AA274A Group 12

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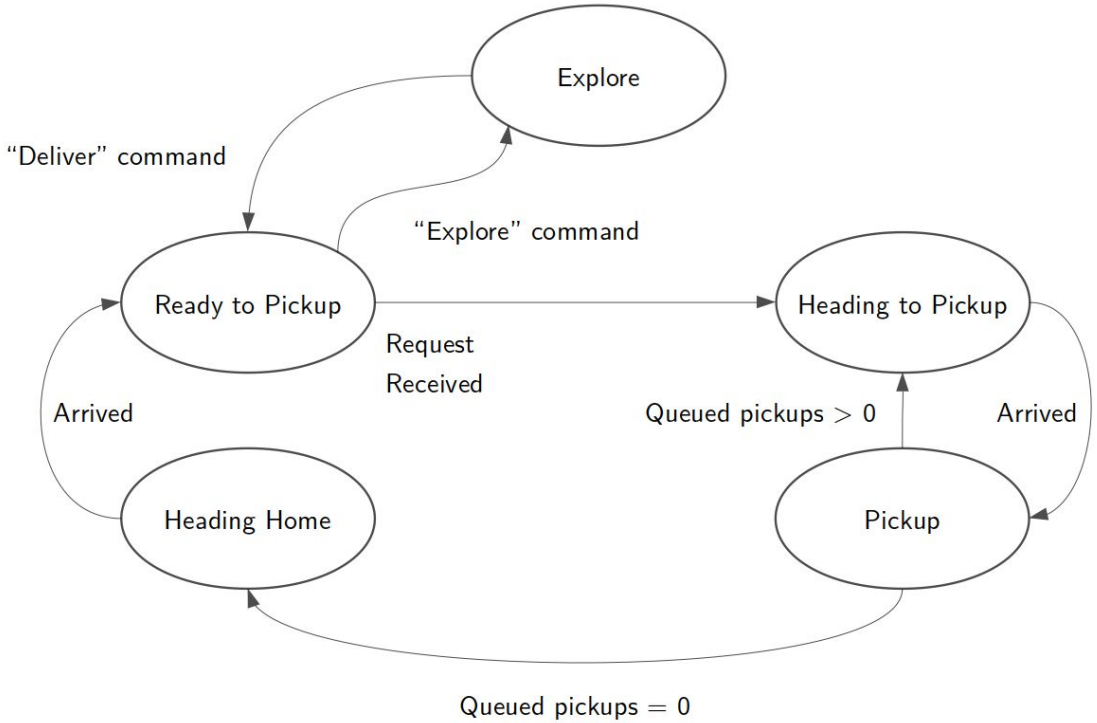
Robot Stack and Design Decisions

- Hardware
  - Lidar
  - Camera
  - Turtlebot
- Software
  - Navigator - **Finite State Machine** (idle, align, track, & park modes); uses the following:
    - AStar - **Planning** (trajectory planning using A*)
    - TrajectoryTracker, PoseController, HeadingController - **Controls**
  - Request_manager - **Finite State Machine** (explore & delivery modes)
  - Detector_mobilenet - **Perception** (object detection)
  - gmapping - **SLAM**
- Food Choices
  - Cake, hot dog, donut, broccoli

