NIP2 — NIP2 TASK 2: DISASTER RELIEF ROBOT

INTRODUCTION TO ARTIFICIAL INTELLIGENCE — C951
PRFA — NIP2

TASK OVERVIEW SUBMISSIONS EVALUATION REPORT

COMPETENCIES

4036.2.1 : Reasoning, Knowledge Representation, Uncertainty, and Intelligence
The graduate analyzes the relationships and rules pertaining to intelligence within systems.

4036.2.2 : Search Strategies for Optimization
The graduate distinguishes among search strategies to fit specific data-oriented problems.

4036.2.3 : Agents
The graduate implements basic intelligent agent technology in order to automate services.

4036.3.1 : Robotics
The graduate writes code to enable robots to execute simple tasks.

INTRODUCTION

Real-time search-and-rescue robots are increasingly used to supplement the efforts of the first responders in areas affected by natural disasters. They are used to spot-check the situational awareness of people in distress, survey the extent of flood or tornado damage, evaluate the number of people that had not been evacuated from their neighborhoods, clean debris, and create passable routes.

For this task, you will use the Coppelia Robotics virtual robot and its environment to demonstrate how such robots may be used in disaster recovery. Your first step is to familiarize yourself with this technology by reviewing the information in the "Coppelia Robotics Resources Page" and "CoppeliaSim User Manual" provided in the Web Links section.

For the next step, you will thoroughly describe a disaster situation similar to the ones mentioned above. Next, you will create a virtual prototype of an autonomous robotic recovery system that demonstrates goal-seeking behaviors in navigating through a predefined area. The robotic recovery system will solve a disaster recovery problem of your choice by using the Coppelia Robotics BubbleRob and its environment as the starting point of your prototyping. You will also add sensors to the robot. These sensors will collect vital information to aid in the disaster recovery effort for the scenario you described.

REQUIREMENTS

Your submission must be your original work. No more than a combined total of 30% of the submission and no more than a 10% match to any one individual source can be directly quoted or closely paraphrased from

Help

sources, even if cited correctly. The similarity report that is provided when you submit your task can be used as a guide.

You must use the rubric to direct the creation of your submission because it provides detailed criteria that will be used to evaluate your work. Each requirement below may be evaluated by more than one rubric aspect. The rubric aspect titles may contain hyperlinks to relevant portions of the course.

*Tasks may **not** be submitted as cloud links, such as links to Google Docs, Google Slides, OneDrive, etc., unless specified in the task requirements. All other submissions must be file types that are uploaded and submitted as attachments (e.g., .docx, .pdf, .ppt).*

Using the CoppeliaSim virtual robot, create a virtual prototype of an autonomous robotic recovery system that demonstrates goal-seeking behaviors in navigating through a predefined area by doing the following:

A. Describe the disaster recovery environment you chose and the **two** obstacles you have added to the environment.

B. Explain how the robot will improve disaster recovery in the environment from part A after you have added the **two** obstacles from part A.

C. Justify the modifications you made to CoppeliaSim's robot architecture, including **two** sensors you chose to add, and explain how these sensors will aid the disaster recovery effort.

D. Describe how the robot maintains an internal representation of the environment.

E. Explain how the robot implements the following **four** concepts to achieve its goal:
- reasoning
- knowledge representation
- uncertainty
- intelligence

F. Explain how the prototype could be further improved, including how reinforced learning and advanced search algorithms can improve the prototype's performance and learning.

G. Submit the robot code that you created.

H. Provide a Panopto video recording that describes the robot and demonstrates its functionalities to stakeholders who are nonpractitioners and include each of the following:
- a statement of the disaster recovery problem
- a summary of the environment and the obstacles
- a summary of the robot's goal and objectives
- a description of the robot and its architecture
- a demonstration of how the robot meets its disaster recovery goals
- an assessment of the robot's capabilities
- an explanation of how to improve the prototype

Note: For instructions on how to access and use Panopto, use the "Panopto How-To Videos" web link provided below. To access Panopto's website, navigate to the web link titled "Panopto Access," and then choose to log in using the "WGU" option. If prompted, log in using your WGU student portal credentials, and then it will forward you to Panopto's website.

To submit your recording, upload it to the Panopto drop box titled "INTRODUCTION TO ARTIFICIAL INTELLIGENCE – NIP2 Task 2 | C951." Once the recording has been uploaded and processed in Panopto's system, retrieve the URL of the recording from Panopto and copy and paste it into the Links option. Upload the remaining task requirements using the Attachments option.

