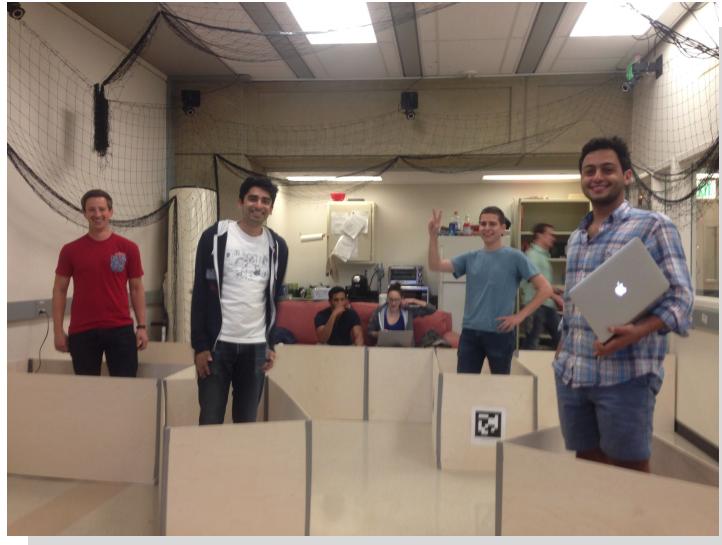


AA274A Final Project

Demo Day: Friday, Nov 20th

2017: Exploration on Mars



Explore and excavate points of interests in a particular order.

2018: Animal Rescue



Finding lost animals in a city, and rescuing as many of them as possible.

