGRAPHY

- Cristopher Bishop Pattern Recognition and Machine Learning, Springer , 2006

- Ian Goodfellow and Yoshua Bengio and Aaron Courville Deep Learning, MIT Press, 2017

- Kevin Murphy Machine Learning A Probabilistic Perspective, MIT Press, 2012