Autonomous Waste Classifier

Group Members

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Problem

- Improper waste management is a pressing environmental issue that contributes to pollution and resource depletion.
- Manual waste sorting is inefficient and labor-intensive.
- Need for an automated, intelligent waste classification system.

Objective

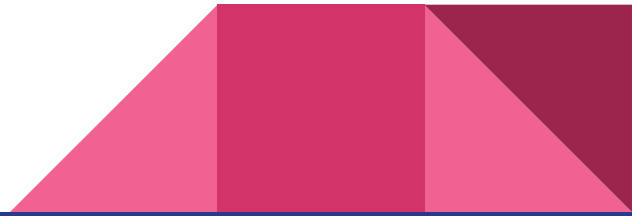
- Design and simulate an autonomous waste sorting robot.
- Utilize deep learning (CNN) trained with 22,564 images for waste classification.
- Implement the system in a simulated environment using ROS 2 & Gazebo 11.
- Detect, classify, and sort waste into organic & recyclable categories.

How It Works

- Use Inverse Kinematics (IK) to control the robot arm's movement
- Camera captures waste item
- Deep learning model classifies waste
- Robot arm picks & places item in the correct bin

Challanges

- Ros2 and gazebo environment required ubuntu
- Testing changes was difficult
- The friction on the robot claw was difficult
- Training the model required a lot of time



Future Improvements

- To capture more images for better accuracy
- To enhance more movement, adding wheel
- Optimize to improve the performance of the robot
- Web UI for Remote Control & Monitoring

Thank You