ROBOTICS
Project

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Aim of the Project

The Aim of this project is to Demonstrate a Ground Robot performing Autonomous Driving by Perception.

Prior Knowledge

The Robot has to follow the lanes with yellow on the left and white on the right and the distance between the lane remains almost constant throughout the track.
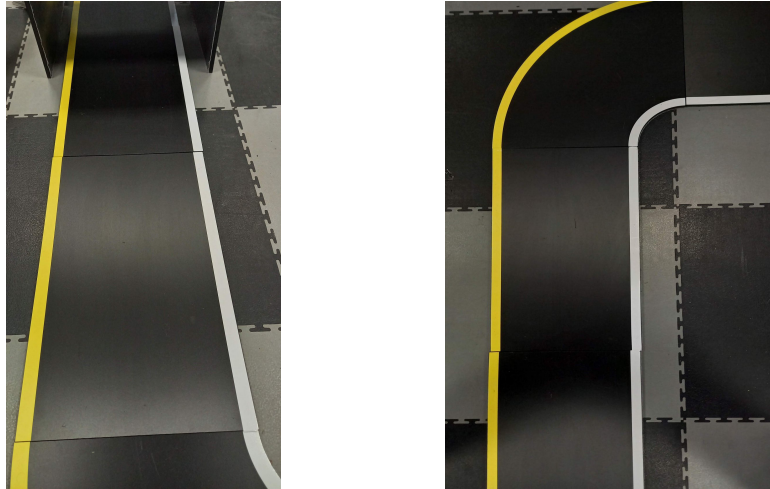

Photo of track at various parts of the track.

Sub-divisions to the Project

- Get the image and apply filters to detect the lanes in the track.
- Control the robot with the detected lanes.
- Control the robot even when we have the one lane in the track.
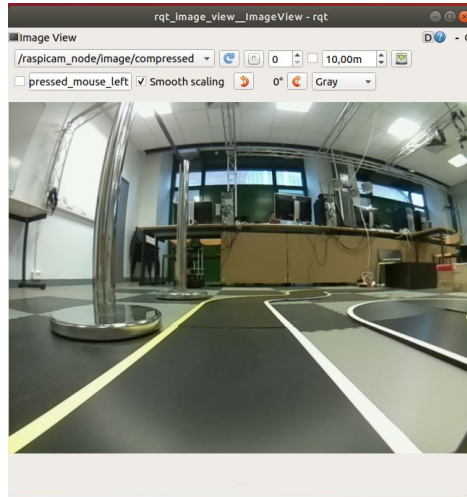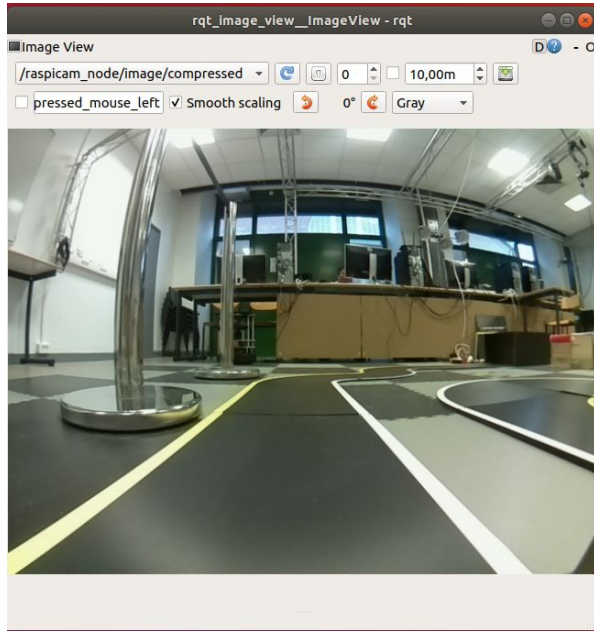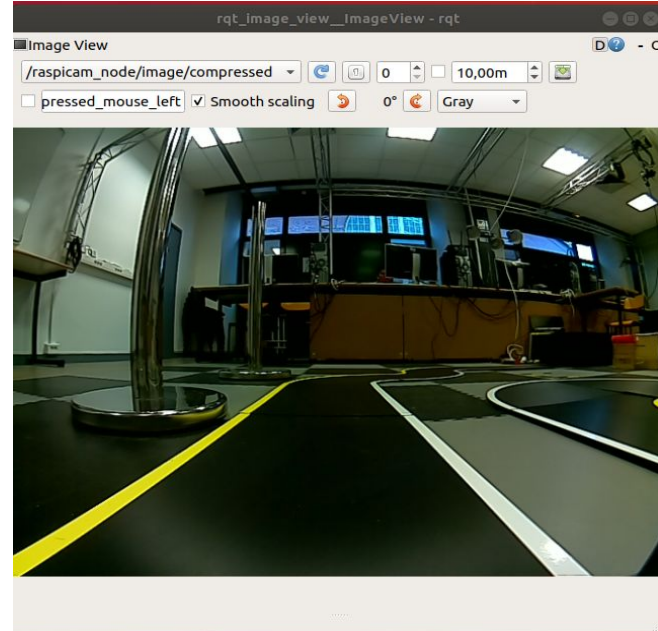

