

ENAE450 Final Project Report

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2 Simulation

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3 Hardware

3.1 Methods

3.1.1 Navigation with Lidar

3.1.2 Aruco Marker Detection

For Aruco marker detection, our team used the opencv library to analyze the camera frame from the turtlebot.

First, we import opencv (cv2) and define the aruco detection variables. We also import the Image class for the camera subscriber:

```
import cv2
from sensor_msgs.msg import Image

dictionary = cv2.aruco.getPredefinedDictionary(cv2.aruco.DICT_4X4_1000)
parameters = cv2.aruco.DetectorParameters()
detector = cv2.aruco.ArucoDetector(dictionary, parameters)
```

Next, we created a subscriber to the /image_raw topic to get the camera data from the turtlebot:

```
self.scan_subscriber = self.create_subscription(
    Image, '/image_raw', self.frame_handler, 10)
```

In the subscriber callback function, we use the open cv library to detect arucos on the frame:

```
def frame_handler(image_data, self):  
    # get camera frame data  
    frame = image_data.data  
  
    # detect arucos  
    (corners, ids, rejected) = detector.detectMarkers(frame)
```

TODO explain how we interfaced this with rest of code

3.2 Results

4 Retrospective

4.1 What Went Well

4.2 What We Would've Done Differently

4.3 Who Did What