

Lectures about Artificial Intelligence, using Zumi

This document highlights the four lectures for the Artificial Intelligence course. Each lecture takes 2 hours, and the participants will learn the basic theory of some machine learning models, together with some practical exercises with Zumi.

1 First lecture (2h)

Introduction AI (1h). We introduce the terms used in AI and the history of AI in an interactive manner. We compare some scientific papers from the historical perspective. The introduction is punctuated by videos.

Build Zumi (1h). We unpack the Zumi car, and connect each pieces together. We take the time to explain the functionality of some important mechanical and electronical parts.

Homework (2h). Read the papers given. Search a problem using AI that you want to solve (home auotmation, etc.). Watch some videos that have been suggested.

2 Second lecture (2h)

We first discuss homeworks. Every participant explains in which context she would like to use AI.

Principle about machine learning (30 min). Explain the problem of data classification and some solutions (we introduce some terms such as classifiers, openvc, tensorflow).

Study of kNN classifier (1h30). We study kNN classifier in a theoretical way (30 min), on a programming example (30 min), and using Zumi (30 min)

Homework (2h). Think about a machine learning model to build: what would be the data, what would be the classifier? Find if some data sets already exist for the problem.

3 Third lecture (2h)

We discuss homeworks.

Study of Haarcascade classifier (1h). We show the theory of haar feature and classification (30 min), we use adaboost to do face recognition on a live stream video (30 min).

Problem solving with Zumi (1h). We setup some exercises:

- move Zumi in straight line and come back; stop Zumi if it meets some obstacles, and
- use camera input data for training a model of color recognition.

Homework (2h). Search which machine learning model fits for classifying data of personal projects.

4 Fourth lecture (2h)

We discuss homeworks.

Continuation on building model (30 min). We continue to build the model of color classification with input stream from camera.

Maze solving (1h30). We use the maze of zumi and the model previously trained to guide zumi from one end to the other of the maze.