ROBOSYNC

ROBOTICS DOJO 2025.AUTHORS OF THIS ARTICLE:
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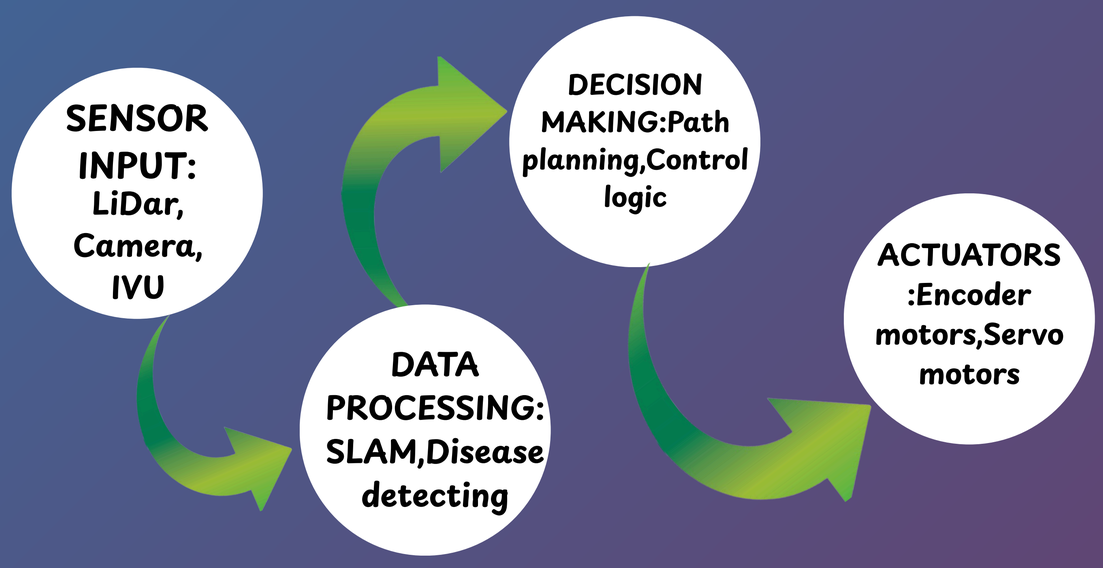
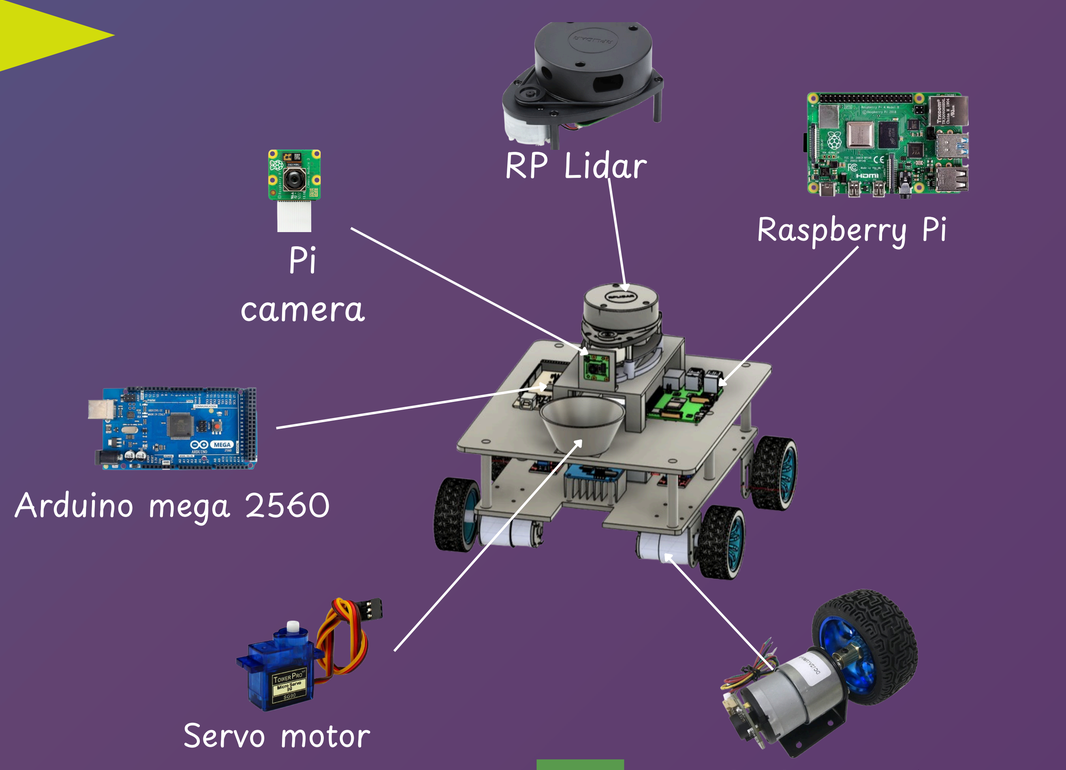
INTRODUCTION

