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CS 38000 Artificial Intelligence

Assignment 01

Due on Tuesday Sept 11, 2018 in class

Consider a problem which design an intelligent agent called the maze-problem-solver.

Given any maze configuration, the maze has an entrance for entering the maze, and an exit. The mazer-problem-solver can find it ways from entrance to the exit. The goal is that the maze-problem-solver enters the given maze and exit from the maze with minimal time span.

Given any maze configuration, to formulate a problem as a search problem, we need the following components for the maze-problem-solver. Describe the maze-problem solver into:

1. Identify the initial state that best represents the starting conditions, and the goal or condition the maze-problem solver wants to achieve.

Initial state?

Initially the agent would be located at the beginning of the maze at (0,0)

Goal state?

Reach end of maze

1. Formulate a state space over which the solver performs search. The state space is way or representing in a computer the states of the real problem.

State Spaces:

The content of the maze is the state space. Put on an 2D array grid we can show that (X, Y) is the position in the maze the agent is currently at and if the agents location is not equivalent to that of the ending location the agent will continue its actions. Moving left or right is a + or – move on the Y-axis and moving up or down is a + or - on the X-axis.

1. Formulate actions or state space transitions that allow the solver to move between different states. The actions reflect the actions one can take in the real problem but operate on the state space instead.

Actions?

* The agent will move in any direction that makes it move less spaces.
  + If the agent begins moving right it will move right until it hits a wall or finds the exit,
  + If the agent begins moving left it will move left until it hits a wall or finds the exit,
  + If the agent begins moving up it will move up until it hits a wall or finds the exit,
  + If the agent begins moving down it will move down until it hits a wall or finds the exit,
* If the agent hits a wall it will move back the opposite way (If right, then left. If left, then right. If up, then down. If down, then up.) until it returns to its previous position where it made the decision to move forward.
* When the agent hits the end of the maze the agent will exit the maze

For designing a maze-problem-solver intelligent agent, which could act rationally. The rationality at any given time depends on the PEAS. Define the PEAS for this maze-problem-solver:

Performance measure?

Goal: get to the end of the maze in the minimum amount of time

Environment?

Can be explained as the agent’s word that it operates in.

Complete the following form.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Environment | Observable | Deterministic | Episodic | Static | Discrete | Agents |
| Maze-Problem-Solver | Partially observable | Deterministic | Episodic | Static | Discrete | Single Agent |

Actuators:

If a physical model, we will need many actuators depending on whether agent is walking/rolling/ or some other movement. If this is a computer-generated agent and environment no actuator will be needed.

Sensors:

If a physical movement is needed, we will need to have some sensor that detects collision when the agent bumps into a wall. If this is a computer-generated agent and environment, then we will not need any sensors.

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