TurtlebotSLAM
Group 1

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Introduction

- Turtlebot
- Robot Operating System (ROS)
- Simultaneous Localisation And Mapping (SLAM)

Problem Description

- Phase 1: Exploration, Frontier Detection
- Phase 2: Graph-based SLAM
- Phase 3: Exploration and Landmark detection
- Competing against other teams

Exploration Algorithms

- Random
- Wave Frontier Detection (WFD)
- Fast Frontier Detection (FFD)

Random

- Moves until it reaches a wall, Then rotates for a random amount of time
- Depends on the map
- Not useful
- Reference for experiments

Wavefront Frontier Detection

- Very fast calculation of new frontiers
- Scans only regions, where the robot has already been
- Performs well in small areas
- Cannot be expected to perform well in large areas

Fast Frontier Detection

- Processes only new laser readings
- 4 steps
  - Sorting of new data by angle
  - Creating a contour of the sorted data
  - Detecting new frontiers using the contour
  - Maintenance of previously detected frontiers

Experiments

Setup of experiments

- Percentage discovered when done
- Percentage discovered over time
- Amount of time taken

Results

Waiting for a statistically relevant amount of data

Conclusions

- Tutorials are excellent
- Documentation is close to nonexistent

Planning

- Graph-based SLAM
- FFD
- Entropy
- Landmark detection

Thank you for your attention

Any questions?