

INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Assignment: Intelligent Agents

Assignment	Problems	Date Due
A-1	<ul style="list-style-type: none">. Read Russell and Norvig chapter 2 <i>Intelligent Agents</i>. Post to the course discussion board a brief description of<ul style="list-style-type: none">- The point that you found most interesting in the chapter- The idea you found most challenging- Something you would like to know more about- An application of intelligent agents not mentioned in the chapter (and not yet posted to the discussion board)	3 SEP 2013
A-2	<ul style="list-style-type: none">. Study Attachment # 1 <i>The Tsunami Warning System</i>. Explore at least one of the links found on Attachment #1.. Post to the course discussion board a brief note about something you learned from the links (that is not yet posted to the discussion board)	3 SEP 2013
A-3	<ul style="list-style-type: none">. Submit your answers to questions Agent-1 through Agent-5 to the course website. Be sure to include the reasoning behind each of your answers. Include examples and support from your outside reading where possible.	4 SEP 2013
A-4	<ul style="list-style-type: none">. Bring a copy of your answers to class	5 SEP 2013
A-5	<ul style="list-style-type: none">. With your small group, collaborate on the design for the Tsunami Activity Reporter. Record where there are differences of opinion and how these differences are resolved. Present (a portion of) your design to the class. Be prepared to discuss tradeoffs and critique other groups' designs	5 SEP 2013
A-6	<ul style="list-style-type: none">. Polish the group design and submit it to the course website<ul style="list-style-type: none">- One team member can post the group assignment- All group members must acknowledge that they have reviewed the final posted assignment	8 SEP 2013

The primary objective of this assignment is to learn about the architecture of intelligent agents and how to analyze the environments in which they operate. The secondary objective is to gain an understanding of the ethical issues related to the use of intelligent agents.

Upon completion of *Tsunami Warning System* case study, students should be able to:

- Define and provide an example of an external performance measure
- Identify the elements of an environment
- Describe the properties of an environment in terms of whether it is
 - accessible *or* inaccessible
 - deterministic *or* nondeterministic
 - episodic *or* nonepisodic
 - static *or* dynamic *or* semidynamic
 - discrete *or* continuous
- Identify actuators
- Identify sensors

- Identify goals and plans
- Analyze and propose agent architecture
 - Table lookup
 - Simple reflex
 - Goal-based
 - Utility-based
- Define and provide an example of an internal evaluation function, stating whether it is
 - Static
 - Dynamic
- Propose a utility function to select among multiple competing goals

Agent-1. Consider the following PEAS description of an agent that reports threat of tsunami activity:

Tsunami Activity Reporter¹	
Performance Measure:	Inform seismologists and coastal residents of the possibility and/or impending approach of a tsunami.
Environment:	Series of buoys (sea-level monitoring equipment) in the oceans of the world.
Actuators:	When readings match one of the recognized patterns of wave movement and related seismic activity has been detected, notify seismologists and residents of coastal areas which will most likely be affected by a possible significant event. Provide estimate of time it will take the tsunami to reach each potentially affected area, and estimate of wave height and intensity.
Sensors:	Continuous readings from sensors strategically placed throughout the world's oceans.

Determine what type of agent architecture is most appropriate (table lookup, simple reflex, goal-based, or utility-based). Give a detailed explanation and justification of your choice.

- Agent-2. Describe the (internal) evaluation function that might be used by the Tsunami Activity Reporter. Is it a static or a dynamic evaluation function?
- Agent-3. Assume that you designed a utility-based agent for the Tsunami Activity Reporter (whether or not the problem warrants it). Describe the utility function that it might use.
- Agent-4. What (external) performance measures would you recommend for your Tsunami Activity Reporter?
- Agent-5. Describe the properties of the environment of the Tsunami Activity Reporter in terms of the principal distinctions we can make (accessible vs. inaccessible, deterministic vs. nondeterministic, episodic vs. nonepisodic, static vs. dynamic vs. semidynamic, discrete vs. continuous). That is, identify in detail which properties are characteristic of the environment described, and give a justification for your description.

¹ Refer to attachment #1 for a more complete description.