Nicholas Rebhun
NetID: zx3555
Dr. Hecker

Artificial Intelligence

Assignment #1

1. **Answer the following question. Is AI described as THINKING HUMANLY, THINKING RATIONALLY, ACTING HUMANLY or ACTING RATIONALLY? Explain your reasoning.**

   It is my opinion that AI is the ability to think and act rationally. Humans, in many a case, cannot be described as intelligent creatures, unless viewed from the standard of the rest of the known life forms on our planet. The ability to make logical, rational decisions is an ultimately powerful tool, and to give a machine, one of the dumbest things on the planet, the ability to use this tool, would truly form an artificial intelligence.

2. **Detail the environments for a rational agent for the following tasks. State any assumptions in your reasoning.**

Agent type	Performance Measure	Environment	Actuators	Sensors
Solitaire (assuming digital)	efficient, completion	cards	functions to select cards?	data structures
Tic-Tac-Toe (assuming digital)	efficiency, maximized (but not total) victory	grid, occupied and empty spaces	functions to place tiles?	data structures
Handwriting Analysis	accuracy, precision,	book	page flipping, page scrolling	cameras
Assembly Line Robotic Arm	Safe, precise, accurate, complete	assembly line, product being assembled	appropriate joints	appropriate tools, cameras, pressure and torque sensors
Automatic Pilot	Safe, comfortable, legal, efficient	surrounding environment	steering, brake/ acceleration control, lights/ signals	cameras, microphones, proximity field
Medical diagnostic system	safe, comfortable, legal, efficient, accurate	medical office room, patient, furniture, staff	patient interaction	camera, speakers, display/screen, medical diagnosis tools

3. **Some AI researchers have argued that the goal of AI should be to build machines that help people in their intellectual tasks rather than to do these tasks. Loosely speaking, "helping" is sometimes called** weak AI, **and "doing" is sometimes called** strong AI. **What is your opinion and why?**

I agree with these researchers, though it does depend on the environment. In researching new and yet-unknown discoveries, for example, creating intelligence that can interpret information better than we can, transcends its usefulness as a tool, and then calls into question all sorts of philosophical questions. If one is to build a tool, build a tool that can be used.

4. **Design a rational agent for a robot that searches through a room until a wall outlet is discovered.**

   The room is rectangular, and is assumed to contain no obstacles. An infrared sensor attached to the outlet indicates when the robot has reached this location. Once the outlet is found, the agent should plug itself into the wall (and stop searching for an outlet!).

   A photoelectric sensor on the front of the robot carriage indicates when the agent is facing a wall. The simple motor attached to the unit can move forward, or turn either 90 degrees to the left or right.

   a) Completely detail the environment for the problem above.
   b) Construct a mapping from percept to action (design the agent function).

a)

Task Environment	Observable Agents	Deterministic	Episodic	Static	Discrete
Find and plug into wall outlet, in empty, rectangular room	Single	Deterministic	Sequential	Static	Discrete

b) I wasn't able to find much information on this, so I apologize for the crude response.

Ideally the amount of time this task takes should be minimized, so assuming the infrared sensor can be detected at any point in the room, and the receiver on the AI's end is pointed "forwards" at all times, it would make sense to travel first horizontally, then vertically, along the center of the room, rotating a full 360 degrees in incremented steps during these paths.

Once the AI detects the plug, it can then stop rotating, and move forward until it is near the wall. Then the AI can plug into the wall, and achieve its task.

5. **Every year the Loebner Prize is awarded to the program that comes closest to passing a version of the Turing test. Research and report on the latest winner of the Loebner prize. What techniques does it use? How does it advance the state of the art of AI?**

"Mitsiku" is an AI with an overarching "master AI", which defines what information is permanently accessible to the "child AI", so that the latter can be taught things which aren't necessarily true, and the master can correct these issues at a later time. This is particularly interesting because it allows for a significant amount of flexibility, without compromising the true state of the AI's awareness of the world it has been programmed to know.