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AI BASED TRASH CLEANING ROBOT

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Abstract : *The objective of the project is to design an automatic AI robot which can segregate the waste with the help of object detection. It includes different partitions of water using camera with a robotic arm for picking and placing of waste. The system will be useful in making waste management in smart cities automation, people are busy in their professional life and they forget to pay attention to their surroundings problem which can lead to may hazardous disease. The project is aimed to minimize the human efforts to clean the waste and to make Blue planet Blue again. From the interest and need of cleaning contaminations in the house hold, this project idea has been created to suit the prerequisite of working in house, giving more decisions for the utilization of cleaning garbage and waste from the floor.*

Keywords - Robot; garbage; waste disposal.

I. INTRODUCTION

The Workers assigned to collect and dispose trash live an inhumane life specially in the third world countries. They live in the risk of health hazards such as heart diseases, metabolic syndrome. A smart waste disposal system can free these people off the burden. Those that get buried in soil prevents trees from growing there naturally. In our project collection of thrown away trash is of main concern. Typical composition of garbage people throw in are 5.8%metals, 3.5%glass, 1.6%plastic, 12.9% papers, 1.8% textiles and 53.7% biodegradable which means only the remaining 20.7% of the wastes should really be going to landfills. Most harmful of these wastes are plastic bottles because they are used to package drinks which people need a lot. Research to separate or classify plastic bottles provides a large area of work. People tend to throw wastes outside trash bin when it is full to its capacity. Some work has been done to identify if a trash bin full or not depending on Stereoscopic Camera System and image processing in OpenCV. Here a message is sent to trash collecting vehicle as soon as the bin is full to come and empty the trash bin. In the above mentioned work the trash bin is stationary and depends on disposal of trash in the bin. A mobile system that roams and collects trash has been worked on where a robot is used to clean the area around a dustbin using combination of Mobile Nets and Single Shot Detectors for fast, efficient deep learning based object detection. Research has been done on autonomous bots which can collect any object in their path from ground, river and water ways with no flow but those are without the capability to separate trash from non trash. Robots without trash identification capability can be harmful to wild life.

II. LITERATURE SURVEY

1. AUTOMATIC WASTE SEGREGATOR BIN USING ROBOTIC ARM

This research aims to design an automatic segregator bin which can segregate the waste at source that helps in reducing the time taken for processing, and the segregation work done for large amounts of waste in the later stages. It includes different partitions for collection of different waste using sensors, with a LCD display which updates the status of the bin. The bin uses a robotic arm for picking and placing of waste, also defines the path to be taken after waste detection around the bin. This robot can be useful at places like offices, apartments, shopping malls, parks etc. This system will be useful in making waste management in smart cities automated.

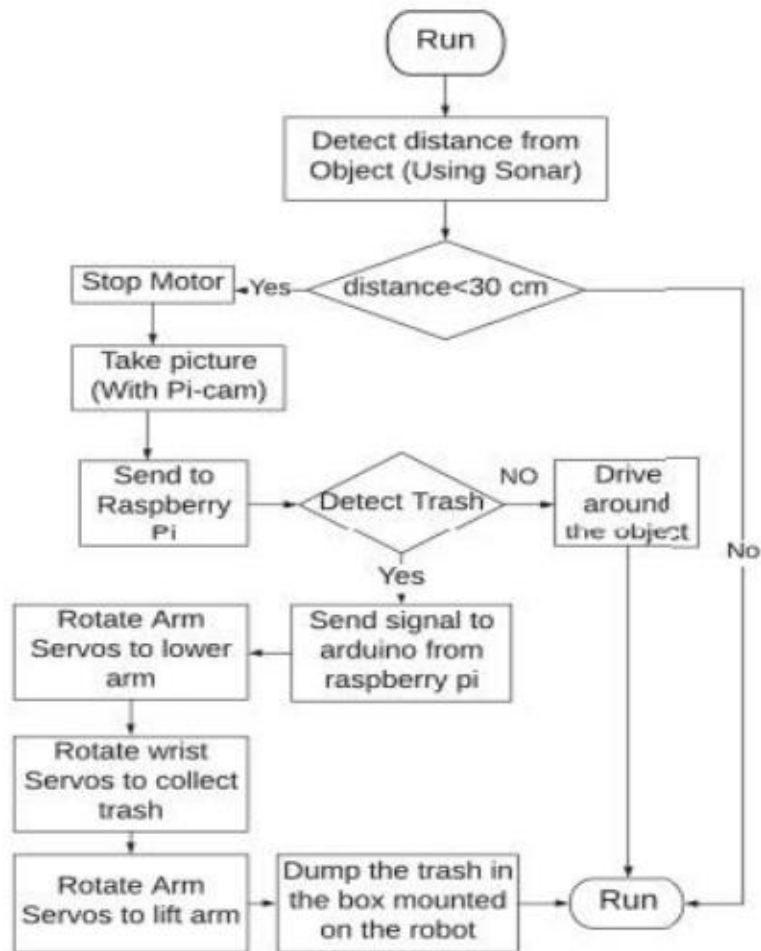
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3. TRASH DETECTION AND TRACKING FOR A RIVER CLEANING ROBOT

The objective of this research work is to develop an algorithm for a river cleaning robot. This algorithm will be able to autonomously detect and track the surface trash flowing in water from a real time video. The state of the art works that have been implemented so far consider that the first frame of the video contains the object to be detected. The various challenges confronting this work are the reflecting nature of flowing objects in water, clutter and noise generated by ripples in water, changes in the HSL levels of the surface of the water and detecting multiple objects in a single frame. Our aim was to develop an algorithm that detects the trash flowing in the water, then keep a track of it as it progresses and then localize the object such that it can be collected by the scooping arm of the robot. This problem has been divided in two parts, where the first part concerns itself with the detection of moving trash and another with tracking the detected trash objects. We did a comparative study of two main detection algorithms, where one is the Background Subtraction in which the mobile object is detected by differencing the current frame from the reference frame of the video feed.

