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Machine Learning in Healthcare

Academic Year: (2021 / 2022)   **Review date: 10/06/2021 13:29:13**

Department assigned to the subject: Signal and Communications Theory Department

Coordinating teacher: VAZQUEZ LOPEZ, MANUEL ALBERTO

Type: Electives ECTS Credits : 6.0

Year : 4 Semester :

OBJECTIVES

CB1: That students have demonstrated to possess and understand knowledge in an area of ¿¿study that starts from the base of general secondary education, and is at a level that, although it is supported by advanced textbooks, also includes some aspects that imply knowledge from the forefront of your field of study.
CB2: That students know how to apply their knowledge to their work or vocation in a professional way and possess the competencies that they usually demonstrate through the elaboration and defense of arguments and the resolution of problems within their area of ¿¿study.
CB5: That students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.
CG4: Ability to solve technological, computer, mathematical and statistical problems that may arise in engineering and data science.
CG5: Ability to solve mathematically formulated problems applied to various subjects, using numerical algorithms and computational techniques.
CG6: Ability to synthesize the conclusions obtained from the analyzes carried out and present them clearly and convincingly both in writing and orally.
CT1: Ability to communicate knowledge orally and in writing, before both specialized and non-specialized audiences.

RA1 Have acquired advanced knowledge and proven an understanding of the theoretical and practical aspects and of the work methodology in the field of data science and engineering with a depth that reaches the forefront of knowledge
RA2 Being able, through arguments or procedures elaborated and supported by themselves, to apply their knowledge, understanding of these and their problem-solving abilities in complex or professional and specialized work environments that require the use of creative and innovative ideas
RA4 Be able to cope in complex situations or that require the development of new solutions both in the academic, labor or professional fields within their field of study;
RA6 Be able to identify their own training needs in their field of study and work or professional environment and to organize their own learning with a high degree of autonomy in all kinds of contexts (structured or not).

DESCRIPTION OF CONTENTS: PROGRAMME

This course aims to provide an overview of the application of machine learning techniques in different problems in healthcare.
1. Introduction to Machine Learning in Healthcare.
2. Smart Electronic Health Records.
3. Disease Identification and Diagnosis.
4. Personalized Medicine
5. Behavioral Characterization and Modification.
5. Drug Discovery.
6. Epidemic Outbreak Prediction.

LEARNING ACTIVITIES AND METHODOLOGY

AF1: THEORETICAL-PRACTICAL CLASSES. In them the knowledge that students must acquire will be presented. They will receive the class notes and will have basic reference texts to facilitate the follow-up of the classes and the development of the subsequent work. Exercises, practical problems will be solved by the student and workshops and an evaluation test will be carried out to acquire the necessary skills.

AF2: Updated to allegation

AF3: STUDENT INDIVIDUAL OR GROUP WORK.

AF8: WORKSHOPS AND LABORATORIES.

AF9: FINAL EXAM. In which the knowledge, skills and abilities acquired throughout the course will be assessed globally.

MD1: THEORY CLASS. Lectures in class by the teacher with the support of computer and audiovisual media, in which the main concepts of the subject are developed and materials and bibliography are provided to complement the students' learning.

MD2: PRACTICES. Resolution of practical cases, problems, etc. raised by the teacher individually or in a group.

MD3: TUTORING. Individualized assistance (individual tutorials) or in groups (collective tutorials) to students by the teacher.

MD6: LABORATORY PRACTICES. Applied / experimental teaching to workshops and laboratories under the supervision of a tutor.

ASSESSMENT SYSTEM

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

The Continuous Assessment is 100% of the student's grade and will consist of the following elements:

* 3 Laboratory tests (30%): resolution of exercises similar to those proposed in the course notebooks using python.
* Written test (30%): it will include the theory and practice contents of the subject
* Final project (40%)

In the ordinary assessment, students who do not pass the subject will be able to take a final exam consisting of a written test and another in the laboratory. In this way they will be able to recover the corresponding elements of the continuous evaluation.

For the extraordinary call, students will be able to take a final exam for a value of 6 points (written test + laboratory) and, additionally, they will be offered a new final project for a value of 4 points.