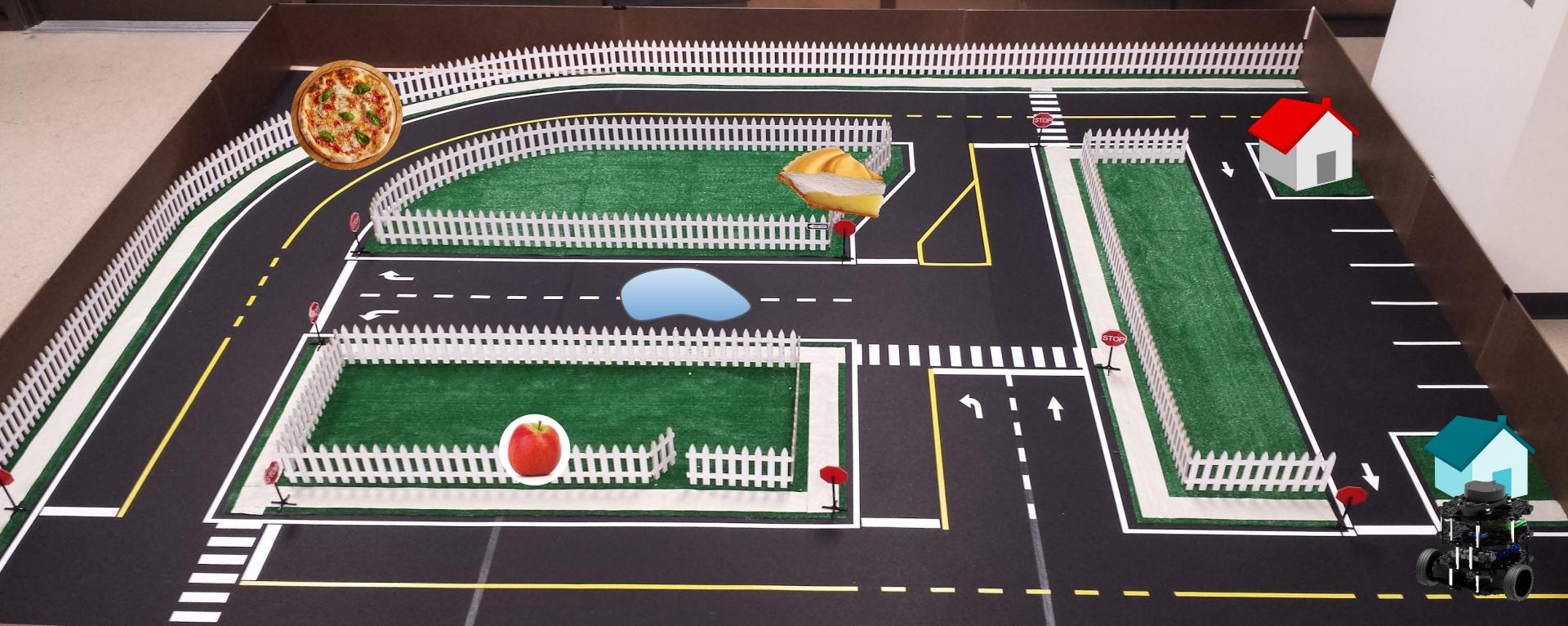
2019 and 2020: Autonomous Food Delivery

2020: Autonomous Food Delivery

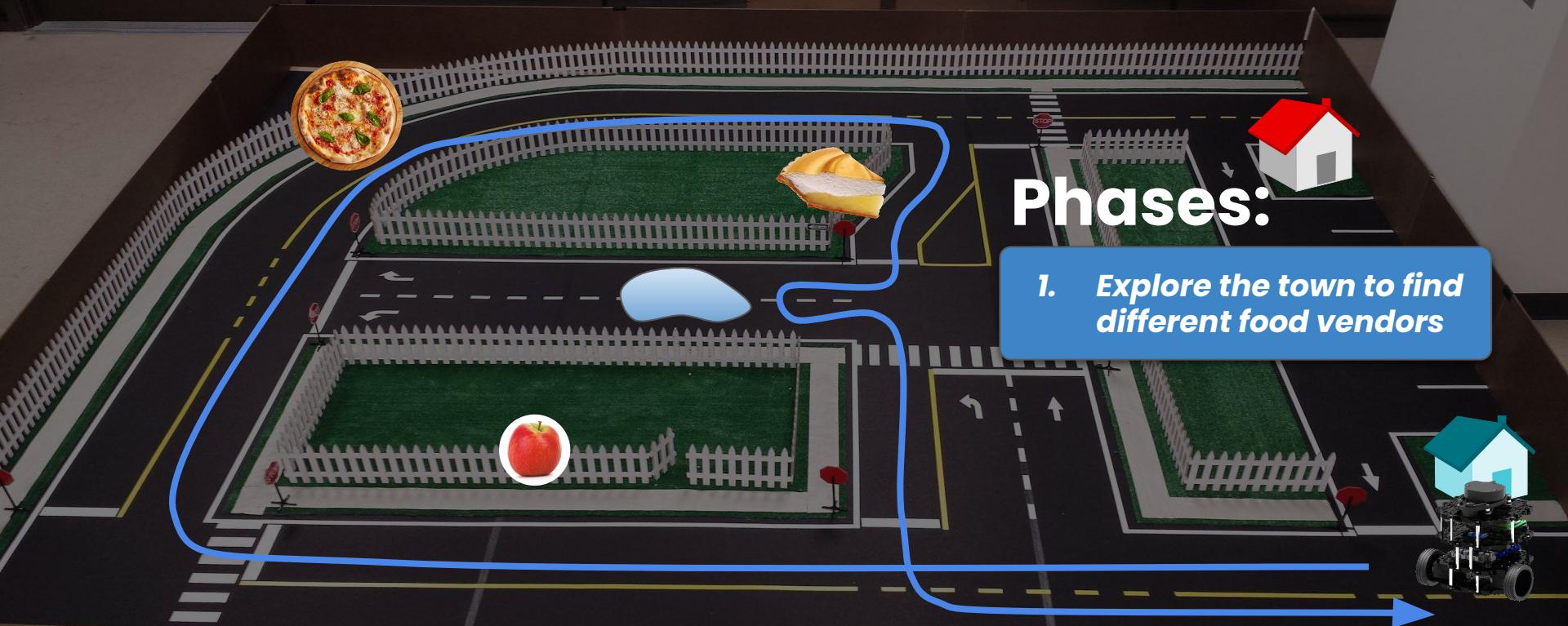


pavonecart