For the Robotics Dojo Competition 2025, our team, Robosync, developed an affordable and modular ground robot capable of autonomous mapping, navigation on uneven terrain, and object handling. Using an RP LiDAR for SLAM, a Raspberry Pi 4 for high-level processing, an Arduino Mega 2560 for motor control, and a Pi Camera for cube recognition, our robot can map mixed terrains, collect and deliver a cube, traverse a ramp, and reach its final destination. A servo-actuated trapdoor provides controlled offloading. Experimental results confirm robust performance in navigation, perception, and task execution, demonstrating the feasibility of our low-cost ROS 2-based platform for competitions and applied field tasks.

ELEMENTS OF ROBOT SYSTEM

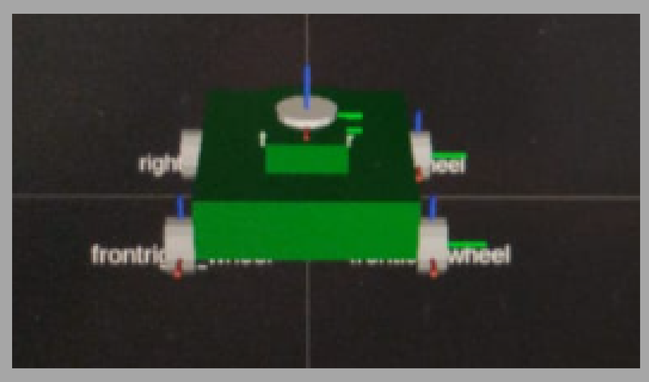




VISUALIZATON

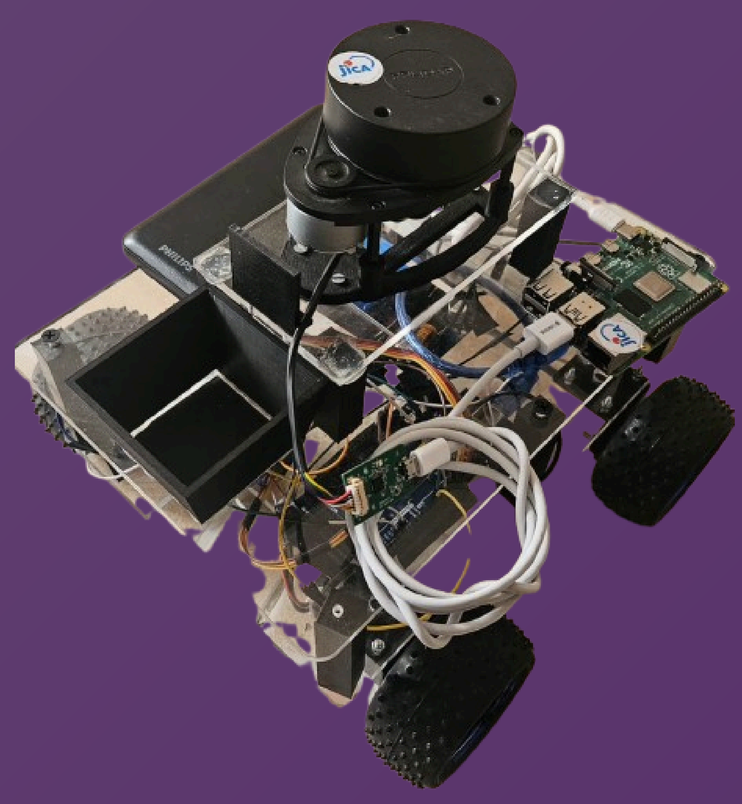
Simulation testing using RViz

Simulation of the robot in a virtual world by creating a URDF(Unified Robot Description Format)



Mapping field

The following field was used to carry out the autonomous navigation.



CONCLUSION

The project developed a mobile robot with ROS2 for autonomous navigation, mapping, object handling, and potato disease detection. Despite challenges like odometry drift, LiDAR noise, and power issues, the system proved effective. Future work will focus on improving localization, terrain adaptability, control, and power reliability.