

Exercises for MI

Exercise sheet 1

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Exercise 1

You want to design an agent for playing tic-tac-toe (see e.g. <http://boulter.com/ttt/>).

- What is the state space the agent needs to reason with?
- How many states are there in the state space?
- Design 2 different feature-based representations of this state space.
- Design one relational representation of this state space.

Exercise 2 You want to design a soccer playing robot (see e.g. <http://www.robocup.org>).

- Compared to the tic-tac-toe problem, is there a single “right” state space?
- Design one possible feature-based hierarchical state representation for the robot.

Exercise 3 Discuss the differences between the problem domains above according to the dimensions of complexity summarized in Section 1.5.10:

Dimension	Values
Modularity	flat, modular, hierarchical
Representation scheme	states, features, relations
Planning horizon	non-planning, finite stage, indefinite stage, infinite stage
Sensing uncertainty	fully observable, partially observable
Effect uncertainty	deterministic, stochastic
Preference	goals, complex preferences
Learning	knowledge is given, knowledge is learned
Number of agents	single agent, multiple agents
Computational limits	perfect rationality, bounded rationality