

Elements of AI

Single subject course

2 credits

Grunderna i AI

ETE318

Valid from: 2019 Spring semester

Determined by

Board of Studies for Chemistry, Biology
and Biotechnology

Date determined

2019-03-14

Main field of study

Computer Science

Course level

First cycle

Advancement level

G1X

Entry requirements

General entry requirements for undergraduate studies

Prerequisites

None

Intended learning outcomes

- Distinguish between realistic and unrealistic AI (science fiction vs. real life)
- Express some basic philosophical problems related to AI
- Formulate a simple real-world problem as a search problem
- Apply the Bayes rule to infer risks in simple scenarios
- Explain the base-rate fallacy and how to avoid it by applying Bayesian reasoning
- Explain why machine learning techniques are used
- Distinguish between unsupervised and supervised machine learning scenarios
- Explain the principles of some supervised classification methods
- Explain what a neural network is and where they are being successfully used
- Understand the technical methods that underpin neural networks
- Understand the difficulty in predicting the future and be able to better evaluate the claims made about AI
- Identify some of the major societal implications of AI

Course content

The material is divided in six chapters which are:

1. What is AI?
 - Definitions of AI
 - Autonomy and adaptivity
 - Philosophical problems related to AI including the Turing test and the Chinese room thought experiment
2. AI problem solving
 - Formulate a simple game (such as tic-tac-toe) as a game tree
 - Use the minimax principle to find optimal moves in a limited-size game tree
3. Real world AI
 - Expressing probabilities in terms of natural frequencies
 - Bayes rule to infer risks in simple scenarios
 - The base-rate fallacy and how to avoid it by applying Bayesian reasoning
4. Machine learning
 - Why use machine learning
 - Unsupervised and supervised machine learning scenarios
 - Supervised classification methods: the nearest neighbor method, linear regression, and logistic regression
5. Neural networks
 - What is a neural network is and where are they being successfully used
 - The technical methods that underpin neural networks
6. Implications
 - Major societal implications of AI including algorithmic bias, AI-generated content, privacy, and work
 - The difficulty of predicting the future and how to evaluate claims made about AI

Teaching and working methods

An open online course Elements of AI (<https://course.elementsofai.se>), consisting of text and interactive elements

Examination

UPG1 Assignments 2 credits U, G

Assessment is based on exercises, including multiple choice quizzes, numerical exercises, and questions that require a written answer. The multiple choice and numerical exercises are automatically checked, and the exercises with written answers are reviewed by other students (peer grading) and in some cases by the instructors. Successful completion of the course requires at least 90% completed exercises and minimum 50% correctness. The course is graded as pass/fail (no numerical grades).

Grades

Two grade scale, older version, U, G

Department

Institutionen för datavetenskap

Director of Studies or equivalent

Peter Dalenius

Examiner

Fredrik Heintz

Course website and other links

Education components

Preliminary scheduled hours: 0 h

Recommended self-study hours: 53 h