Automatic machine learning

Academic Year: (2023 / 2024) **Review date: 25-04-2023**

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: FERNANDEZ REBOLLO, FERNANDO

Type: Compulsory ECTS Credits : 3.0

Year : 3 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

Programming
Statistics

OBJECTIVES

* Understand basic Machine Learning techniques
* Learn to determine when to use Machine Learning on real problems
* Learn to determine which technique is appropriate for each problem
* Learn to apply the techniques in a practical way to real problems

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction to machine learning
2. Classification and prediction techniques
3. Non supervised techniques
4. Reinforcement-based techniques
5. Relational learning
6. Methodological aspects

LEARNING ACTIVITIES AND METHODOLOGY

THEORETICAL PRACTICAL CLASSES.
Knowledge and concepts students must acquire. Receive course notes and will have basic reference texts. Students partake in exercises to resolve practical problems.

TUTORING SESSIONS.
Individualized attendance (individual tutoring) or in-group (group tutoring) for students with a teacher. Subjects with 6 credits have 4 hours of tutoring/ 100% on- site attendance.

STUDENT INDIVIDUAL WORK OR GROUP WORK.
Subjects with 6 credits have 98 hours/0% on-site.

WORKSHOPS AND LABORATORY SESSIONS.
Subjects with 3 credits have 4 hours with 100% on-site instruction. Subjects with 6 credits have 8 hours/100% on-site instruction.

ASSESSMENT SYSTEM

FINAL EXAM.
Global assessment of knowledge, skills and capacities acquired throughout the course. The percentage of the evaluation varies for each subject between 60% and 0%.

CONTINUOUS EVALUATION.
Assesses papers, projects, class presentations, debates, exercises, internships and workshops throughout the course. The percentage of the evaluation varies for each subject between 40% and 100% of the final grade.

Final grade will be composed of 50% of individual work and 50% of team work. Among the individual activities, assessment of activities performed during the course will be a 70% of each student grade, and a final exam will be a 30% of the grade, although mechanisms to pass the course only with the final exam will be provided. A minimum qualification in each part could be required.

Specifically, the activities to develop are:

- Partial exams (20%): exams with theoretical content, to evaluate the knowledge acquired by the students trough the use of basic and advanced bibliography. Those exams permit to evalueta the knowledge in fundamentals, paradigms and techniques in intelligent systems and machine learning.

- Final exam (30%): theoretical-practical exam to evaluate the capacity of the student to represent human knowledge in different formalisms, specifically, in a way that can be handled with machine learning methods, allowing them the analysis, design and implementation of a final solution. The development of the exam requires a global knowledge about the main concepts related to machine learning.

- Tutorials and practices (50%): tutorials will be about the use of machine learning tools and techniques; practices wiil be about practical applications that require the representation of knowledge for the analysis, design and implementation of a computing solution in intelligent systems based on machine learning.

% end-of-term-examination: 30
% of continuous assessment (assigments, laboratory, practicals...): 70

% end-of-term-examination:	30
% of continuous assessment (assigments, laboratory, practicals…):	70

BASIC BIBLIOGRAPHY

- E. Rich y K. Knight Artificial Intelligence, McGraw-Hill.
- S. Russel y P. Norving Artificial Intelligence: a modern approach, Prentice Hall, 2003
- T. M. Mitchell Machine Learning, Mc Graw Hill.

ADDITIONAL BIBLIOGRAPHY

- J. W. Shavlik y T. G. Dietterich (eds.) Readings in Machine Learning, Morgan Kaufmann.
- P. W. Langley Elements of Machine Learning, Morgan Kaufmann.
- R. Sutton and A Barto Reinforcement Learning: an Introduction, Kluwer Academic Publishers.
- Saso Dzeroski y Nada Lavrac Relational Data Mining, Springer Verlag.