

Autonomous Agents, FFR125/FIM760

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Teachers:

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Robotics assignment 1:

Mine sweeper navigation contest:

The goal for this task is to equip the Boe-Bot with behaviors that will make it possible for the robot to roam a mine field and identify the mines, while avoiding obstacles and not running over any mines.

In practice, the Boe-Bot will be placed in an arena (approximately 3x3 m) with a light floor, with small areas of black (symbolizing mines) scattered about. The arena will be surrounded by walls. The Boe-Bot is then to roam this area and search for mines using its sensors (photo resistors or IR LED/detector pairs), and whenever a mine is identified the robot shall signal this by blinking a LED while standing still a few seconds in front of the mine. The Boe-Bot shall then move away from the mine in search for other mines. Of course, the Boe-Bot shall not run over any mines and not crash into any of the surrounding walls.

The arena will be approximately 3x3 meters, and there will be around 20 mines spread out in there. The mines will be made of black paper sheets, 10x10 cm in square. Each robot will have 2 minutes to look for the mines.

Select a proper method for behavioral organization, and implement a number of suitable behaviors, e.g. the following ones: **Obstacle avoidance**, **navigation** and **mine identification**. The navigation behavior can simply be implemented as random walk. If you decide to use the utility function method for the behavior selection, you may want to introduce an internal (hormone) variable in order to avoid the robot getting stuck in front of a detected mine.

Try to achieve some level of sophistication by adjusting the navigation and mine identification behavior - the robot shall move away from an identified mine in order to locate another mine and not simply return to the last identified mine. The number of detected (unique) mines will be counted, and the team scoring the highest number of detections in a certain amount of time (which will be 2 minutes) will be considered the winner of the contest.