Task 2

## A: DISASTER ENVIRONMENT

The disaster is a building that has caught on fire, and a robot is deployed to find people who cannot find their way out. The obstacles include cylinders and cubes, as well as other objects that the robot will not interact with during the simulation. The person is on the other side of a bookshelf.

## B: IMPROVED DISASTER RECOVERY

The robot will attempt to find humans by using a sensor. If the robot is going to bump into any object (e.g. cylinder, cube, human) it will reverse itself, rotate, and continue forward. The robot will use the terminal to let first responders know the GPS location of the person found.

## C: ARCHITECTURE

The bot is using a proximity sensor and a GPS sensor. The proximity sensor is what is used if it is about to bump into something so it may reverse and change paths. The proximity sensor also has another job of detecting when a human object is sensed. Once the human object is sensed, then the GPS sensor is used to find the exact coordinates of where the human was found so that rescue teams may assist with evacuation.

## D: INTERNAL REPRESENTATION OF THE ENVIRONMENT

The robot uses a checkDistance() method that returns a float. The float represents how far away an object is if there is one. If there is no object, then the distance returned is 0. Once the robot receives a float greater than zero, the robot will back up and change direction. At the same time, the same checkDistance() method is used to see if the human is in sight. If the value is more than 0, the human is recognized and will call the GPS method to alert the first responders of their location.

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## E: REASONING, KNOWLEDGE REPRESENTATION, UNCERTAINTY, AND INTELLIGENCE

***Knowledge:*** The robot collects data from the environment by using its sensors. These are raw numbers and needs to be interpreted. My robot constantly collects distances from it’s proximity sensor.

***Reasoning:*** Once data has been collected, it uses methods and algorithms to determine what to do next. The reading from the proximity sensor is evaluated, and if it is more than zero then it will reverse and change direction, and/or activate the GPS sensor if the object is human.

***Uncertainty:*** The robot has no idea what is in the room. The environment is unknown to it until it enters the room. This robot does not record a map of the room or where it has already been, so as it does not “learn” to not be redundant. This could, however, be implemented using another algorithm.

***Intelligence:*** Since the robot does not know what lays in the path ahead, it must intake data and then interpret it to make decisions. The only thing that is preprogramed into its functionality is what to do if it encounters an object. This is what makes it artificial intelligence; it does not know what information it will come across at the time of execution, but it does know how to interpret it and make decisions of how to handle it.

## F: FURTHER IMPROVEMENTS

The prototype can be improved further by adding a mapping feature. This mapping feature could include reinforced learning and advanced searches. While the robot is searching in each room, a map is made into its memory and then use this information to make a search tree where it will find the quickest path to search all of the rooms and recover all humans in the fastest time possible. If the robot finds a human in a room, it will keep track of where the human was found in relativity of the room design. If enough people are found behind bookshelves, it will use machine learning to search these areas first since it is more likely to find people immediately.

## I: SOURCES

No external sources were used.