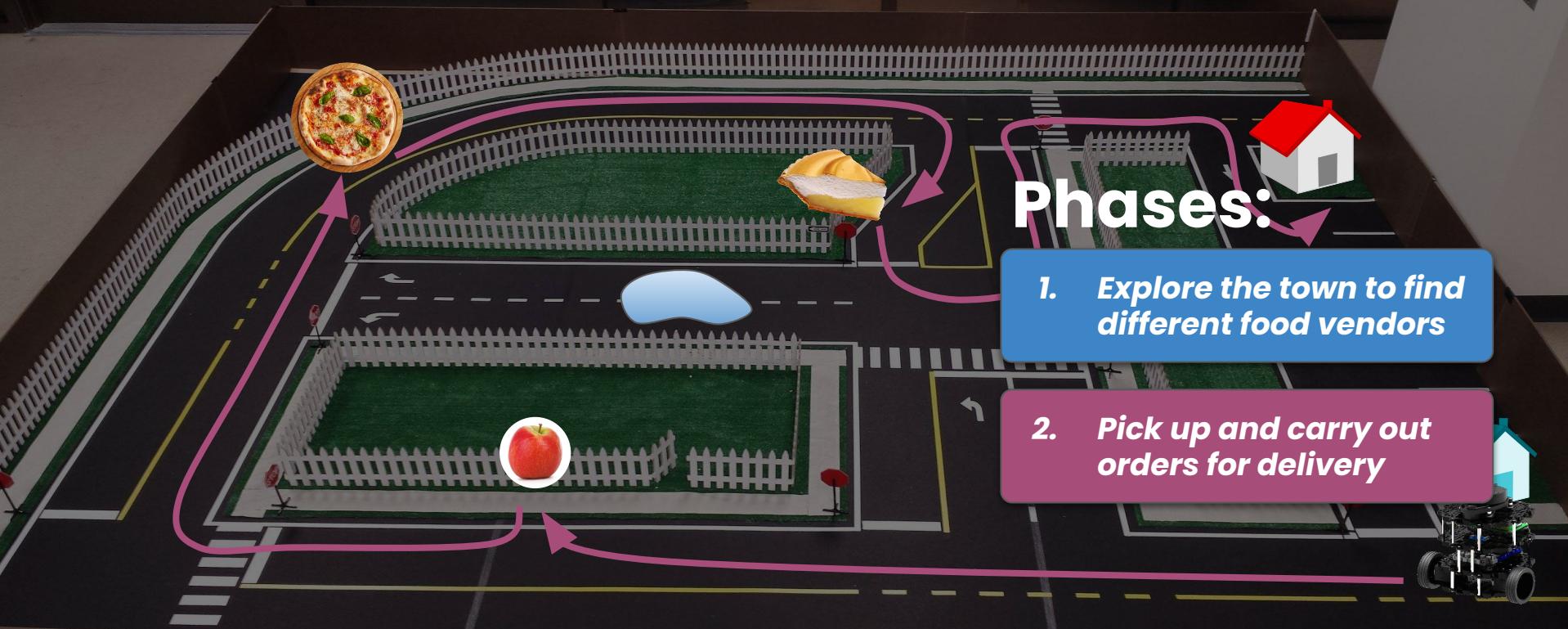
2020: Autonomous Food Delivery

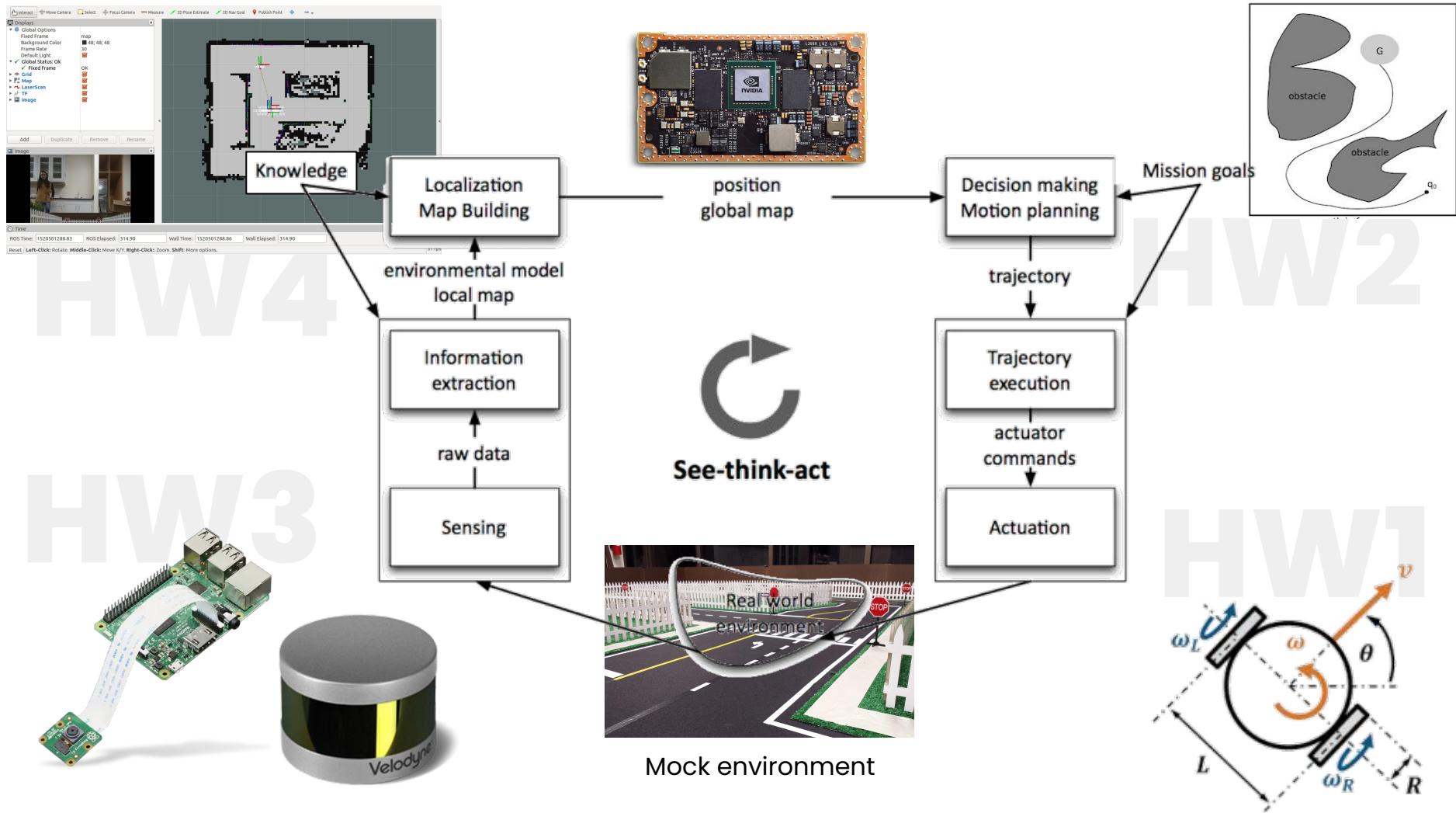


2020: Autonomous Food Delivery



2020: Autonomous Food Delivery





