PavoneCart

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Demo Phase 1: Exploration

Mapping

- Used provided SLAM package during teleop control

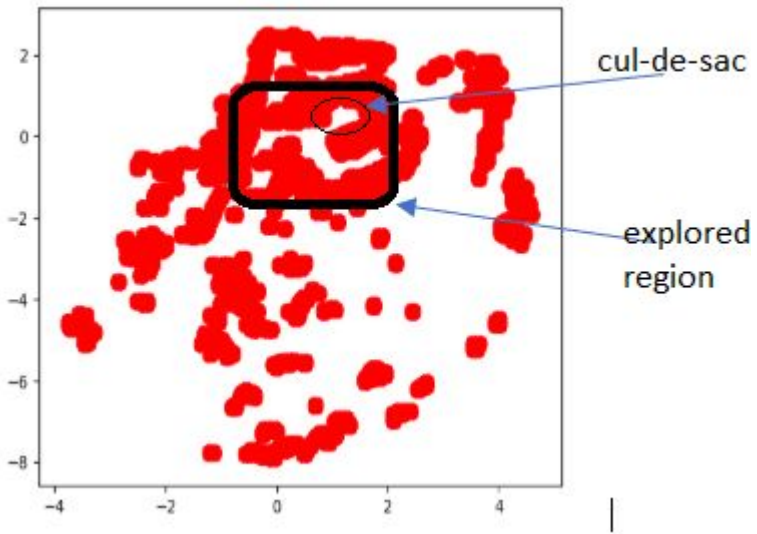
Object detection + logging

- Objects recognized with confidence threshold
- Recognized objects stored in object log (.txt)

Marker visualization

- Markers created and updated at highest confidence object detection

Map of cul-de-sac area after exploration



Demo Phase 2: Delivery

Parsing Objects & Requests

- Dictionary of object names/locations parsed from obj. log
- Iterate through requests & provide robot with next goal

Trajectory Planning

- Used modified navigation algorithm (incorporated stop sign behavior, adjusted transition behavior) to reach goals

