

Assignment 01 CSE422

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Section: 06

①

a

We know that, Titan is the largest moon of Saturn. Its surface is mostly covered in seas, lakes and ice. Addition to this, there is a large diverse landscape with mountains and hills. The environment is extremely cold with low gravity and thick atmosphere. According to these information the agent model can be,

⑤ Exploring the subsurface oceans of Titan

Agent	Performance measure	Environment	Actuators	Sensors
Exploring robot in Titan	Percentage of data and features collected from subsurface that can help build a map.	dark and cold environment. low visibility hills and concrete surface liquid surface to travel through oceans	communication device to send back collected data, flashlight, servo motors, robotic legs, rolling chains to move	camera, LiDAR sensor, temperature sensor, sonar sensor.

Agent	Properties of environment					
Exploring robot in Titan	Partially	Multi agent, as a multi aspects of environment	Stochastic	Sequential	Dynamic	Continuous
Agent type: Goal based agent						

⑥ Shopping for used books on the internet

Agent	Performance	Environment	Actuators	Sensors
Shopping for used books	book condition, user satisfaction budget	online marketplace, user reviews shipping options and prices	web applications, communication app	algorithm user feedback app and notifications

Agent	Properties of environment					
	Fully observable	Multi agent	Deterministic	Sequential	Static	discrete

Agent type: Utility based agent

c. Playing a tennis match

Agent	Performance	Environment	Actuators	Sensors
Playing tennis match	Percentage of scores, accuracy and winning	Court, surface, surroundings, tennis ball	Motors to move around, Servos for arm movement, tennis bat	Camera vision, Gyro sensors, Sound sensor, intention detect sensor
Properties of environment				

Fully observable	Multi agent	Stochastic	sequential	dynamic
Agent type: simple reflex agent				continuous

d. Practicing tennis against a wall

Agent	Performance	Environment	Actuators	Sensors
Practicing tennis against a wall	Percentage of accuracy and skill development	surface, wall, tennis ball and bat	Motors servos arm tennis bat	Camera vision, Gyro sensor, sound sensor, angle sensor
Properties of environment				

Fully observable	Multi agent	deterministic	sequential	static	discrete
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Agent type: Model based reflex agent

e. Performing a high jump.

Agent	Performance	Environment	Actuators	Sensors
Performing a high jump	Jump measuring percentage, height reached each time, success limitations	Outdoor or indoor with enough space	Spring motors, Arm, legs	Vision, sensing own position and height, accelerometer and gyro sensors.

Properties of environment

Fully observable	Single agent	deterministic	sequential	episodic
				discrete

Agent: Goal based agent

7. Bidding on an item at an auction

Agent	Performance	Environment	Actuators	Sensors
Bidding on an item	Budget based winning bid percentage	Auction place, auctioneer, bidders, items, prices	Web applications, system, database, interactions between applications	Camera vision, Hearing sensors, other bidden bid calculations, item identification, object classification sensor using YOLO.

Properties of environment

Fully observable	Single agent	deterministic	sequential	episodic	discrete
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Agent: utility based agent

↳ Pseudocode for exploring the subsurface oceans of Titan.

Exploration Loop

navigate unexplored areas until
goal reached

explore environment

collect data

store data

Transmit data

~~return~~

if goal reached,

go home / on starting point

when initial search

initiated.

Answer 3

Learning agent Construction for an automated taxi:

- Learning agent: In this case, an automated taxi can use decisions making choices such as, making route choices with shortest path or less traffic path Learning.
- Performance element: With enough data, from LiDAR sensor, camera sensor, sound sensor it can process and actuate necessary steps, such as when to brake and accelerate also when to slow down can for better performance.
- Critics: Critics help the learning element to make improvements where it is needed to achieve performance goals. So, it will make decisions such as if the route has more obstacles, then it will send feedback to learning element to make adjustments.

• Problem Generator: For problem generating, it can go through or explore other routes, take unusual photos or scenarios to make improvements in ~~learning~~ ~~to~~ ~~elements~~ performance elements.

5 gallon jug $\Rightarrow x$. 2 gallon jug $\Rightarrow y$

~~(0,0)~~ Answer 5

initial state \Rightarrow 5 2

Goal state $(x, 1)$