III. METHODOLOGY



We illustrate the processes which are used for object tracking and end-to-end machine learning-based trash identification and collection.

The whole method is divided into three parts:

- Object detection
- Trash identification
- Trash collection

IV. RESULT AND DISCUSSION

DRY WASTE ACCURACY AND LOSS :



WET WASTE ACCURACY AND LOSS :

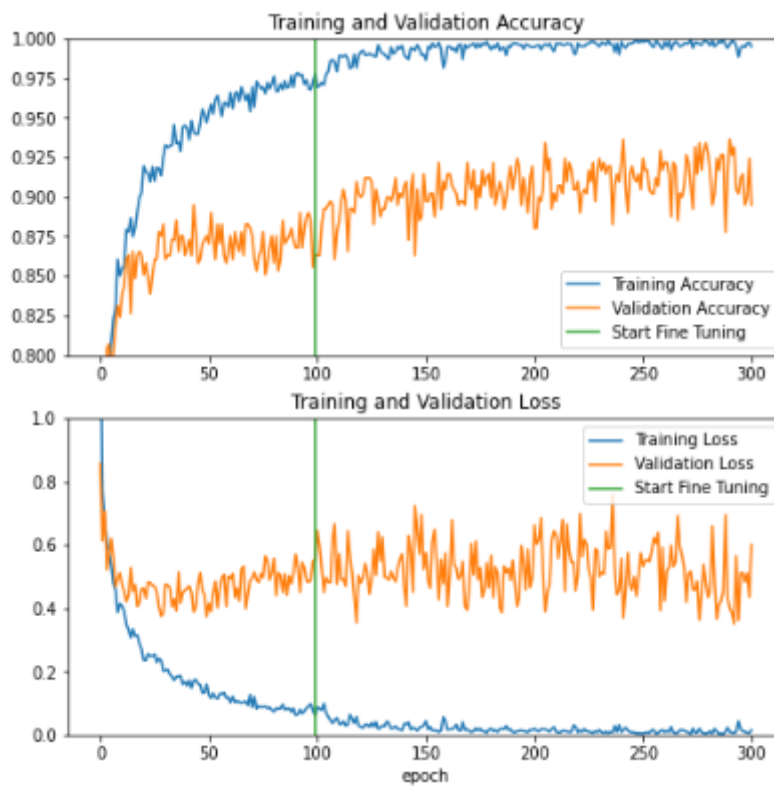
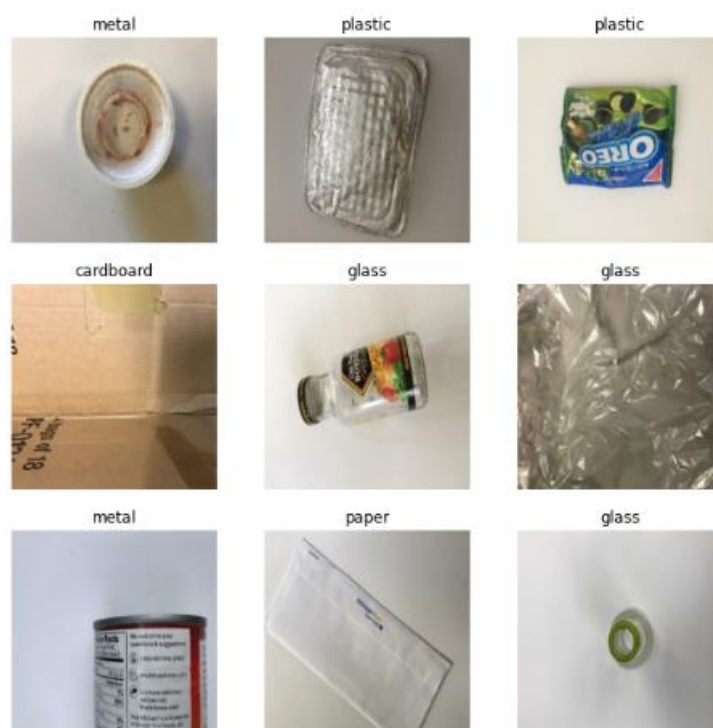


IMAGE SEGMENTATION :



V. CONCLUSION

Our purpose is to build a stable system for collecting and depositing trash in the trash container mounted on a robot which runs on four wheels to move and collect trash. A simple and efficient object identifying algorithm from an image is designed with keras. Upgrading waste disposal system will be beneficial to protect the nature. Our irresponsible behavior of throwing trash here and there is creating a problem of getting non-disposable materials into soil and water thus polluting them. We hope to solve the problem by collecting thrown away trash and putting them in a place where those will be properly handled.

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