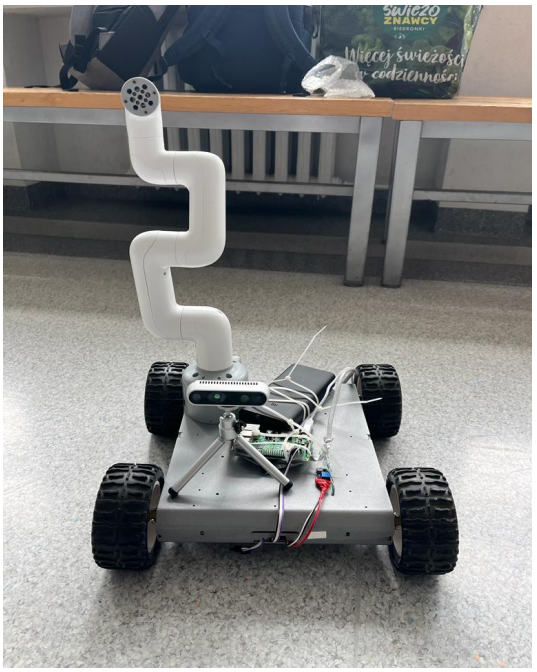
RESEARCH PROJECT-I

INFORMATION FOLDER – JUNE 2023

Department of Electronics,Telecommunication, and Informatics



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Keywords:	**Garbage detection, AI/ML, Robot**

PROJECT TITLE:

Garbage collector robot – clean the World using a mobile AI platform

OBJECTIVE:

Develop a garbage collecting robot using IntelSense depth camera, Raspberry Pi, and a robotic arm to autonomously detect and collect waste, enhancing waste management efficiency.

SCOPE:

- Utilize IntelSense depth camera and machine learning algorithms to detect and identify various types of waste.
- Integrate Raspberry Pi for processing data and controlling the robot's movements.
- Implement a robotic arm to pick up and collect waste with precision.
- Enable autonomous navigation of the robot using obstacle detection and avoidance techniques.
- Focus on safety features to ensure the robot operates safely in its environment.
- Develop a user interface for monitoring and controlling the robot's functions and activities.

RESULTS ACHIEVED:

- Implemented YOLOv7 model for accurate object detection and classification of waste using the IntelSense Depth camera.
- Enabled wireless monitoring of the robot's visual feed, providing real-time visibility of the waste detection process.
- Successfully measured distances to optimize the robot's positioning for efficient waste collection.
- Achieved wireless control capabilities for remote navigation and maneuvering of the robot.
- Overall, the results demonstrate an efficient garbage collecting robot with features for waste detection, monitoring, and wireless control.

FUTURE WORKS:

- Improved Detection Accuracy: Explore different YOLO versions to enhance detection accuracy for waste identification.
- Multiclass Waste Detection and Segregation: Expand the robot's capabilities to detect and segregate multiple types of waste for more efficient sorting and disposal.
- Autonomous Distance Measurement and Navigation: Develop automatic distance measurement and navigation features to optimize the robot's movement towards waste.
- Robotic Gripper for Garbage Collection: Integrate a robotic gripper mechanism to improve the robot's ability to pick up and handle different types of waste.
- User Interface and System Optimization: Enhance the user interface for remote monitoring and control, and optimize the overall system performance for speed, power efficiency, and obstacle avoidance.