

AUTONOMOUS LAND VEHICLE GAZİ

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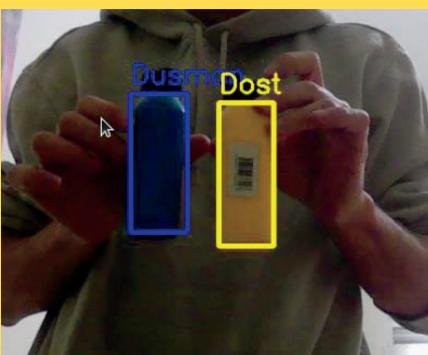
OVERVIEW



- Autonomous Movement
- LIDAR Mapping
- Image Processing

Our vehicle creates maps with LIDAR. It also updates the map while moving autonomously to the destination we specified on this map. It also distinguishes between friend and foe with image processing.

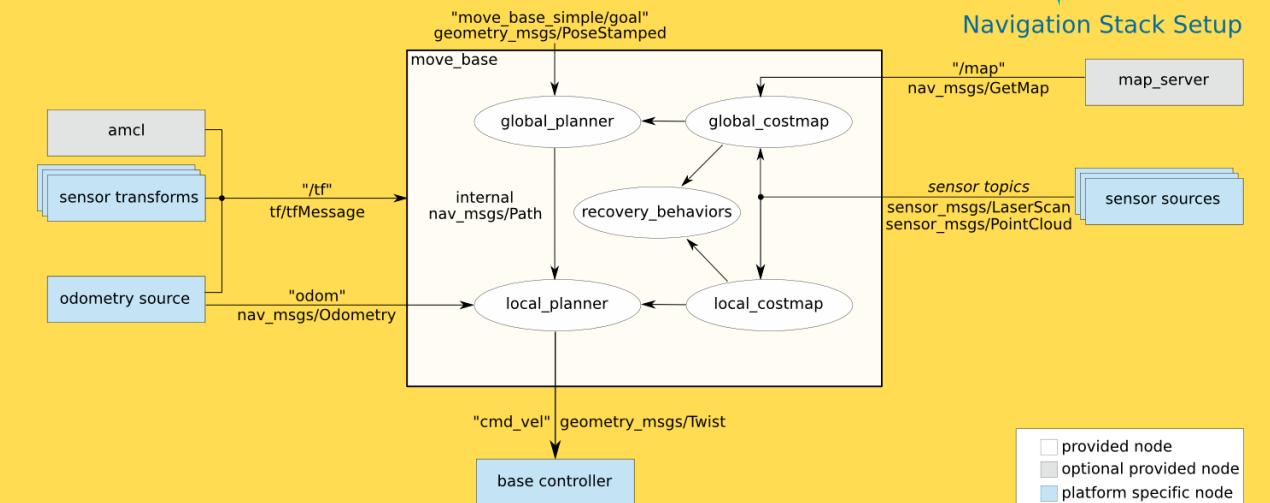
IMAGE PROCESSING



The real-time image data captured by the vehicle's camera is sent to Raspberry Pi.

Then, algorithms implemented with Python's OpenCV library are utilized on Raspberry Pi to process the image data and perform friend-foe distinction

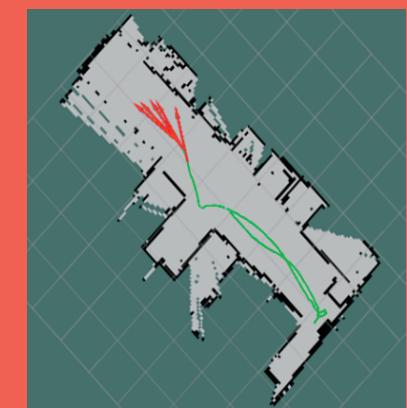
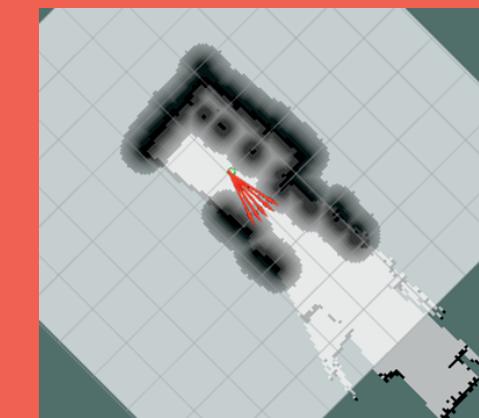
ROBOT OPERATING SYSTEM ROS



ROS is a flexible and powerful framework extensively used in robotics research and development. ROS is offering numerous tools and libraries to facilitate tasks such as perception, planning, control, and coordination. That is why we preferred ROS.

MAPPING

We used Hector Mapping in SLAM. we examined the factors that affect map creation and experimented with optimizing the parameters.



We utilized **move_base** package and implemented to our robot. It combines localization, obstacle avoidance, and path planning to enable autonomous robot navigation.

AUTONOMOUS

We have written Python code that utilizes the RPi.GPIO library. This code includes functions to control the robot's movements in different drive conditions, such as forward, backward, left, and right. ROS message called **cmd_vel**. Upon receiving this message, certain conversions are made. The **cmd_vel** message contains six attributes, but we focus on two of them: **linear_x** and **angular_z**. These values determine the direction and speed for the drive functions.

MECHANICAL DESIGN

- 4-Wheeled Chassis
- 7.4V Battery
- Power Distribution Board
- 4 Motors
- RPLIDAR
- Raspberry Pi Camera

