

Proposal: Metric Mapping and Localization for a Mobile Robot

Thesis outline

The goal of this master thesis project is to implement a Simultaneous Localization and Mapping algorithm on a Pioneer 3DX mobile robot (Fig.1). The algorithm should build a probabilistic metric map (Fig.2) using the ultrasonic and laser data and use the built map to localize continuously the robot.



Fig.1 : Pioneer 3DX

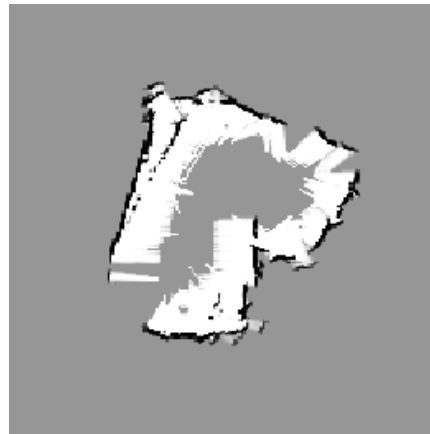


Fig.2. Example of Metric Map using US sensors

Student Tasks

The student will receive the following:

- A Pioneer robot platform (P3-DX).
- An example C++ program to control the robot.
- All necessary documentation

With this information, the student is required to output the following:

- A C++ program to:
 - read the US data and build a probabilistic metric map
 - read the Laser data and build a probabilistic metric map
 - fuse the two metric maps
 - Use the built map to localize the robot.
- A thesis text (in English) describing the work done

Student Profile

- Good knowledge of C++
- Sound interest in robot control and computer vision