

CIS 716.5 Spring 2010 Homework 2

The first three questions are about the “vacuum world” example from Lecture #3.

1. Suppose the vacuum world contains obstacles which the agent has to avoid, and that the agent has a sensor to detect the obstacles. Write down a new logic-based solution for the agent.

Explain what, if any, guarantees you can make for your solution about its ability to make the room clean, and justify your answer.

(20 points)

2. Suppose that the vacuum world agent’s sensors — the one from the lecture that sees the dust, and the new one from Question 1 that can see obstacles — are now *noisy* so they only give the right answer 80% of the time.

(You can interpret this to mean that if there is dust or an obstacle, the relevant sensor will say that it is there 80% of the time. You can assume when there is no dust or obstacle, the sensor always correctly reports this.)

How does this change the logic-based control program? Assume that if the agent tries to move into a square that contains an obstacle, it does not move.

Explain what, if any, guarantees you can make for your solution about its ability to make the room clean, and justify your answer.

(20 points)

3. Formulate the operations available to the vacuum world agent using the STRIPS notation. You can do this for the simplest version of the world, with no obstacles and no faulty sensors.

(10 points)

4. Explain what beliefs, desires and intentions are in the context of a practical reasoning agent.

(10 points)

5. Explain how beliefs, desires and intentions interact in the control of a practical reasoning agent.

(10 points)

6. Explain what is meant by a “commitment strategy” for a practical reasoning agent. Give an example of a possible commitment strategy as part of your answer.

(10 points)

7. Why is it hard to define an optimal commitment strategy? What factors need to be considered when defining a commitment strategy for a particular agent, and what aspect of the agent’s environment are important in this definition?

(10 points)