Foundations of Artificial Intelligence

Prof. Dr. J. Boedecker, Prof. Dr. W. Burgard, Prof. Dr. F. Hutter, Prof. Dr. B. Nebel
T. Schulte, R. Rajan, S. Adriaensen, K. Sirohi
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University of Freiburg
Department of Computer Science

Exercise Sheet 1

Due: Friday, April 30, 2021

Exercise 1.1 (Potentials and Limits of AI)

Examine the AI literature or the Internet to discover to what extent the following tasks can currently be solved by computers/robots:

(a) Playing the board games Checkers and Go.

(b) Performing real-time natural language processing.

(c) Autonomy of unmanned ground and aerial vehicles (UGVs and UAVs).

(d) Automatic face recognition.

(e) Playing video games (e.g., classical Atari games) like a human.

(f) Composing of music.

(g) Turing test

Write down your findings in 2–3 sentences each.

Exercise 1.2 (Performance and Utility)

(a) What is the difference between a performance measure and a utility function?

(b) Describe the relation between the performance measure and the utility function for a learning agent.

Exercise 1.3 (Rational Agents)

(a) Write down a PEAS (**P**erformance **E**nvironment **A**ctuators **S**ensors)-Description for each of the following agents:

(i) Playing monopoly
(ii) Long jump athlete
(iii) Playing the 2048 Game (`http://gabrielecirulli.github.io/2048`)

(b) Characterize the environments of the agents in (a) according to the following criteria:

- fully observable vs. partially observable
- deterministic vs. stochastic
- static vs. dynamic
- discrete vs. continuous

Note: The exercise sheets may be worked on in groups of up to three students.