

### Robot specification

- ❑ Body Weight: 8.34Kg
- ❑ Maximum Payload: 2Kg
- ❑ Maximum speed: 0.8m/s
- ❑ Ground Clearance: 4cm
- ❑ 30 minutes of continuous operation
- ❑ Differential drive configuration
- ❑ Square base footprint
- ❑ Autonomous navigation and obstacle avoidance

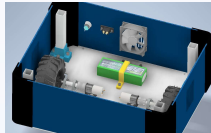


### Robusta Robot Goal

Robusta is a coffee delivery robot that work in coffee shops, the barista choose table number from touchscreen and robot go for the chosen table autonomously.

### Safety considerations

- Robusta has kill switch for any emergency situation that turn off the robot
- Robusta doesn't have any sharp corners to prevent any harm of people around it in the environment
- Ventilation system for the high and low level to prevent overheating.



### Vision

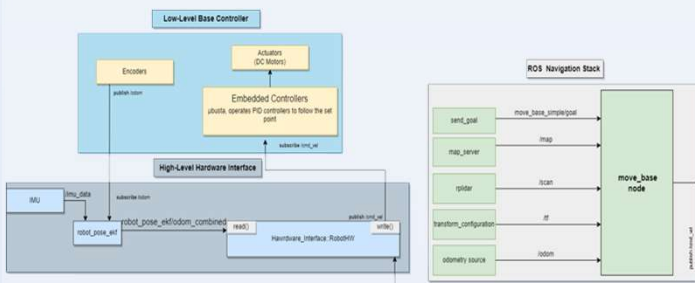
Our goal is to find a low-cost solution so that delivery robots becomes applicable in the real life. We will use combinations of 2D lidar and other sensors to lower the cost but keep the functionalities. These sensors will collect data and communicate with controller. After processing the data and calculate the desired actions, the robot will adjust the motor to avoid the obstacles. After dealing with all the problems it encountered, the robot will navigate to the destination in the end.

### How to use Robusta

Robusta has gui that give user ability to interface with robot (the barista can enter the table number that is the goal of robot, and customer can confirm order)



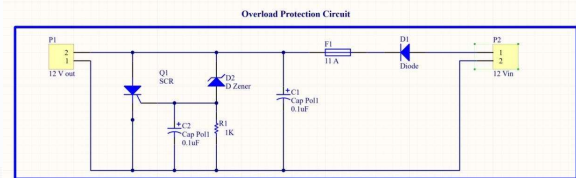
### Software Architecture



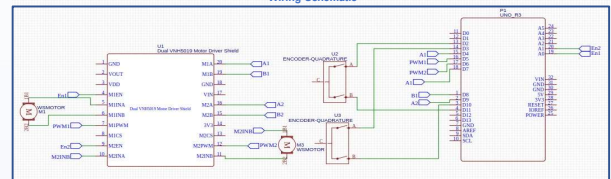
### Robusta in Reality



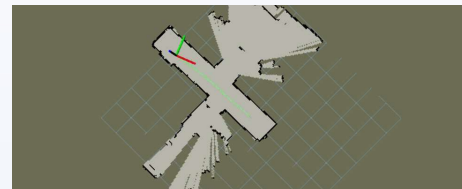
### Electrical Wiring



Wiring Schematic

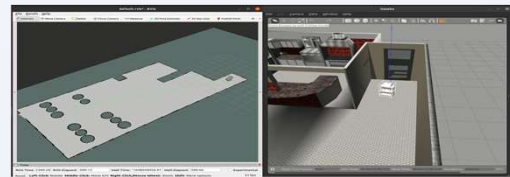


### Mapping

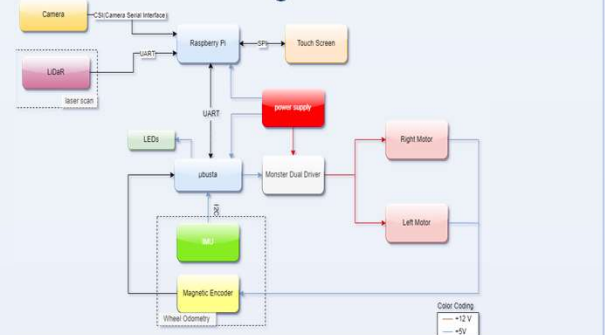


### Navigation

The robot can navigate autonomously to a goal in a static map which is done using Hector SLAM. Navigation is done using the Navigation Stack in ROS.



### Block Diagram



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