**C951 Task 1**

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C951

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**A: DISASTER ENVIRONMENT**

The simulated disaster environment is collapsed building after an earthquake. The obstacles I’ve placed in the simulation are walls, ground debris, and hanging debris. My robot can detect the wall and ground debris and navigate around them. With the hanging rubble, my robot can identify if it is too low for human entrance.

**B: IMPOVED DISASTER RECOVERY**

My robot will improve disaster recovery by identifying debris that can be hazardous or hinders the recovery team from extracting humans or material. For example, confined areas can be an issue for the recovery team by restricting moments. Especially team members that require additional gear, such as respirators or bulky fire resistance uniforms.

**C: ARCHITECTURE**

One of the modifications I added to the recovery robot was a sensor that allowed the robot to detect debris in front of it and navigate away successfully; this would allow for continuous operations. The second modification was a sensor that detects low-hanging debris or confined spaces that may be dangerous for the extract team. For example, if the room is too small, the first sensors will alert the robot to navigate away safely; otherwise, the robot will continue its operation until the area becomes too small for access.

**D: INTERNAL REPRESENTATION OF THE ENVIRONMENT**

The robot is preprogrammed and automatically begins to move and survey with its two sensors. The cone sensor in front of the robot uses reflected rays that bounce back to determine the distance between it and the object. Once that ray detects something inside the set parameter, it will navigate from said object. The second cone sensor on top of the robot uses reflected rays to determine the distance from the robot's top to that object. For example, once a specific thing is within the set parameter, it will alert that clearance is too low for human entrance but will continue its sweep.

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

1. **Knowledge:** The robot uses a sensor attached to the front of it and a sensor attached to the top. These sensors will inform the robot if objects are within its given parameters and then decide to navigate away or if it’s too low.
2. **Reasoning:** The robot is preprogrammed with decision-making actions, and those decisions are triggered based on the sensors' feedback.
3. **Uncertainty:** Currently, the robot treats every environment as new and is reactive to that environment when running.
4. **Intelligence:** The sensors allow the robot to continue sweeping without getting stuck or needing assistance. The robot will adjust itself accordingly and doesn’t have to rely on extraction.

**F: FUTHER IMPROVEMENTS**

The robot would benefit from using reinforced learning by identifying objects that would cause a rollover. It could also learn if a hanging object is moving or stationary, then adjust its routes accordingly. The operating algorithm only shoots the rays randomly and then reads those rays to give instructions. Different sweeping algorithms would be implemented, such as sweeping from the top down to prevent the robot from running into falling debris.

**H: PANOPTO RECORDING**

<https://wgu.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=362e340b-e15b-4994-96dd-aed6001a2938>

**I: Sources**

No sources were used.