uc3m | Universidad Carlos III de Madrid

Deep Learning

Academic Year: (2023 / 2024)   **Review date: 14-01-2024**

Department assigned to the subject: Signal and Communications Theory Department

Coordinating teacher: MARTÍNEZ OLMOS, PABLO

Type: Electives ECTS Credits : 6.0

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 objective of the course is the description and implementation of the fundamental models and architectures in deep learning, covering problems of different kinds and advanced methodologies.

DESCRIPTION OF CONTENTS: PROGRAMME

Neural networks and backpropagation.
Deep networks: optimization and regularization for massive data.
Deep architecture and methods for spatially correlated data.
Deep architectures and methods for sequences.
Deep attention models and transformers.
Representation learning.
Generative deep neural networks.

LEARNING ACTIVITIES AND METHODOLOGY

AF3	Theoretical practical classes
AF4	Laboratory practices
AF5	Tutorials
AF6	Team work
AF7	Student individual work
AF8	Partial and final exams

Activity code	total hours number	presencial hours number	% Student Presence
AF3	134	134	100%
AF4	42	42	100%
AF5	24	0	0%
AF6	120	0	0%
AF7	248	0	0%
AF8	16	16	100%
SUBJECT TOTAL	600	184	30,66%

ASSESSMENT SYSTEM

The continuous evaluation will consist of partial exams, practicals and programming projects and presentation of works.

The extraordinary evaluation will consist of a single exam about the content of the course and the programming projects developed in class.

% end-of-term-examination: 0

% of continuous assessment (assigments, laboratory, practicals…):   100

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

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