Smart Waste Management System

Rebecca Angela Fernandes[1],Anusha Manjunath[2],Anurag E P[3],Anubhav Prakash KP[4],Muhammed Fayis P[5]

[1]Assistant Professor, Dept. of ECE, Yenepoya Institute Of Technology, Moodbidri, India -574225 2345 Students, Dept. of ECE, Yenepoya Institute Of Technology, Moodbidri, India -574225

ABSTRACT—waste lies littered in the surroundings, dumped on open lands and becomes a major threat to the environment. So, waste management becomes an important concern for the health and well-being of the society. Segregation makes it possible to reuse and recycle the waste effectively and the economic value of waste is best realized when it is segregated. So, it is very crucial to have some system to manage waste automatically which is currently not here. So, our idea is to make an automatic waste segregator which can identify the different types of waste and put them in different bins accordingly and automatically.

Keywords—Rasbperry pi, Bins, Motors, Smart Waste Management, Sensors.

I. INTRODUCTION

The waste collection process is a critical aspect for the service providers. The traditional way of manually monitoring the wastes in waste bins is a complex, cumbersome process and utilizes more human effort, time and cost which is not compatible with the present day technologies. In order to overcome all these problems, we are proposing the idea of smart waste management system which helps in auto-management of waste without human interaction in order to maintain a clean environment. The concept of smart waste management is implementable in cities where waste production is domestically high but theeffort put to control it is relatively very low.

OBJECTIVES

This project aims to build a smart waste management system using Raspberry pi, which can sort different types of waste materials. It helps the workers to easily collect waste and thereby reducing the time consumption. Smart waste management is an idea where we can control lots of problems which disturbs the society in pollution and diseases. The waste management has to be done instantly else it leads to irregular management which will have adverse effect on nature.

II. METHODOLOGY

The process begins with the entry of waste. Infrared (IR) sensor detect the arrival of the waste. All the sensors are kept at the arrival part of the model.. Moisture sensor detect the wet waste and it will store in bin 1. Metal detector detects the metallic waste which will then be separated into bin 2. Glass and plastic can be identified by Capacitive Proximity Sensor and glass is separated into bin3,By the help of Image processing Plastics waste like plastic bottle and cover will separated into different bins bin4 and bin 5 respectively. If all the waste bins is 90% filled, then Ultrasonic sensor will detect the level of each bins and GSM module will pass the message to the respective person. LCD display show the information regarding the waste whether the bins is full or not and the system will close automatically.
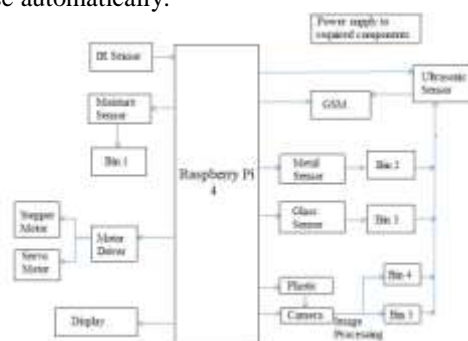

Fig Block diagram

The camera module is connected to Raspberry Pi to capture the waste image for the purpose of object detection and identification. After the waste is identified, stepper motors controlled by the Raspberry Pi will actuate the opening and closing of the lid of the waste compartment. The opening of the lid allows waste to fall from the waste detection compartment into its respective

waste compartment.An ultrasonic sensor is attached to the microcontroller to measure the empty level of the trash box and entry of the waste. The ultrasonic sensor is placed at the top of our developed model. Ultrasound is transmitted and received to calculate the entry level of trash bin. To check the validity of an empty level. If the waste crosses the threshold level, the system will stop the respective process and alert the user by sending a notification to clean and replace the trash box via GSM and also message will update on the LCD display.

III. CONCLUSION

The system can collect accurate data on real time which can be used further as an input to a management system. With load cell calibration approach, it simplifies the calibration process so it can be attached to commonly used waste-bin without changed or modification. The level sensors also can be attached to common waste-bin. So the prototype is suitable for using in conventional waste management infrastructure helping a cost effective project for the betterment of our world.The system can sort different waste materials and hence simplifying the process of waste management. The system uses image processing techniques there by increasing the accuracy. The system also alert the required person to collect the waste.

RESULTS

The smart waste management system is accomplished using Raspberry pi image processing. The system can sort different waste materials and hence simplifying the process of waste management. The system uses image processing techniques there by increasing the accuracy. The system also alert the required person to collect the waste. The display gives information regarding the bins. The system also reduce the time required to sort the waste materials and easily the process.

ADVANTAGES
➢ Which results in major cost savings and less urban pollution.
➢ Historical information on collections helps adapt the deployment of containers to the actual needs of the city
➢ It keeps the surroundings clean and green, free from bad odor of wastes,
➢ Reducing manpower required to handle the garbage collection.

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