MODELING ENVIRONMENTAL UNCERTAINTY IN GROUND ROBOT NAVIGATION

Computer Science

MODELING ENVIRONMENTAL UNCERTAINTY IN GROUND ROBOT NAVIGATION R. Meuth, R. Dolan, P. Robinette, J. Jolly, S. Agarwal*, D McAdams*, University of Missouri-Rolla, Intelligent Systems Center, Rolla, MO 65409, sanjeev@umr.edu. The University of Missouri-Rolla (UMR) Robotics Competition Team has developed an innovative solution to the challenge presented by the Intelligent Ground Vehicle Competition (IGVC). The challenge calls for a ground robot to navigate an obstacle course consisting of boundary lines and upright obstacles. The obstacle course, arranged on a grass field bounded by painted lines, includes construction barrels, heavy-duty netting, cones, trees and simulated potholes. This competition expects students to focus on advanced path planning, control, and vision algorithms. The base system can be extended with higher-level learning algorithms for any ground vehicle platform. The team's solution is to have the robot develop two models of its environment. The first is simply a map of the obstacles detected by the robot's sensors. The second records the uncertainty of each region in the obstacle model. These models are populated by a vision system and accessed by an intelligent control system to drive the robot.This allows the team's omni-directional robot to look in areas of low certainty while driving in areas of low cost, thus making the robot seem curious and intelligent in its environment.