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Statistical Learning

Academic Year: (2022 / 2023)   **Review date: 28/04/2022 09:13:41**

Department assigned to the subject: Statistics Department

Coordinating teacher: NOGALES MARTIN, FRANCISCO JAVIER

Type: Compulsory ECTS Credits : 6.0

Year : 2 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Linear algebra
Probability and Data Analysis
Introduction to Statistical Modeling

OBJECTIVES

CB2: That students know how to apply their knowledge to their work or vocation in a professional manner and possess the skills that are usually demonstrated through the elaboration and defense of arguments and the resolution of problems within their area of ¿¿study.
CB3: That students have the ability to gather and interpret relevant data (usually within their area of ¿¿study) to make judgments that include a reflection on relevant issues of social, scientific or ethical nature.
CE3: Ability to correctly identify classification problems corresponding to certain objectives and data and to use the basic results of the multivariate analysis as a basic foundation of the methods of classification, clustering and reduction of the dimension.
CG1: Knowledge and adequate skills to analyze and synthesize basic problems related to engineering and data science, solve them and communicate them efficiently.
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 diverse 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.

RA1: Have acquired advanced knowledge and demonstrated an understanding of the theoretical and practical aspects and work methodology in the field of science and data engineering with a depth that reaches the forefront of knowledge.
RA2: Power, through arguments or procedures developed and supported by them, apply their knowledge, understanding of these and their abilities to solve problems in complex or professional and specialized work environments that require the use of creative and innovative ideas.
RA3: Have the ability to collect and interpret data and information on which to base their conclusions including, when necessary and relevant, reflection on social, scientific or ethical issues in the field of their field of study.
RA4: Being able to cope with complex situations or requiring the development of new solutions in the academic, work or professional field within their field of study.
RA5: Know how to communicate clearly and accurately to all types of audiences (specialized or not), knowledge, methodologies, ideas, problems and solutions within the scope of 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 types of contexts (structured or not).

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introducción al aprendizaje estadístico

2. Evaluación de métodos de aprendizaje

3. Aprendizaje no supervisado

   3a. Clustering

   3b. Reducción de dimensión

4. Aprendizaje probabilístico

   4a. Clasificación estadística

   4b. Regresión y predicción

5. Casos de estudio

LEARNING ACTIVITIES AND METHODOLOGY

Theory (3 ECTS), Practice (3 ECTS).
50% lectures with teaching materials available on the Web. The other 50% practical sessions (computer labs).

ASSESSMENT SYSTEM

% end-of-term-examination/test:	50
% of continuous assessment (assigments, laboratory, practicals…):	50

The assessment will be made by weighting the continuous evaluation (50%) and the final exam (50%), with a minimum grade of 5 points over 10 in each assessment activity.

BASIC BIBLIOGRAPHY

 - BISHOP, C.M. "PATTERN RECOGNITION AND MACHINE LEARNING", SPRINGER SCIENCE AND BUSINESS MEDIA, 2006

 - FRIEDMAN, J.; HASTIE, T.; TIBSHIRANI, R. "THE ELEMENTS OF STATISTICAL LEARNIG", NEW YORK, SPRINGER SERIES IN STATISTICS, 2001

 - K. Murphy Machine Learning, A Probabilistic Perspective, MIT Press, 2012