Image from the robot's camera

Implementation
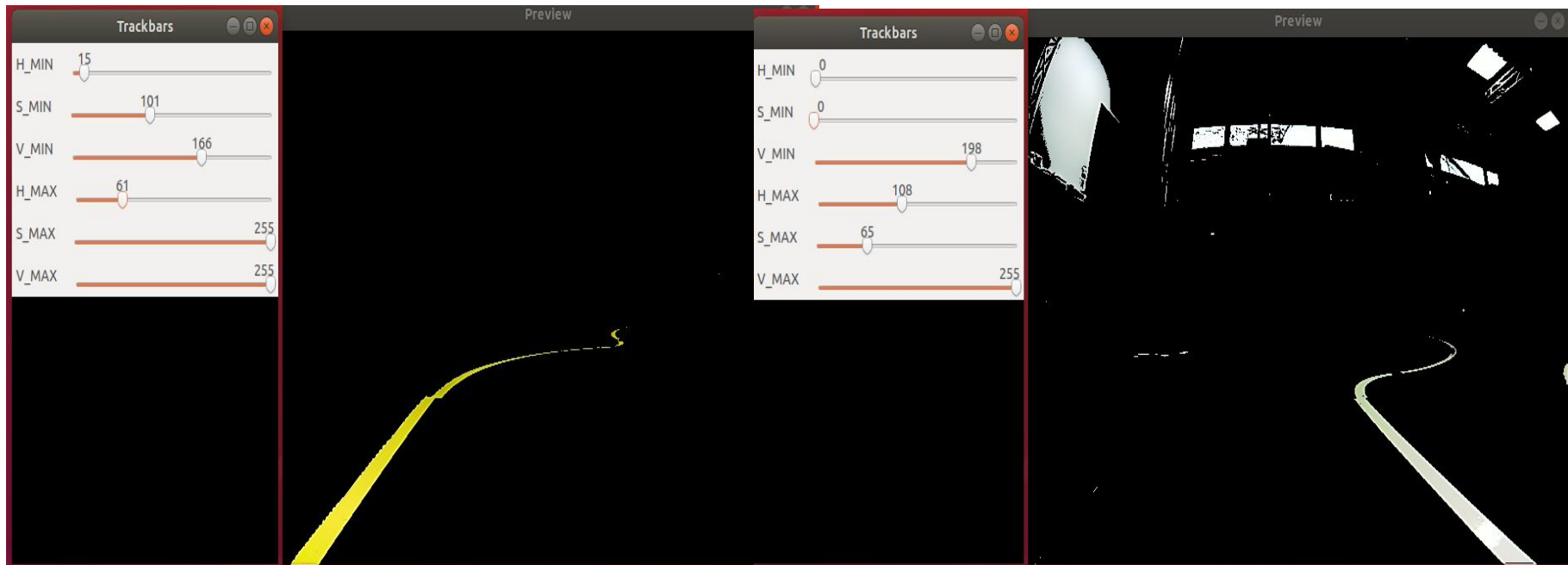
Step 1 : Image Calibration

