Cooperating Intelligent Systems Lab 1 Agents

August 31, 2010

1 Task

The assignment is intended to make you acquainted with the concept of agents and how they can be implemented in software. It is recommended that you read chapter 2 in the book Artificial Intelligence - A Modern Approach (AIMA) before you start working. You will in the assignment be implementing a simulator for a vaccum cleaner world similar to the one depicted in Figure 2.2 and specified on page 34 (in the AIMA book, second edition).

2 Code

You can find a simple implementation of the vaccum example in the AIMA code repository at http://aima.cs.berkeley.edu/code.html. The Java code is recommended as it is simpler to understand and modify (unless you have previous LISP or PYTHON experience). You are however not required to use this code, it is allowed to write your own code in any language of your choice. To compile and run the basic program that gets you started go to the src directory (in the java zip-file) and type:
javac aima/basic/vaccum/TrivialVaccumDemo.java
java aima.basic.vaccum.TrivialVaccumDemo
If you do not have a Java compiler installed on your computer, you can e.g. download software development kit and documentation at http://java.sun.com/j2se (Java 2 Platform, Standard Edition (J2SE) version 1.4)

3   Grading

For grade 3: Implement a simulator of the vaccum world (random dirt placement on a 4x3 world) with a performance measuring system. Discuss different ways of measuring performance. Record the average scores of a simple reflex agent and a model based reflex agent (that keeps track of where it has been) and draw conclusions.

For grade 4: Consider a version where the geography of the environment (extent, boundaries and obstacles) is unknown. Design an environment where a simple reflex agent with a randomized agent function outperforms a simple reflex agent.

For grade 5: The vaccum environments in the preceding exercises have all been deterministic. Discuss possible agent programs for each of the following stochastic versions:

a. Murphys Law: twenty-five percent of the time, the Suck action fails to clean the floor if it is dirty and deposits dirt onto the floor if the floor is clean. How is your agent program affected if the dirt sensor gives the wrong answer 10% of the time?

b. Small children: At each time step, each clean square has a 10% chance of becoming dirty. Can you come up with a rational agent design for this case?

In order to get grade 4 you have to also complete the grade 3 assignment, for grade 5 you need to also complete both 3 and 4.