



CORSO DI LAUREA: Innovative Technologies for Digital Communication L-20

INSEGNAMENTO: Introduction to Artificial Intelligence

CFU: 6

EVENTUALE ARTICOLAZIONE IN MODULI: No

ANNO DI CORSO: 2023/24

NOME DOCENTE: Prof.ssa Brunella Botte

INDIRIZZO EMAIL: b.botte@unilink.it

ORARIO DI RICEVIMENTO: At the end of classes or by appointment

TEACHING-LEARNING OUTCOMES:

Teaching aims for students to achieve the following learning outcomes:

With reference to knowledge and understanding:

- a) Know the disciplinary complexity behind Artificial Intelligence;
- b) Learn what an intelligent agent is;
- c) Understand the elements involved in the operation of an intelligent agent;
- d) Understand how AI is prepared to solve complex real-world problems;
- e) Learn what a logical agent is and how it works;
- f) Understand how knowledge representation occurs for a logical agent;
- g) Gain awareness of how automated planning works.

With reference to the application of the acquired knowledge and skills:

- a) Be able to deduce the main implications arising from the use of such advanced technology;
- b) Be able to distinguish under what circumstances it is best to make use of such technology;
- c) Develop critical skills useful in guiding ethical use of technology.

With reference to communication skills:

- a) Mastering the technical language of the subject.

DETAILED PROGRAMME

General Aspects

- Introduction to AI
- Touring's approach
- The cognitive modeling approach
- The "laws of thought" approach
- The rational agent approach
- The foundations of AI
 - Philosophy
 - Mathematics
 - Economics
 - Neuroscience
 - Psychology
 - Computer engineering
 - Control theory and cybernetics
 - Linguistics
- History of AI evolution

State of the art

Risks and benefits of AI

Intelligent agents

- Introduction
- Agents and environments
- Good behaviour: the concept of rationality
- The nature of the environments
- The properties of the environments
- The structure of agents
 - Simple reflex agents
 - Model-based simple reflex agents
 - Goal-based agents
 - Utility-based agents
 - Learning agents
- How the components of an agent program work

Solving problems by searching

- Introduction
- Problem-solving agents
- Searching for problems and solutions
- Real-world problems
- Measuring problem-solving performance

Logical agents

- Knowledge-based agents
- The Wumpus world
- Logics

Knowledge representation

Ontological engineering
Categories and objects
Physical composition
Measures
Natural kinds
Mental objects and modal logic
Semantic networks

Automated Planning

Definition of classical planning
Algorithms for classical planning
Hierarchical planning
Solving scheduling problems

Quantifying uncertainty

Acting in uncertainty
Uncertainty and rational decisions
Probability

Monographic lectures

AI and art
AI and games
AI and natural language

PROPEDEUTICS

None

EXAM PROCEDURE

The exam consists of a final written test to assess the knowledge acquired during the course.

It is also possible, for students who attended the 80% of classes, to participate in two midterms, one in the middle and one at the end of the course. The final grade will be the sum of the grades earned in the two midterms. To participate in the first midterm doesn't mean that the students are automatically admitted to the second one. The limit in participation should be respected.

EVALUATION CRITERIA

Knowledge and understanding skills

Upon completion of this course, students should know the fundamentals of AI, the disciplines involved and its evolutionary history. They should also have a general understanding of the agents that operate through AI and the main areas of application. Finally, they should have an overall knowledge of how an artificial intelligence "thinks."

Application of acquired knowledge and skills

Upon completion of the course, students should be able to apply the knowledge gained in the course to real cases.

Communication skills

By the end of the course, students should have acquired the specialized language of the subject and be able to correctly expound on the topics covered.

FINAL GRADE AWARDING CRITERIA

The final grade will depend on the student's demonstrated knowledge in the exam and, in general, participation during the course lectures.

STUDY MATERIALS

1. Teacher's PPT, available on the ESSE3 platform
2. Textbook ["Artificial Intelligence: A Modern Approach, 4th Edition, S. Russell, P. Norvig, 2021"](#).
3. Further materials available on the platform and shown during classes.