Predictive modeling

Academic Year: (2023 / 2024)

Review date: 26/04/2023 08:54:05

Department assigned to the subject: Statistics Department

Coordinating teacher: NOGALES MARTIN, FRANCISCO JAVIER

Type: Compulsory ECTS Credits : 3.0

Year : 1 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Mathematics for data analysis Statistics for data analysis

OBJECTIVES

* Basic competences

- CB6: Possess and understand knowledge that provides a basis or opportunity to be original in the development and/or application of ideas, often in a research context.

- CB9: That students know how to communicate their conclusions and the knowledge and ultimate reasons that sustain them to specialised and non-specialised audiences in a clear and unambiguous way.

- CB10: That the students have the learning skills that allow them to continue studying in a way that will be largely self-directed or autonomous.

* General competences

- CG1: Ability to apply the techniques of analysis and representation of information, in order to adapt it to real problems.

- CG4: Synthesise the conclusions obtained from data analyses and present them clearly and convincingly in a bilingual environment (Spanish and English) both written and orally.

- CG5: Be able to generate new ideas (creativity) and anticipate new situations, in the contexts of data analysis and decision making.

- CG6: Use social skills for teamwork and to relate to others autonomously.

- CG7: Apply advanced techniques of analysis and representation of information, in order to adapt it to real problems.

* Specific competences

- CE1: Apply in the development of methods of analysis of real problems, advanced knowledge of statistical inference.

- CE2: Use free software such as R and Python for the implementation of statistical analysis.

- CE5: Apply the advanced statistical foundations for the development and analysis of real problems, which involve the prediction of a variable response.

- CE6: Apply nonparametric models for the interpretation and prediction of random phenomena.

- CE10: Apply statistical modeling in the treatment of relevant problems in the scientific field.

* Learning outcomes

Acquisition of knowledge on: 1) statistical-mathematical foundations of the linear regression model; 2) comparison and selection of regression models; 3) extensions of the linear regression model (penalization, nonlinear models, models with dimensionality reduction, generalized linear models, etc.); 4) big data adaptations for generalized linear models.

- 1. Introduction
- 2. Linear Regression
- 3. Generalized Linear Models
- 4. Advanced Regression

LEARNING ACTIVITIES AND METHODOLOGY

50% lectures with teaching materials available on the Web. The other 50% practical sessions (computer labs).

ASSESSMENT SYSTEM

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

The assessment will be made by continuous evaluation, weighting with a 50% the first assignment and with the other 50% the second one.

With a minimum grade of 5 points over 10 in each assignment.

BASIC BIBLIOGRAPHY

- James, G., Witten, D., Hastie, T. y Tibshirani, R. An Introduction to Statistical Learning with Applications in R, Springer-Verlag, 2021

ADDITIONAL BIBLIOGRAPHY

- Kuhn, M. and Johnson, K. Applied Predictive Modeling, Springer, 2013
- Li, Q. and Racine, J. S. Nonparametric Econometrics, Princeton University Press, 2007
- Peña, D. Regresión y Diseño de Experimentos, Alianza Editorial, 2002
- Wasserman, L. All of Statistics, Springer-Verlag, 2004
- Wood, S. N. Generalized Additive Models: An Introduction with R, Chapman & Hall/CRC, 2006