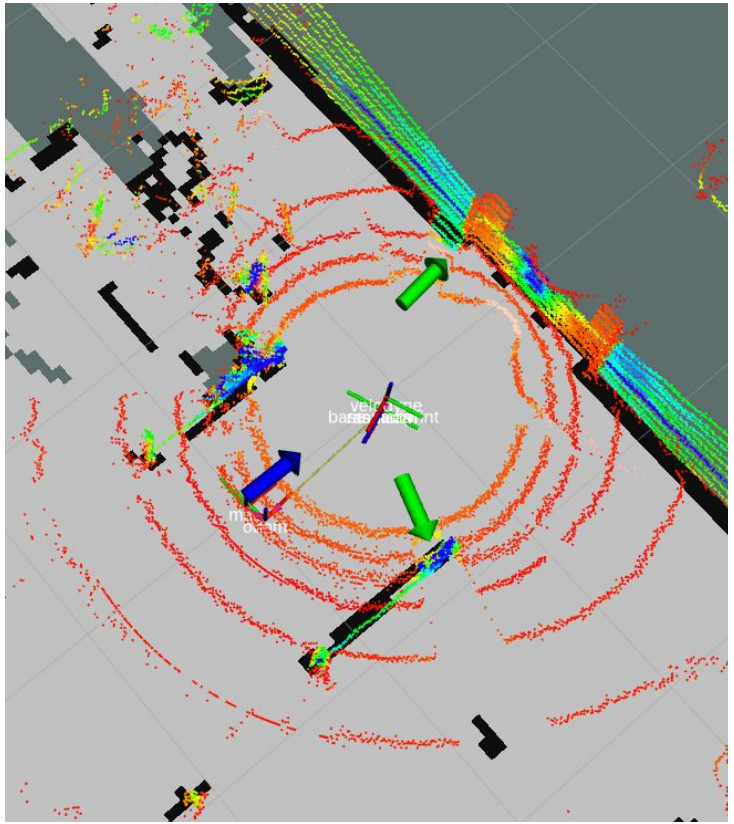
Food Delivery FSM

Runs on top of our navigator FSM



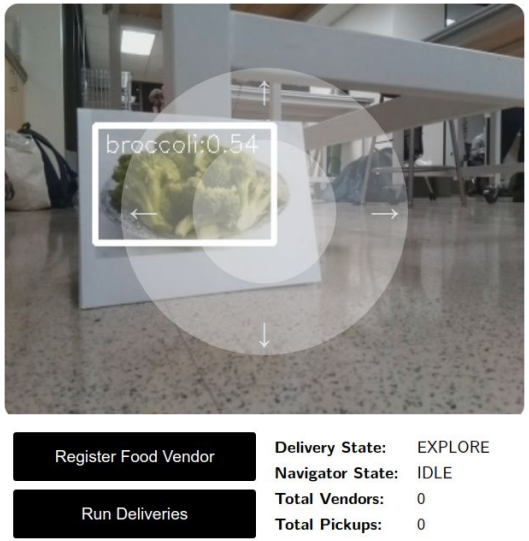
RViz Command Center

- Registered food vendors show as green arrows
- Home location shows as blue arrow
- Turtlebot location broadcasted via tf
- Good for checking localization

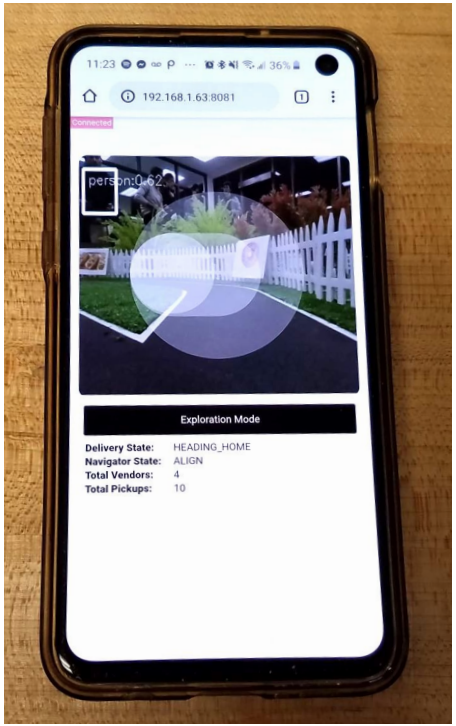


Web-based Command Center

- Use any web-connected device to control the robot
- Camera feed gets streamed to the web app
- Easy switching between exploration and delivery mode
- Keeps track of total number of registered vendors, displays state of the delivery and navigation state machines, keeps track of total pickups
- Javascript to ROS interface



Works on laptops...



and phones!

System Architecture