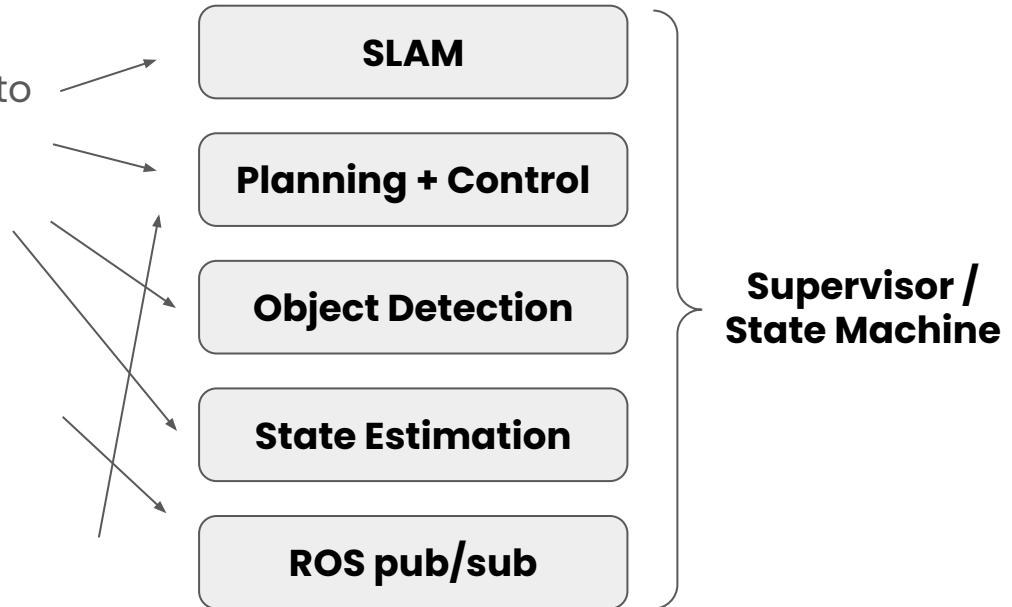
Mission Outline

Explore

- Navigate the city without colliding into obstacles.
- Record locations of food vendors.

