CSE 422

Artificial Intelligence

Assignment (Classwork)-01

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Section   :   11

Date of Submission: 13/10/2023

Answer to the question 1

(a)

Performance Measure: How much area is explored, how much valuable discoveries are made, how perfectly obstacles were avoided.

Environment : Deep Ocean with many resources, Obstacles and animals.

Actuator: Propeller, arm, motors.

Sensor : Camera, Ultrasound, Sonar, GPS, Transducers., Temperature Sensors.

Properties: Partially observable, Stochastic, sequential, dynamic and continuous.

Pseudo code:

```
function explore (initial location, explored maps):
    • Use sonar, ultrasound and camera to observe
      the surroundings. and add observation to
      the explored map list.
```

<center>(b)</center>

Performance Measure: Ability to find and buy user's desired used book at the best price within a specific budget.

Environment: Online bookstores, featuring prices, seller rating, customer review, reader review, stock availability.

Actuator: Web browser, Online or offline payment System, Monitor.

Sensor:
- Web interface and database to collect and check users desired book, budget.
- Keyboard, Mouse, Microphone

Properties of environment: single-agent, episodic, ~~sequential~~ discrete.

Agent type: Goal based agent to identify books within budget based on user preference.

(c)

Considering the agent to be a human.

Performance measure: Ability to win the match by scoring maximum points

Environment: Tennis court, opponent, tennis ball

Actuator : Arms, legs, tennis racket,

Sensors : Eyes, Ears

Properties of environment: Multi-agent, sequential, fully observable, continous.

Agent type: Model based agent using heuristic evaluation.

(d)

Considering the agent to be a human,

Performance measure: How much improvement in technique and accuracy.

Environment: Tennis Court, Wall, Tennis ball

Actuator : Arms, legs, tennis racket

Sensors : Eyes, ears.

Properties of environment: Single - agent, episodic, fully-observable, discrete.

Agent type: Simple reflex agent

(e)

Performance measure: ability to clear the high jump bar at the highest possible height.

Environment: High jump mat, jump bar, running track, take-off area.

Actuator : Legs, arms, body movement.

Sensor : Eyes

Properties of environment: Single agent, episodie, fully observable, continuous

Agent type: Utility based agent to optimize approach and jumping technique.

(f)

Performance Measure: Ability to win an item at the highest possible acceptable rate

Environment: Auction house, auction item, other bidders.

Actuators: Bidding actions.

Sensors: Eyes, ears,

Properties of environment: Multi-agent, episodic, fully-observable, discrete.

Agent type: Goal based agent using game theory to apply bidding strategy.

Answer to the question no 3

Learning agent construction for an automation taxi would be like the following:

An automated taxi can be considered as a learning agent. The performance measure for an automated taxi would be the numbers of passengers it transports safely, comfortably, at a shortest time, without breaking any rule and by using less fuel. The environment would be weather, road, other vehicles, pedestrians, pets, traffic signal, traffic laws. Actuators would be steering wheel, accelerate, break, AC. Cair conditioner). The sensors would be camera, GPs, radar, lidar sensor, speedometer, thermo couples, IR Sensor. The passenger might give some criticism or feedback on the agent's performance, such as whether it was driving safely or not. The learning element would use this feedback to improve the agent's performance. The

problem generator would suggest actions like suggesting new routes, situations, considering passenger's situation etc. Therefore, an automated taxi would use it's initial knowledge and learn from experiences to improve its performance in the real-world environment.
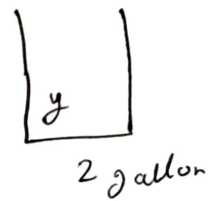
(a)

Initial State : (5, 0)

Goal State : (*, 1).

5 gallon   2 gallon

(b).

Condition - action rule:

fill   x

fill   y

fill   x, y

empty x

empty y

empty   x   fill y

empty y   fill x

empty   x   empty y.

(c)

(0,0)

(5,0)   (5,2)   (0,2)

(3,2)   (5,2)   (0,0)   (0,0)   (0,2)   (5,0)   (0,0)   (2,0)   (5,2)

(5,2)   (5,0)   (3,0)   (0,2)   (2,2)   (0,0)

(3,2)   (1,2)   (0,0)   (5,2)   (0,2)   (2,0)   (0,0)

(0,0)   (1,0)   (0,2)   (3,0)   (5,2)

(0,0)   (5,0)   (5,2)   (0,1)   (1,2)