

IX.2324/IX.2424 Introduction to Artificial Intelligence

Person in charge: Maria Trocan

Prerequisites: Basics of data science techniques, Algorithmics and programming

Organisation: Class– Labs – Project (42hrs + 70hrs individual work)

Assessment : Exam / Project defense

ECTS: 4 credits

Overview

Artificial intelligence is mainly interested in solving problems, usually complex, using general knowledge on the field. Two important questions are at the heart of this activity: How to formalize this general knowledge? How to design systems capable of automatically exploiting them to solve the problems that interest us.

This course presents different possible approaches. In particular, it focuses on state-space-based resolution techniques, heuristic algorithms, and game algorithms, which, on the whole, lead to solving problems. It also presents the problem of knowledge-based systems, where the formalization of knowledge is carried out in a more "logical" framework and where problem solving is similar to the construction of reasoning, exploiting this logical knowledge, at the same time. help of inference systems.

Learning Objectives

Skills

This module covers the applications of artificial intelligence to problem solving. The students will master the methods of problem formalization and knowledge representation: state-based representation, knowledge-based logical representations. Furthermore, they will master the resolution algorithms associated with these representations: search in graphs, heuristics, inference systems, learning based models.

Knowledge

Concepts

- Uninformed exploration strategies.
- Informed exploration strategies
- Problems to satisfaction of constraints

- Game trees, min-max, expectimax
- Markov decision process
- Introduction to probabilistic graphical models
- Naïve, Bayes.
- Perceptrons and logistic regression
- Neural networks

Know-how

- The course will allow students to dive into Python while solving AI problems and learning AI applications. Programming assignments will be in Python.

Teaching method

Class (21h) – Labs (21h) – Project.

Assessment

Continuous assessment – individual

Project assessment – per project group

Working language

English

Bibliography

[1] <https://courses.edx.org/courses/course-v1:ColumbiaX+CSMM.101x+2T2017/course/>