I. Acknowledge sources, using in-text citations and references, for content that is quoted, paraphrased, or summarized.

J. Demonstrate professional communication in the content and presentation of your submission.

File Restrictions

File name may contain only letters, numbers, spaces, and these symbols: ! - _ . * ' ( )
File size limit: 200 MB
File types allowed: doc, docx, rtf, xls, xlsx, ppt, pptx, odt, pdf, txt, qt, mov, mpg, avi, mp3, wav, mp4, wma, flv, asf, mpeg, wmv, m4v, svg, tif, tiff, jpeg, jpg, gif, png, zip, rar, tar, 7z

RUBRIC

A:DISASTER ENVIRONMENT

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
A description of the chosen disaster recovery environment is not provided.	The submission inaccurately describes the chosen disaster recovery environment but does not include 1 or *both* of the additional obstacles. Or the information provided contains inaccuracies.	The submission accurately describes the chosen disaster recovery environment with 2 additional obstacles.

B:IMPROVED DISASTER RECOVERY

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
A submission explaining how the robot will improve disaster recovery is not provided.	The submission inaccurately explains how the robot will improve disaster recovery in the environment from part A after the 2 additional obstacles are added.	The submission accurately explains how the robot will improve disaster recovery in the environment from part A after the 2 obstacles are added.

C:ARCHITECTURE

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
A submission justifying the modifications made to the robot's architecture is not provided.	The submission inaccurately justifies the modifications made to the robot's architecture, or it does not include 1 or *both* sensors added to the architecture. Or the submission inaccurately explains how the additional sensors will aid the disaster recovery effort.	The submission accurately justifies the modifications made to the robot's architecture, including *both* added sensors. The submission accurately explains how the additional sensors will aid the disaster recovery effort.

D:INTERNAL REPRESENTATION OF THE ENVIRONMENT

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
A submission describing how the robot maintains an internal representation of the environment is not provided.	The submission inaccurately describes how the robot maintains an internal representation of the environment.	The submission accurately describes how the robot maintains an internal representation of the environment.

E:REASONING, KNOWLEDGE REPRESENTATION, UNCERTAINTY, AND INTELLIGENCE

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
A submission explaining how the robot implements the 4 given concepts is not provided.	The submission does not accurately or logically explain how the robot implements 1 or more of the 4 given concepts to achieve its goal.	The submission accurately and logically explains how the robot implements *each* of the 4 given concepts to achieve its goal.

F:FURTHER IMPROVEMENTS

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
A submission explaining how the prototype could be further improved is not provided.	The submission illogically or inaccurately explains how the prototype could be further improved, or it does not explain how reinforced learning or advanced search algorithms can improve the prototype's performance and learning.	The submission logically and accurately explains how the prototype could be further improved, and it explains how *both* reinforced learning and advanced search algorithms can improve the prototype's performance and learning.

G:ROBOT CODE

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
A robot code is not submitted.	The robot code submitted is incomplete or inaccurate, or *both*.	The robot code submitted is *both* accurate and complete.

H:PANOPTO RECORDING

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
A Panopto recording describing the robot is not provided.	The Panopto video recording does not demonstrate the robot's functionalities in a way that stakeholders who are nonpractitioners would understand. Or the video recording does not include 1 or more of the 7 required segments.	The Panopto video recording demonstrates the robot's functionalities to stakeholders who are nonpractitioners in a way they would understand, and the video recording includes *all* 7 of the required segments.

I:SOURCES

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
The submission does not include both in-text citations and a reference list for sources that are quoted, paraphrased, or summarized.	The submission includes in-text citations for sources that are quoted, paraphrased, or summarized and a reference list; however, the citations or reference list is incomplete or inaccurate.	The submission includes in-text citations for sources that are properly quoted, paraphrased, or summarized and a reference list that accurately identifies the author, date, title, and source location as available.

J:PROFESSIONAL COMMUNICATION

NOT EVIDENT	APPROACHING COMPETENCE	COMPETENT
Content is unstructured, is disjointed, or contains pervasive errors in mechanics, usage, or grammar. Vocabulary or tone is unprofessional or distracts from the topic.	Content is poorly organized, is difficult to follow, or contains errors in mechanics, usage, or grammar that cause confusion. Terminology is misused or ineffective.	Content reflects attention to detail, is organized, and focuses on the main ideas as prescribed in the task or chosen by the candidate. Terminology is pertinent, is used correctly, and effectively conveys the intended meaning.

Mechanics, usage, and grammar promote accurate interpretation and understanding.

WEB LINKS

CoppeliaSim User Manual

Coppelia Robotics Resources Page