
Introduction to Machine Learning. Handout.

Abstract

This document covers the main questions addressed in the lecture. These questions are the most relevant for the course and could be evaluated in the final examination. The answers to these questions can be found in the slides from the lecture and within the references they contain.

1 Machine learning applications

- Provide a definition of ML.
- What are some common applications of ML?
- Which are some ethical problems in the application of ML?

2 Machine learning and Artificial Intelligence

- What are the main differences between ML and Good Old Fashioned AI (GOFAI)?
- From the point of view of AI, what are some criticisms made to the ML approach?

3 ML approaches

- Which are some of the possible criteria to classify ML methods?
- Identify four of the most important approaches developed in ML.
- What is supervised learning?
- What is unsupervised learning?
- What is reinforcement learning?
- What is supervised genetic programming?

4 Supervised learning

- What is the difference between classification and regression?
- What are the components of a supervised classification problem?
- What is the difference between a feature and a response variable?
- What is the difference between the training and test sets in a classification problem?
- What is the role of the features in a classification problem?
- Mention some supervised classification algorithms.
- Mention some real-world classification problems.
- Mention some real-world regression problems.

5 Unsupervised learning

- What is the difference between supervised and unsupervised learning?
- What are the components of a supervised classification problem?
- What is the most common unsupervised learning task?
- What is the purpose of dimensionality reduction ?
- Explain what is the goal of clustering ?
- Mention some real-world clustering problems.
- What is the difference between clustering and biclustering?
- Mention some clustering algorithms.
- What is dimensionality reduction?
- What outlier detection methods do?
- What is change-point detection? For what type of data is it used?
- What do methods that discover graph structure produce as output?

6 Reinforcement learning

- What is the goal of reinforcement learning?
- Which are the components of a reinforcement learning algorithm?
- How is the environment of a RL algorithm usually formalized?
- What types of applications can RL be applied?
- What is the difference between RL and supervised classification?

7 Genetic programming

- What is the objective of genetic programming?
- What type of problems can GP be applied to?
- Which possible program representations can GP use?
- Why is GP considered an evolutionary algorithm?
- What is the role of the fitness function in GP?
- Mention examples of genetic programming algorithms.