Artificial intelligence in business

Academic Year: (2020 / 2021) **Review date: 10-07-2020**

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: LEDEZMA ESPINO, AGAPITO ISMAEL

Type: Compulsory ECTS Credits : 6.0

Year : 4 Semester : 1

REQUIREMENTS (SUBJECTS THAT ARE ASSUMED TO BE KNOWN)

- Artificial Intelligence

OBJECTIVES

EUROACE COMPETENCES
- General competences:
  - CG2. Ability to create new ideas and concepts (creativity), foresee new settings and to work both independently or being part of a team.
  - CG7. Ability to present and discuss proposals for teamwork evaluation, proving they have the personal and social skills to assume different responsibilities.

- Computing area competences:
  - CECC4. Ability to learn the concepts, paradigms and techniques of the intelligent systems in order to analyze, design and implement intelligent services and applications.
  - CECC5. Ability to extract, model and represent human knowledge in a suitable way to solve problems using a computer system, particularly such problems related with the understanding and processing of the data obtained from smart environments.

ABET COMPETENCES
- General competences:
  - Analysis and synthesis skills (PO: b, e, g)
  - Planning and organization skills (PO: b, c)
  - Problem solving skills (PO: a, e, k)
  - Team work skills (PO: d)
  - Capacity to apply theoretical concepts (PO: a, b, c, e, f, i, k)
  - Critical Reasoning skills (PO: a, f)

- Specific Competences:
  - Cognitive (acquired knowledge) (PO: a, b, c, e, f, k)
    1. Knowledge about main Artificial Intelligence (AI) techniques and concepts.
    2. Knowledge about the application of the different AI techniques in different areas, such as business, banking or finance.
    3. Knowledge about the complexity in implementing intelligent solutions in real environments.

  - Instrumental (know how) (PO: b, c, e, k)
    1. Designing intelligent systems to solve practical problems.
    2. Critical analysis of real-life problems.
    3. Using specific tools to develop intelligent systems.

  - Attitude (PO: e, g, i)
    1. Creativity.
    2. Quality aspects.
    3. Motivation.
    4. Seeking solutions to new problems.

DESCRIPTION OF CONTENTS: PROGRAMME

1. Introduction
   - Context.
   - Key Features.
   - Main techniques.

2. Expert Systems
- Introduction.
- What is an Expert System?
- Applications of Expert Systems.
- Advantages and Disadvantages
- Case studies

3. Neural Networks
- Introduction
- Artificial Neural Networks
- Applications of ANN
- Advantages-Disadvantages
- Case studies

4. Evolutionary Algorithms
- Introduction
- Evolutionary algorithms
- Applications of evolutionary algorithms
- Advantages and disadvantages
- Case studies

5. Data Mining
- Introduction
- Applications
- KDD and Data Mining
- Data Mining Tasks
- Applications
- Case studies

6. Text mining
- Definition
- Overall Architecture of Text Mining Systems
- Core Text Mining Operations
- Applications
- Case studies

7. Web Mining
- Introduction
- Types of Web Mining
- Content Web Mining
- Structure Web Mining
- Usage Web Mining
- Case studies

8. Fuzzy Logic
- The concept of fuzzy
- Fuzzy Sets
- Fuzzy logic
- Fuzzy reasoning systems
- Case studies

9. Agents
- Introduction
- What is an agent?
- Multiagent Systems
- Applications
- Case studies

10. Other techniques
- Introduction
- Description
- Applications
- Case studies

LEARNING ACTIVITIES AND METHODOLOGY

Theory: Lectures. (EuroACE CECC4). (PO: a, b, e, f, i , k)
The aim is to achieve the specific cognitive competences of the course. The main ideas of the course will be presented.

Cases (EuroACE CG2, CG7, CECC4, CECC5). (PO: d, e, g, i)
The aim is to complement the acquisition of the cognitive specific competences. In addition, it is some transversal competences such as analysis, synthesis and collaborative work are carried out.

Academic activities with the lecturer. Lab experiments (EuroACE CG2, CG7, CECC4, CECC5). (PO: a, b, c, d, e, f, i, k)
Instrumental and most of the transversal competences are developed, such as collaborative working, capacity to apply theoretical concepts, analyzing and interpreting data. In addition, the aim is to develop attitude capacities; design and develop an intelligent system working in a team.

Realization of Supervised Academic Activities. (EuroACE CECC4, CECC5) (PO: a, b, c, d, e, f, g, i, k)
- With the lecturer . To propose a practical case, with the help of the lecturer, in which some of the main aspect of the subject are considered. A presentation of the work needs to be done. Partial exams.
- Without the lecturer - Student work. Exercises and complementary lessons proposed by the lecturer. Active participation in the subject's SPOC.

ASSESSMENT SYSTEM

The continuous evaluation activities and the cases allow both to teach the objectives of the subject and to evaluate the students. The evaluation proposed consists of the assessment of cases, academic supervised activities and the lab experiments using the following score (The relation with the competences is not specified because the formative activities have been already connected with them)

1. Cases: 10% EuroACE: CG2, CG7, CECC4, CECC5. (PO: d, e, g, i)
2. Continuous assessment tests: 30% EuroACE: CECC4, CECC5 (PO: a, b, c, d, e, f, g, i, k)
3. Other academic activities: 20% EuroACE: CECC4, CECC5 (PO: a, b, c, d, e, f, i, k)
4. Lab experiments: 40% EuroACE: CG2, CG7, CECC4, CECC5. (PO: a, b, c, d, e, f, g, i, k)

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

BASIC BIBLIOGRAPHY

- Akerkar, Rajendra Artificial Intelligence for Business, Springer, 2019
- Francesco Corea Applied Artificial Intelligence: Where AI Can Be Used In Business, Springer, 2019
- Jerry Overton Artificial Intelligence, O'Reilly Media, Inc, 2018
- Ramesh Sharda, Dursun Delen, Efraim Turban Analytics, data science, & artificial intelligence : systems for decision support, Pearson , 2020

ADDITIONAL BIBLIOGRAPHY

- Efrain Turban, Ramesh Sharda, Dursun Delen Decision Support and Business Intelligence Systems (ninth edition), Pearson, 2011
- Nilsson, N. Inteligencia Artificial. Una nueva síntesis, McGraw-Hill.
- Pyle, Dorian Business modeling and data mining, Morgan Kaufmann Publishers.
- Witten, I.H., Frank, E. Data mining : practical machine learning tools and techniques, Morgan Kaufmann.