Before Image calibration
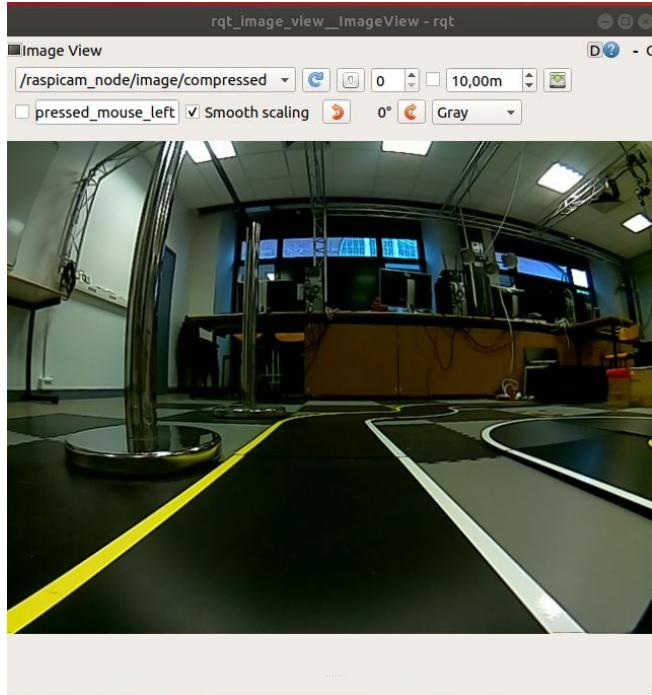

Before Image calibration

Step 2 : HSV Filtering
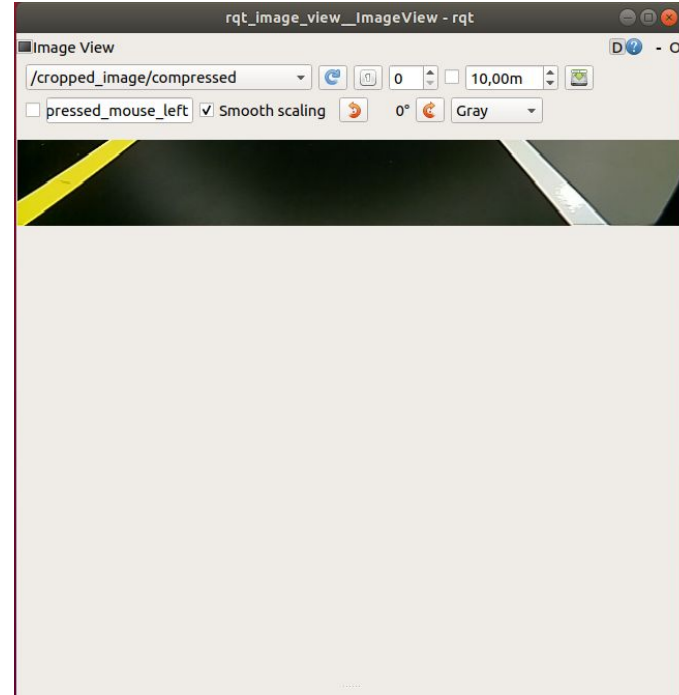

Yellow lane Filtering

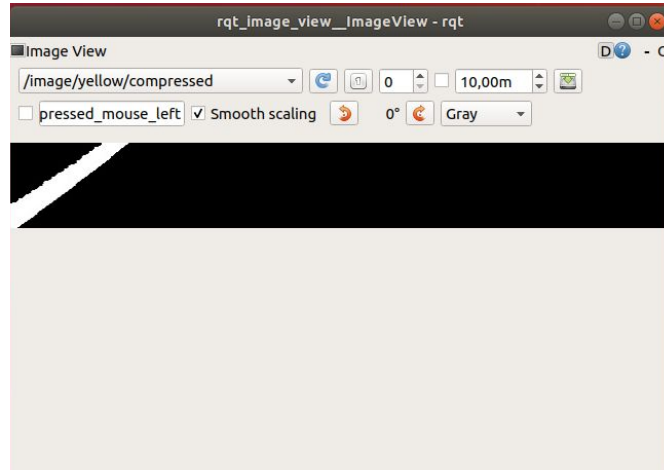White lane Filtering
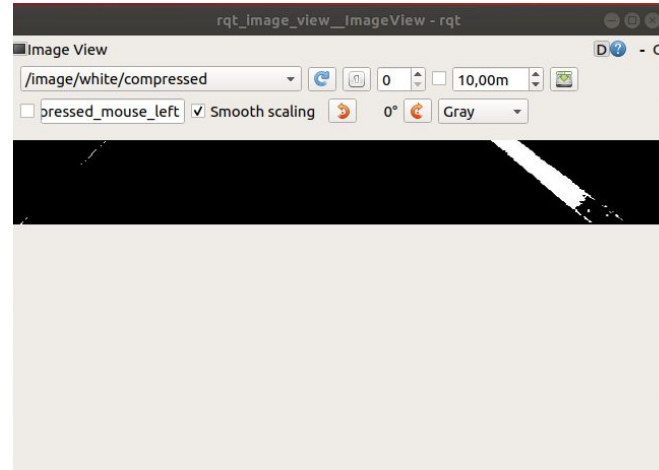
Step 2: Cropping the Image

Before Cropping
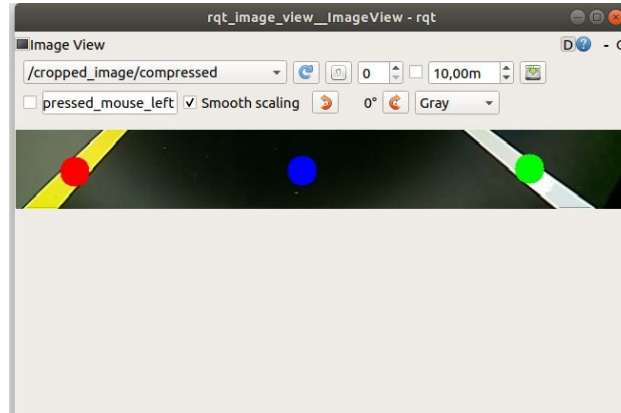

After Cropping

Step 2 : Cropping the Image

Yellow Lane Maked Image

White Lane Masked Image

Step 3 : Control

- Calculate the centroid of the lane detected in the image.
- Apply PID Control with the difference b/w the centroid of the lane and center the image (along x-axis) as error.

Demo

Conclusions

Our Method uses HSV filtering for efficient filtering,image cropping to centralize the area of control, centroids of the track to control the robot's motion.

Our Methods takes 4 to 5 minutes to complete the track. When we tried to increase the speed, the PID Parameters were also changed, which deviates the robot off the track.

Thank you