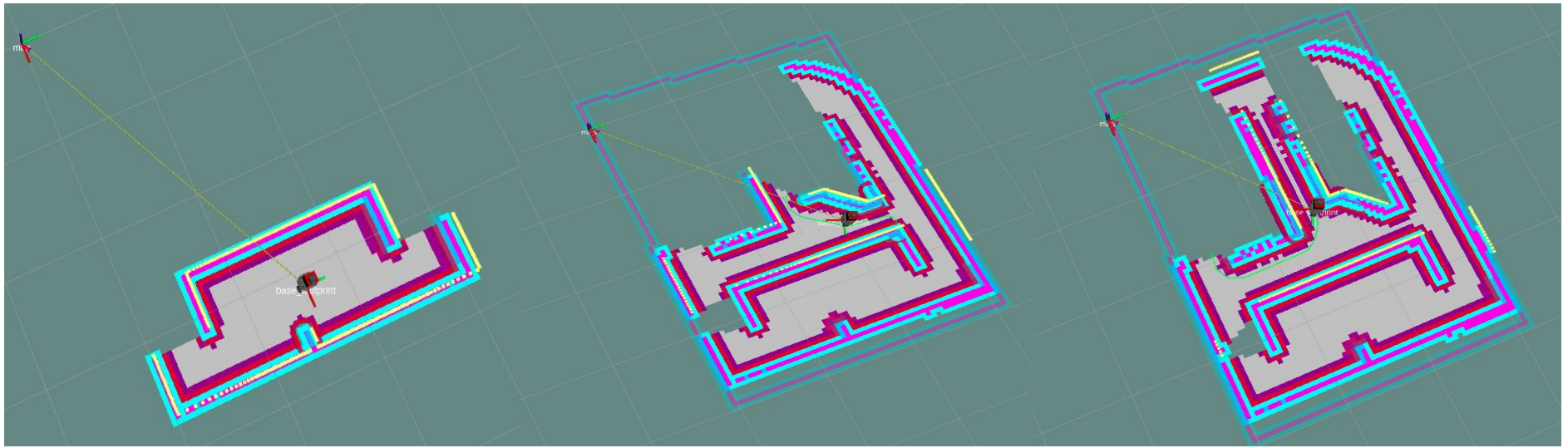
Updating Marker Visualization

- Most immediate goal marker turns green to denote current order status

Design challenges

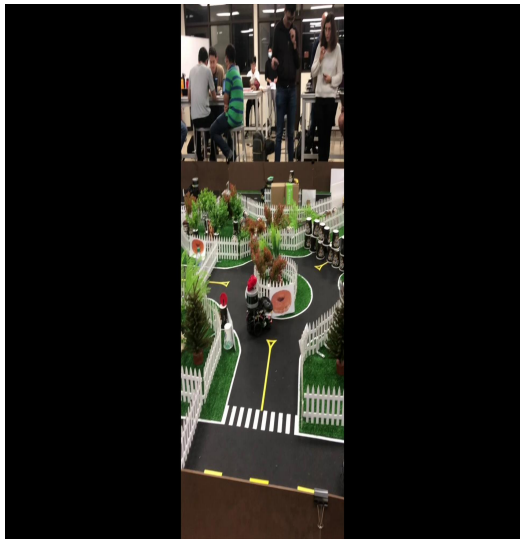
- **Phase I:**
  - Auto Exploration
  - Choosing detection objects
  - Detection metrics for logging (triangulation, distance/confidence behavior)
- **Phase II:**
  - Occupancy Grid - Collision threshold, window size tuning from phase I
  - Fast trajectory planning for far destinations
  - Localization drift
  - Confirmation of Delivery
  - Disconnect between simulation and physical robot (stop sign, mobilenet)

Auto Exploration

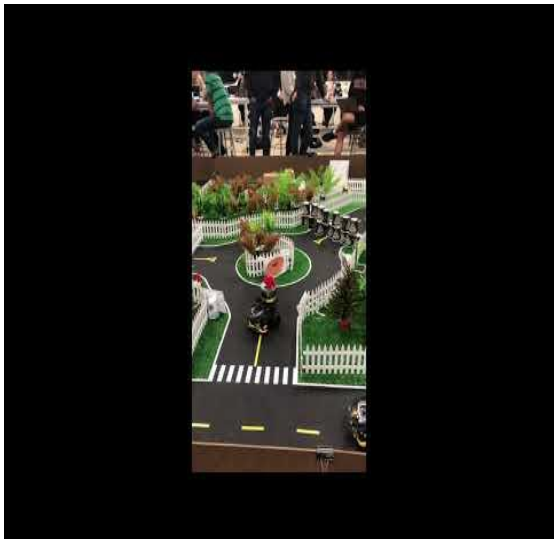


Demo video

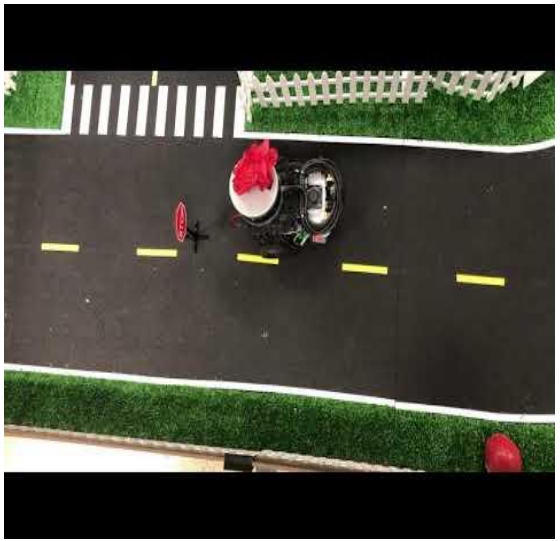
Phase 1: exploration



Phase 2: delivery



Stop Sign Detection



Thank you for your attention!