AITA - Exercise Sheet 3

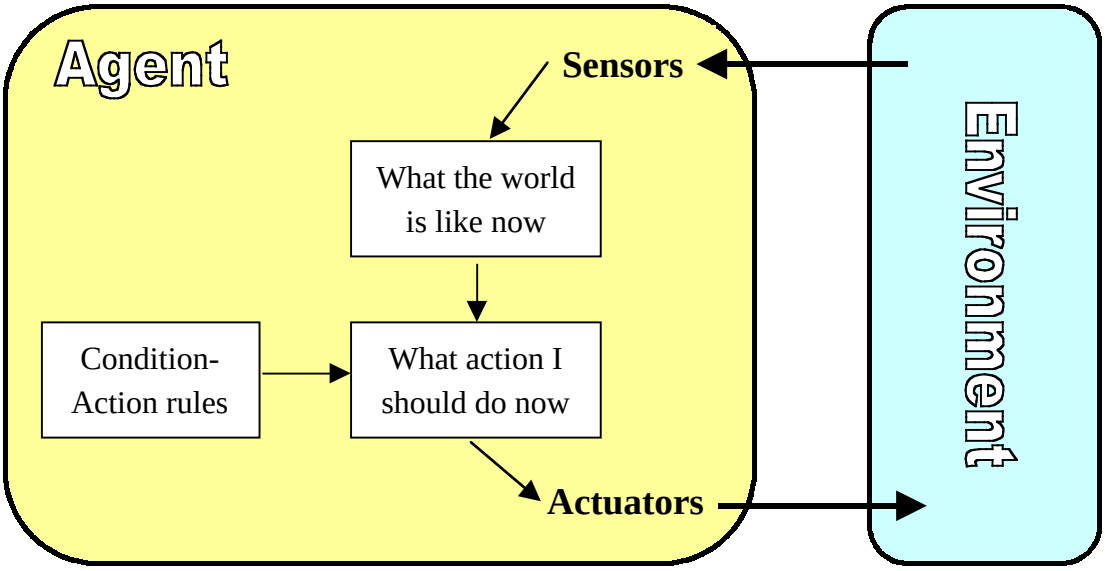
This sheet should be read in conjunction with your notes and handouts for lecture w4s1. We begin with a set of questions to help you think about intelligent agents, and end with a typical exam question on this topic.

Question 1

Can everything be described as an agent? What is an example of a non-agent? What about clocks – in what sense are they agents? Does the distinction between agents and non-agents really make any sense?

Question 2

In their Figures 2.9, 2.11, 2.13 and 2.14, Russell & Norvig (2003) suggest schematic diagrams for each of the four main types of agent: Simple reflex agents, Reflex agents with an internal state, Goal based agents, and Utility based agents. For example, they represent the interaction of a Simple reflex agent with its environment as:.



Try to come up with better ways of representing those four types of agent.

Question 3

Pick several Artificial Intelligence systems that interest you and work out PAGE (i.e. Percepts, Actions, Goals, Environment) descriptions for them.

Question 4

Classify your systems from Question 3 into the four types of agent in Question 2. Are your general schematic diagrams sufficient to represent your systems? Are Russell & Norvig's diagrams better or worse in this respect than your diagrams?

Question 5

Classify the environments from Question 3 according to the five principal distinctions: Accessibility, Determinism, Discreteness, Episodicness, and Staticness.

Question 6

To what extent do your systems from Question 3 involve machine learning? If they don't, then consider how they could be improved by incorporating machine learning.

Question 7

Extend your ideas from Question 2 to produce a schematic diagram for a learning agent. How does this compare with the corresponding diagram suggested by Russell & Norvig (their Figure 2.15)?

Question 8

How do the machine learning systems from Question 6 tie in with the discussion of learning agents in the lectures?

Question 9

How do the artificial neural networks and the brain models discussed in the Week 3 lectures fit into the agent framework? What types of agent are they?

Question 10 (10% of May 2002 AI Techniques Exam)

(a) What is an "agent"? What is a "rational agent"? [2%]

(b) In describing intelligent agents it is often convenient to specify them in terms of Percepts, Actions, Goals and Environment. State briefly what each of these concepts mean. [4%]

(c) List what these concepts correspond to in the following agents:
   (i) A medical diagnostic system.
   (ii) An object sorting robot. [4%]