Tutorial - Week 2

History & Future of AI, Agents & Environments

Activity 1

Consider a game of checkers and two options of programmed players. One program selects a move by searching through all possible moves and choosing the best one. The other program makes its move based on experience, playing numerous games and learning which moves are better.

a.   What are the advantages and disadvantages of each program?
The first option: extensive search takes a lot of time to make a move, but it chooses the best move so has higher chances to win. The second option: take much less time to make a move, but might take a lot of time to "learn" how to make a good move, which still can be suboptimal.

b.   Which of these programs resembles the concept of "Chinese Room"?
Both of them in a different way.

c.   Considering 4 perspectives on AI definition, how would you describe each of these programs.
The first one refers to AI that acts rationally, the second refers to AI that acts humanly (suboptimal moves) or thinks humanly (neural networks) - depends on the approach to the system.

Activity 2

Consider three systems: (1) a smart car, (2) a smart home assistant, and (3) a breakout player.

a.   Describe the system of your choice in PEAS (performance measure, environment, actuators, sensors) terms.

System	Performance measure	Environment	Actuators	Sensors
Smart car	*Number of broken rules, fuel/energy consumption, travel time*	*Roads, road signs, pedestrians, traffic lights, other cars*	*Steering wheel, breaks, motors*	*Cameras, proximity sensors*
Smart home	*Number of successfully completed tasks, accuracy, user satisfaction*	*People, rooms, appliances, devices, network*	*Smart lights, thermostat, TV, AC, locks, etc.*	*Motion, presence, light sensors, microphone, camera, etc.*
Breakout player	*Score, efficiency, accuracy*	*Bricks, ball, walls, the paddle*	*The paddle control, the ball launcher*	*Ball and paddle positions, brick status*

b.   For the same system describe its environment and justify your choice:

- simulated or situated/embodied
- static or dynamic
- discrete or continuous
- fully or partially observable
- deterministic or stochastic
- episodic or sequential
- known or unknown
- single-agent or multi-agent

Smart car: situated & embodied, dynamic, continuous, partially observable, stochastic, sequential, known, multi-agent;
Smart home assistant: situated & embodied, dynamic, discrete & continuous, partially observable, deterministic & stochastic, episodic, known & unknown, single-agent;
Breakout player: simulated, dynamic, continuous, fully observable, deterministic, episodic, known, single-agent.

Smart home assistant is a bit more challenging to describe than the other two systems - the choice of the environment characteristics depends on how the assists looks like (functionality, how it's used, etc.)

Activity 3

Consider a checkers and a breakout programmed players.

a.   Which one can be implemented as a reactive agent and why?
Breakout player.

b. Which agent type would be the most appropriate for the other programmed player and why?
Game-playing agent as it needs to evaluate the moves of the opponent.

Activity 4

Download *stock.ipynb*, open terminal or cmd, navigate to the folder where stock.ipynb is located and then run:

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jupyter notebook
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