

Foundations of Artificial Intelligence

Prof. Dr. W. Burgard, Prof. Dr. M. Riedmiller
B. Frank, D. Joho, Dr. S. Lange
Summer Term 2011

University of Freiburg
Department of Computer Science

Exercise Sheet 1

Due: Tuesday, May 10, 2011

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 translations of spoken English into spoken German.
- (c) Autonomy of unmanned ground and aerial vehicles (UGVs and UAVs).
- (d) Carrying heavy loads in rough terrain.
- (e) Automatic face recognition.

Write down your findings in 2–3 sentences each.

Exercise 1.2 (Performance and Utility)

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

Exercise 1.3 (Rational Agents)

Write down a PEAS¹-Description for each of the following agents:

- (a) Table Soccer Robot Kiro
- (b) Chess Player
- (c) Mars Exploration Robot

Characterize the environments of these agents according to the following criteria:

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

The exercise sheets may and should be handed in and be worked on in groups of three (3) students. Please fill the cover sheet² and attach it to your solution.

¹Performance Environment Actuators Sensors

²<http://ais.informatik.uni-freiburg.de/teaching/ss11/ki/cover-sheet.pdf>