

# AA274 Team 3 Final Project

## Winter '19

### TEAM 3 MEMBERS:

ADRIAN COSTANTINO, SOMRITA BANERJEE, ROBERT DYRO, ZOE GHIRON,  
AREC JAMGOCHIAN, BERNARD LANGE



## Hardware/Software stack

- Standard ASL Turtlebot equipped w/ Velodyne Lidar, NVIDIA Jetson embedded computer, Camera, Raspberry Pi Controller
- Gmapping for SLAM
- TensorFlow RESNET architecture for object detection
- A\* motion planning

# Design Decisions

## 1) Initial exploration via tele-operation

- Tried method of fixed waypoints for exploration, but variability in map sensing and odometry causing issues

## 2) Publishing dictionary of detected objects

- RESNET architecture over MobileNets – seems to be more robust, but some occasional CUDA out-of-memory warnings
- Detection requires vision at a close distance

## 3) Autonomous navigation to user-requested fruit via A\*

## 4) Every delivery ends with home

# Why is our robot unique?

- Markers to show current and target pose
- Stop sign detection and stopping
- Waypoints for initial environment exploration
- Extra safety features (instant path termination utility)
- Coming back home after fruit grabbing



## Extra Robot Details

- Initial path angle alignment gain was improved: allows for robust navigation between goals (no oscillations)
- Adjusting the detector threshold (to improve the recall)