ARTIFICIAL INTELLIGENCE

PRACTICAL 1

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Experiment 1

Aim: Identify PEAS for different Applications/Agents

Theory:

1. **Application: Chess playing with a clock**
   Description: Chess is a board game with two players. One player takes white pieces and the other player takes black pieces. The goal of the game is to checkmate the opponent's king, which means to place it under an attack from which it cannot escape or be rescued. Chess clocks are used in chess tournaments to limit the time for each player during a game, making it more difficult for a player to think without worrying about time running out.
   PEAS:
   > Performance Measures: Win/lose percentage, time taken
   > Environment: Chessboard, clock, chess pieces
   > Actuators: Human arm, motors, chess board & pieces
   > Sensors: Camera for tracking pieces on board or reed/mechanical switches

   Environment: Fully observable, strategic, sequential, semi-dynamic, discrete and has multiple agents

2. **Application: Learning disability detection**
   Description: By using the many different forms of inputs from the user, we can predict the chances of dyslexia or any other disability for a particular person. The use of AI has been a great help to educators, parents and other professionals who work with children with learning disabilities. It can be used to identify dyslexia, which is a common disability that hinders reading fluency and comprehension. It can also be used for other disabilities like ADHD, autism spectrum disorder, etc.
   PEAS:
   > Performance Measures: Low % of the estimation of the certain learning disability
   > Environment: Children (usually below the age of 12)
   > Actuators: Computer, Written material
   > Sensors: Camera, microphones, movement of the eyes

Environment: Fully observable, deterministic, single agent, dynamic, continuous, sequential

3. **Application: Corona guidelines follower**
   Description: An agent to identify whether the person going through is following the corona guidelines. This agent can be assigned to a person who needs assistance, and it will follow them around and mimic their actions as they navigate through an environment. The idea behind this is that it gives the person some sense of independence, and also helps them get used to new surroundings.
   PEAS:
   Performance Measures: Wearing a mask, obeying social distance (of eg. 1m)
   Environment: Normal People, Traffic signals, Crosswalks, the entrance of the public places
   Actuators: Movement/walking of the people, signals, entry points, sanitizer
   Sensors: Cameras(multiple can be used in order of different angles), clothes, mask on the face analysis
   Environment: Fully observable, stochastic, multi-agent, static, discrete activity, episodic in nature

4. **Application: Conduction of an auction**
   Description: When conducting an auction on a large scale basis or locally, there are various participants taking part like bidders and auctioneers. The auction is a process of buying and selling goods, which is done by calling out bids to the highest bidder. Auctions are typically conducted by an auctioneer who may use a variety of methods to conduct the sale, such as shouting or hand gestures. Auctioneers can usually be found at auctions selling anything from antiques and art to cars and furniture. They can also be found at estate sales where they sell items from the deceased's estate.
   PEAS:
   Performance Measures: cost, value, quality, the necessity of the selling item
   Environment: Auctioneers, Bidders, BiddersItems (which are to be bid)
   Actuators: Speakers, microphones, display items, budget
   Sensors: Camera, price monitor, eyes, ears of attendees
   Environment: Partially observable, single agent, stochastic, sequential, dynamic, continuous activity

5. **Application: Satellite image analysis system**
   Description: An application that correctly analyses images from a satellite and classifies it. Satellite images have been used for many years to monitor and analyze the Earth's surface. In recent years, however, satellite imagery has been increasingly used for other purposes such as crop monitoring and fire detection. Satellite image analysis systems are automated systems that can detect objects in satellite images. The system can be operated either manually or automatically.
   PEAS:

Performance Measures: Coverage of land, quality of images, efficiency in classification
Environment: Satellite, space, land, weather
Actuators: Mechanism to position cameras, satellite thrusters
Sensors: RGB cameras and infrared cameras

Environment: Fully Observable, Deterministic, Episodic, Static, Continuous, single agent.

6. **Application: Medical diagnosis system**
   Description: A robot or application that diagnoses the patient's disease and recommends treatments by analyzing patient. AI has a lot of potential and can be used for a variety of tasks. It can be applied to help doctors diagnose patients and provide more accurate results.AI is also being used in the medical field for more than just diagnosis. There are systems that can predict when someone is going to have a heart attack or stroke. These AI-based systems are capable of predicting this before it happens, which could save someone's life.
   PEAS:
   Performance Measures: Healthy patient, minimize costs, lawsuits
   Environment: Patient, hospital, staff
   Actuators: Screen display (questions, tests, diagnoses, treatments, referrals)
   Sensors: Keyboard (entry of symptoms, findings, patient's answers)
   Environment: Partially observable, single-agent, stochastic, sequential, dynamic, continuous

7. **Application: Refinery controller**
   Description: An application that automatically manages the flow, quantity, temperature, and other parameters for the refining process
   PEAS:
   Performance Measures: Purity metric, yield, safety
   Environment: Refinery, valves, material
   Actuators: Valves to control flow, temperature control
   Sensors: Temperature, pressure, and material-specific physical readings
   Environment: Fully observable, stochastic, episodic, dynamic, continuous, single agent

8. **Application: Poker playing**
   Description: A robot that plays poker with humans and tries to win
   PEAS:
   Performance Measures: Win/Lose ratio, Amount earned
   Environment: Poker table, chips, money pool
   Actuators: Human/robotic mechanism to play cards
   Sensors: Visual sensors to see current cards on hand and table
   Environment: Partially observable, multi-agent, stochastic, sequential, static, discrete

9. **Application: Chatbot**

Description: An application that talks with humans to solve queries or hold sensible conversations

PEAS:

 Performance Measures: Following up conversations, grammatically accuracy

 Environment: Screen, User

 Actuators: Writing on screen, replying to messages

 Sensors: User input

Environment: Partially observable, multi-agent, stochastic, sequential, dynamic, continuous

10. **Application: Soccer playing robot**

 Description: A robot that plays soccer with humans and tries to win

 PEAS:

  Performance Measures: Goals hit, fairness, speed, safety

  Environment: Soccer field, ball, players

  Actuators: Mechanism to hit ball (servos and actuators)

  Sensors: RGB cameras, odometry, infrared/depth cameras

 Environment: Partially observable, multi-agent, stochastic, sequential, dynamic, continuous

11. **Application: Recommender system**

 Description: An application that tries to recommend similar items to a user that they have interacted with

 PEAS:

  Performance Measures: Accuracy in the recommendation, similarity score in recommendations

  Environment: Users, products

  Actuators: Showing recommendations to users

  Sensors: User's choices and favorite products

 Environment: Partially observable, multi-agent, stochastic, sequential, dynamic, discrete