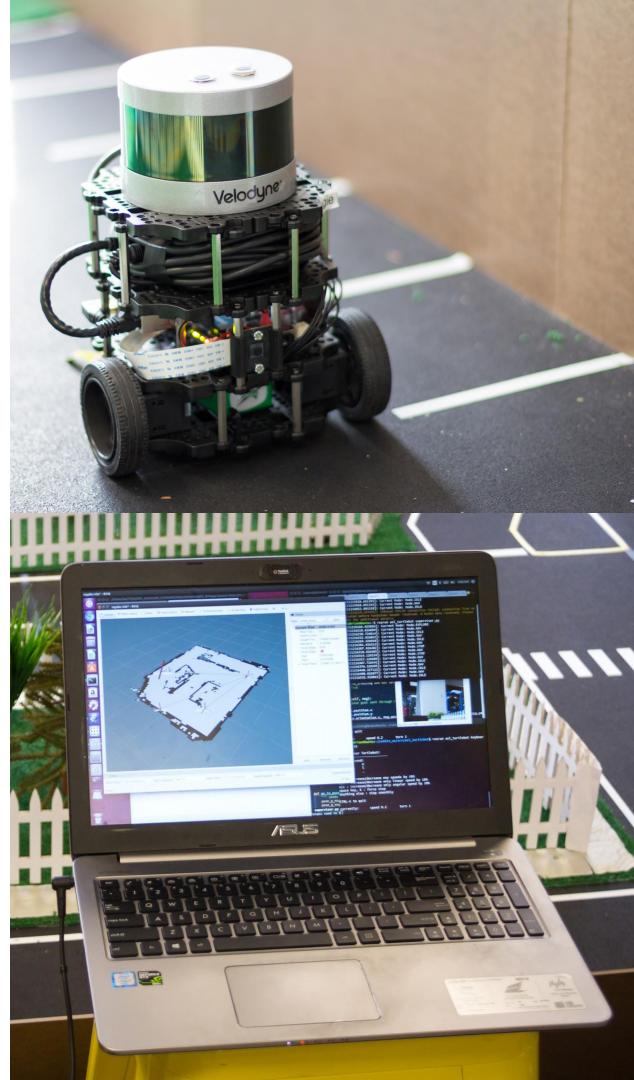
Deliver

- Receive and process requests for delivery.
- Autonomously drive through the city to pick up desired items and deliver them to the goal.



Deliverables

1. Software Demo on Genbu
2. “Command Center” Visualization Tool in RViz
3. Three Minute Pitch Presentation



1. Software Demo

Baseline:

- Human operated waypoint following for exploration.
- Logging food locations through TF frames / broadcasting on a topic.
- Autonomous navigation to revisit vendors and drive to delivery location without running into fences.
- The baseline implementation is not sufficient for full credit. A baseline implementation will result in 70% of total credit. Each extension will net roughly 10% or more in additional credit.

Possible Extensions:

- Autonomous exploration.
- Accurate pose estimation via filtering.
- Shortest path / user-defined order for picking up deliveries.
- Detecting and avoiding driving over puddles.
- Calibration of velodyne/camera offsets.
- **Your own ideas!**

1. Software Demo Specifics

These are indicated in the https://github.com/StanfordASL/asl_turtlebot README anyways*, but we're bringing attention to them here since we've gotten questions about them recently. *Subject to change!!

- You can create the food/vendors that you would like to detect for the final project!
 - They can be simple spheres or you can get as creative as you'd like. You can display 2D images in Gazebo! The one requirement we have is that you use the CNN detector rather than just color-coded stop signs, i.e. set use_tf = True.
- Orders for deliveries will be given by the TAs verbally or programmatically, after which you use the request_publisher.py script to send out our desired objects.
 - The “or” is written above because if you change the request_publisher.py script then we wouldn’t be able to pass parameters directly, and instead we’ll verbally say which objects we want picked up/delivered and you’d enter that in the script.
- You may get orders which have multiple objects in them, the request publisher script can handle this with commas.

1. Software Demo

Baseline:

- Human operated waypoint following for exploration.
- Logging food locations through TF frames / broadcasting on a topic.
- Autonomous navigation to revisit vendors and drive to delivery location without running into fences.

Extensions:

- Autonomous exploration.
- Shortest path / user-defined order for picking up deliveries.
- Detecting and avoiding driving over puddles.
- Calibration of velodyne/camera offsets.
- More ideas in HW3, or your own ideas!

