

Statistical Learning

Academic Year: (2023 / 2024)

Review date: 12-04-2023

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

Become familiar with different analytical tools, based on data, to make decisions

Acquire skills in unsupervised learning to build clusters and decrease dimensionality in big datasets

Develop skills for the main statistical and machine-learning tools in supervised learning: classification and regression

Use these models to make practical predictions/classifications and perform analytical inferences

Handle the R language for these tools

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to the statistical learning
2. Evaluation of learning methods
3. Unsupervised learning
 - 3a. Clustering
 - 3b. Dimension reduction
4. Probabilistic learning
 - 4a. Statistical classification
 - 4b. Regression and prediction
5. Case studies

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

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 (both the continuous evaluation and the final exam).

% end-of-term-examination:	50
% of continuous assessment (assignments, laboratory, practicals...):	50

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