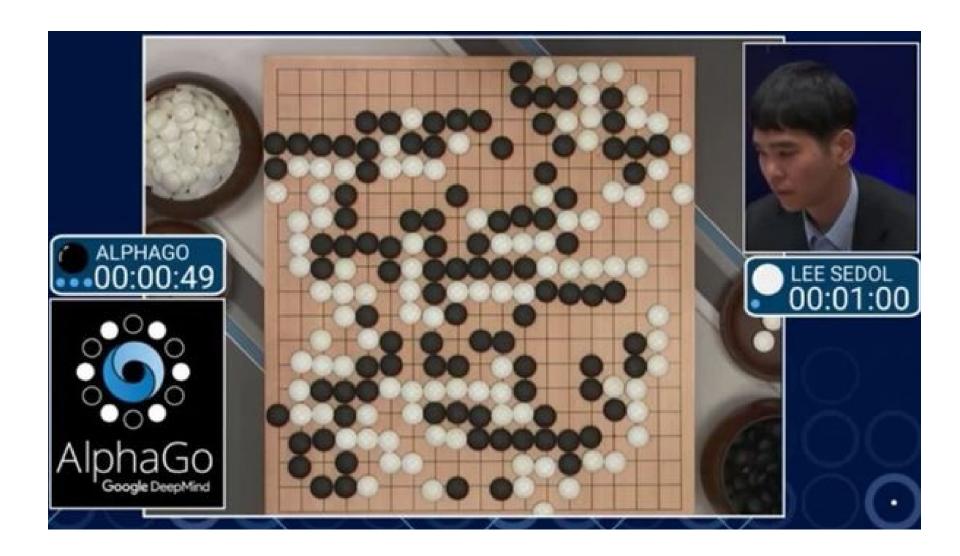
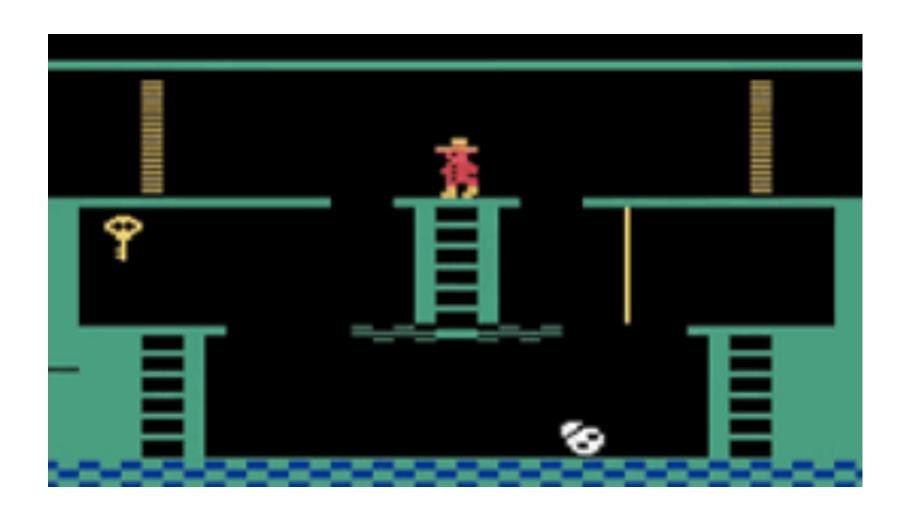


ELEC-E8125 Reinforcement learning Course arrangements

Joni Pajarinen 4.9.2023





Robot learns to swing a ball into a cup using reinforcement learning

Youtube video:

https://www.youtube.com/watch?v=ljyYCuxcJqs&ab_channel=IntelligentAutonomousSystems

Course contents

- Overview of mathematical models and algorithms behind sequential decision making, that is, decision making in time-series systems
- Optimal decisions in known worlds
- Optimal decisions in unknown worlds
- Optimal decisions in partially observable worlds

Learning goals – What's the course about?

- After completing the course, you can explain main concepts and approaches related to decision making and learning in stochastic time series systems
- Read scientific literature to follow the developing field
- Choose approaches for a particular problem
- Implement algorithms such as value iteration and policy gradient

Prerequisities

- Essential
 - Programming (Python)
 - Math (probability, matrix algebra, calculus)
- Useful
 - Machine learning (supervised learning, neural networks)
 - Control engineering (feedback, LQR will be useful)
- Motivation to work hard!

Teaching

- Independent study
 - Readings, videos
- Lectures
 - Discuss concepts, summarize, give new viewpoints
 - Tue 14:15-16
 - 2 hours of lecture / week
- Quizzes
 - Based on lectures and readings, completed electronically
 - Questions based both on previous lecture(s) and for the next lecture (reading material)
- Assignments/problem sets
 - 7 assignments, TO BE COMPLETED INDIVIDUALLY (1 PERSON)
 - Weekly exercise sessions for going through assignment and getting feedback. Starting 5.9.2023 and going on until project deadline
- Project
 - Application of learned knowledge (2nd period)
 - 2 person groups
 - Project topic given



Grading and evaluation

- To pass
 - Complete assignments
 - Complete project
 - Get 50%+ of total course points
- Grading
 - Quizzes 20 %
 - Assignments 60 %
 - Project 20 %

Workload estimate

- Lectures 24 h
- Exercise sessions 20 h
- Independent study 64 h
- Project work 27 h
- Total 135 h



Material

- MyCourses
 - Lecture slides
 - Lecture recordings
 - Links to readings and videos
- Sutton & Barto, "Reinforcement learning", 2018 ed.
- Any other material you can find

Teachers

- Lecturer: Prof. Joni Pajarinen (joni.pajarinen@aalto.fi)
- Teaching assistants (TAs)
 - Aidan Scannell (main TA)
 - Vivienne Huiling Wang
 - Wenyan Yang
 - Yi Zhao
 - Wenshuai Zhao
 - Nikita Kostin
 - Mohammadreza Nakhaei
 - Yuying Zhang
 - Taha Heidari
- Primary contact channel: Zulip (see MyCourses)
 - If you need to contact individual TAs see MyCourses for the responsibilities of TAs

Questions?