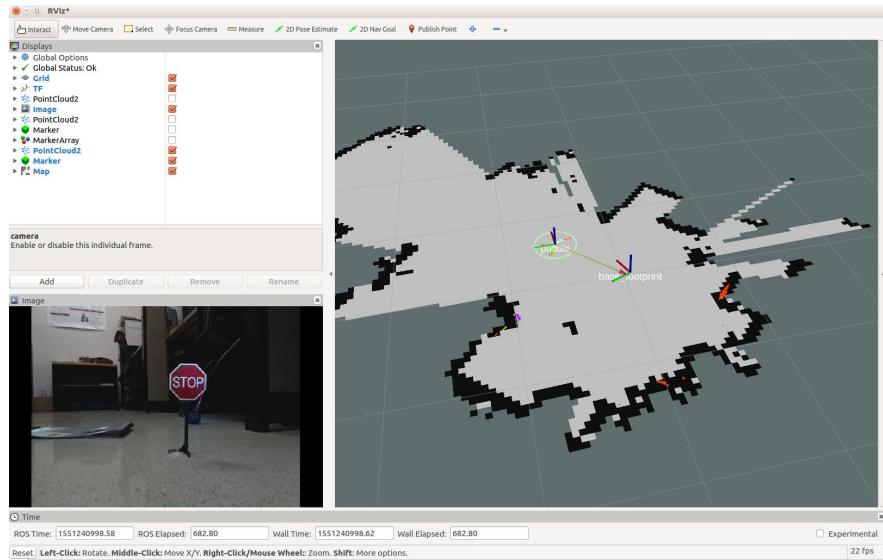
This is very open ended!

Talk to us about your ideas, we're open to tweaking the setup, adding objects, etc. to help you demo your extensions!

2. Command Center Visualizations

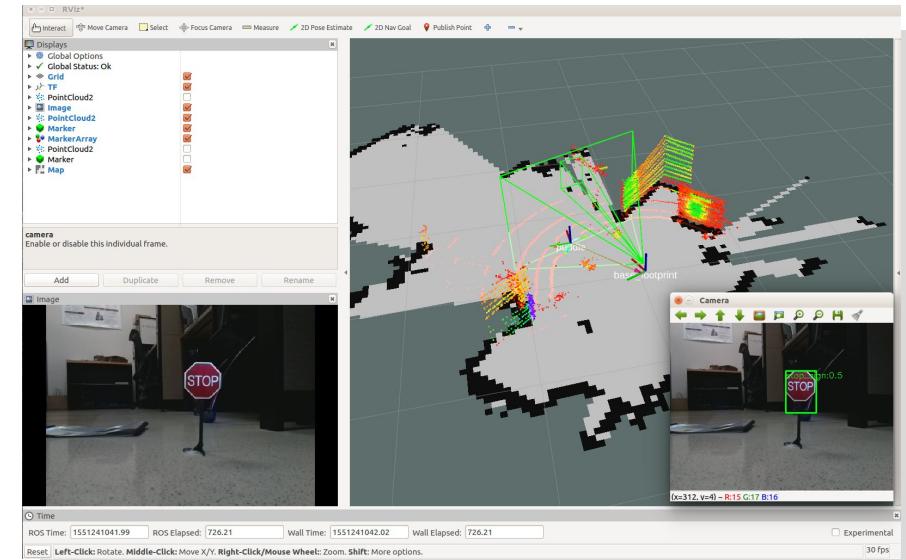
Baseline:

- Visualize the TurtleBot and desired poses with markers



Possible Extensions:

- Mark/label puddles on map
- Visualize camera FOV



3. Pitch Presentation

Three minute presentation:

- Describe your overall software stack.
- Explain your design decisions.
- Highlight what makes your robot unique!
- Include extra slides to tell us about details of your robot.



Rubric

1. Software Demo on Genbu (~70%)
2. Command Center Visualization in RViz (~20%)
3. Three Minute Pitch Presentation (~10%)

more details to come

Demo Day Logistics

- Demos will be held on **Friday, Nov. 20th** over Zoom. Time will be announced soon.
- Groups will present and demo in **12-minute slots**.
 - Simultaneously presenting while the robot is moving, to maximize time efficiency.
- We will have **>2 groups** doing their demo on Genbu **at the same time** to get through the final project evaluations quicker. You will be in separate Zoom rooms and details will be provided soon.
- A Google sheet with time slot sign-ups will be sent by Canvas email. The release time will be announced in advance. It will be first come, first serve.
 - Don't erase others' entries!!!