ELEC 7970 Advanced Mobile Robotics

HW 6 Assigned Wed. 3/6/13 Due Wed. 3/20/13 (also date of project briefing 2)

* Skim Adam Ray’s MS thesis in its entirety, and then read Chapt. 4
* Read Paper Z (Mataric 1995), which is ref. 31 in Adam Ray’s thesis.

1. Summarize paper Z in your own words – address the authors’ objectives, intended audience, and applications.

2. Consider the following scenario. You are hired as a consultant by FEMA to develop a high-level flowchart for performing disaster search and rescue with a team of advanced robots together with humans. The expected number of all deployed units (robots plus humans) ranges from 5 to 50, depending on the scale of the disaster. (a) Draw a flowchart for deployment, operation, and termination. This might be behavior-based, along the lines discussed in paper Z and Ray’s thesis. (b) Explain each step of the flowchart in a way that an operations manager could put it into practice.

3. Develop a simulation using MATLAB or another tool that implements your flowchart. At a minimum, the user should be able to select the size of the area covered, and the number of units deployed. There should be multiple obstacles and a single target. The simulation should terminate when any unit finds the target. The field map (obstacles and target) can be user provided, or randomly generated. Minimal behaviors are to *introduce* the units (treat robots and humans as equivalent for this purpose), *disperse* them, *avoid* obstacles, stay within boundaries, *search* collaboratively, and *terminate* upon finding the target or reaching a preset time limit.

There is some sample code (very rough and bug-y) on the class website under HW.

Submit this on Canvas as a single Word or PDF document. For problem 3, submit the code and a brief description.