Artificial intelligence

1. What are the pros and cons of cognitive computing?

2. Do you know about any real-world applications of AI?

3. Let us examine the rationality of various vacuum-cleaner agent functions.

- Show that the simple vacuum-cleaner agent function described in Figure is indeed rational under the assumptions listed on page
- Describe a rational agent function for the case in which each movement costs one point. Does the corresponding agent program require internal state?
- Discuss possible agent designs for the cases in which clean squares can become dirty and the geography of the environment is unknown. Does it make sense for the agent to learn from its experience in these cases? If so, what should it learn? If not, why not?

Percept sequence	Action
$[A, Clean]$	$Right$
$[A, Dirty]$	$Suck$
$[B, Clean]$	$Left$
$[B, Dirty]$	$Suck$
$[A, Clean], [A, Clean]$	$Right$
$[A, Clean], [A, Dirty]$	$Suck$
⋮	⋮
$[A, Clean], [A, Clean], [A, Clean]$	$Right$
$[A, Clean], [A, Clean], [A, Dirty]$	$Suck$
⋮	⋮

Figure 2.3 Partial tabulation of a simple agent function for the vacuum-cleaner world shown in Figure 2.2.

4. Define in your own words the following terms: agent, agent function, agent program, rationality, autonomy, reflex agent, model-based agent, goal-based agent, utility-based agent, learning agent.

5. Consider a simple thermostat that turns on a furnace when the temperature is at least 3 degrees below the setting, and turns off a furnace when the temperature is at least 3 degrees above the setting. Is a thermostat an instance of a simple reflex agent, a model-based reflex agent, or a goal-based agent?

6. Your goal is to navigate a robot out of a maze. The robot starts in the center of the maze facing north. You can turn the robot to face north, east, south, or west. You can direct the robot to move forward a certain distance, although it will stop before hitting a wall.

1. Formulate this problem. How large is the state space?

2. In navigating a maze, the only place we need to turn is at the intersection of two or more corridors. Reformulate this problem using this observation. How large is the state space now?

3. From each point in the maze, we can move in any of the four directions until we reach a turning point, and this is the only action we need to do. Reformulate the problem using these actions. Do we need to keep track of the robot's orientation now?

4. In our initial description of the problem we already abstracted from the real world, restricting actions and removing details. List three such simplifications we made.

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