

WASTE MANAGEMENT: RE-BIN

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Abstract-Waste sorting is the process by which waste is separated into different elements. It can occur manually at the household but this project makes the separation automated using robots. A robotic waste sorting system consists of an android application in order to guide the robot, sensors to identify and separate out a wide range of materials including plastic, paper, glass, metal. The android operated robot arm is designed so as it can perform the activities of a human arm which will be able to distinguish the objects and will place the waste in to respective bins with the help of sensing devices. An alarm will be generated when the bin is full.

Key words: android application, sensors, robot, waste separation.

I. INTRODUCTION

Solid waste management is a serious challenge for all metropolitans and growing cities worldwide. Today the situation of cleanliness in Indian cities is worst than ever. Some of our major cities are labeled as one of the dirtiest cities in the world. The government and/or the municipal corporation are overwhelmed with the amount of garbage, which our cities are generating. This situation is going to get worse in the future if we don't handle this now[1]! So now we came up with a novel idea of waste management system in which we can segregate the waste using our android smartphone. Here the robot for segregating the waste is placed. And the robot contains 1 android mobile attached to. Now we will communicate with this android phone via wireless communication technology. Then, for moving the robotic arm for pick and place (segregate) the waste we will press specific keys on the mobile[1]

The status of development of a country may be categorized in several ways. With respect to its impact on solid waste management, in this publication status of development is categorized on the basis of availability of economic resources and

on degree of industrialization. Degree of industrialization is measured in terms of extent of Mechanization and availability of technological resources. Justifiably or not, the terms “developed” and “industrialized” occasionally are used synonymously. Because of localized changes in degree of development within each country, it is difficult to apply a single developmental category as far as solid waste management is concerned. For example, a large urban community (typically the capital city and surrounding area) in a developing nation may be in a stage of development that is well above that of the rest of the nation. On the other hand, these communities are not entirely immune to the limitations imposed by the status of the nation[2][1].

The main objectives of the new system is to overcome the pitfalls of the existing system. This project targets on achieving a better recycling ratio than current manual methods. This can be expected in particular in the sorting of plastic wastes, where different types of plastic cannot be sorted visually and sensors have to be applied.” The result will be more efficient sorting of bulky wastes and a better resource recovery. Robots have overrun the planet. Humans are battling with automated machines for jobs. Artificial Intelligence (AI) is present in everyone's homes.

Environmental and health impacts :

The organic fraction of MSW is an important component, not only because it constitutes a sizable fraction of the solid waste stream in a developing country, but also because of its potentially adverse impact upon public health and environmental quality. A major adverse impact is its attraction of rodents and vector insects for which it provides food and shelter. Impact on environmental quality takes the form of foul odors and unsightliness. These impacts are not confined merely to the disposal site. On the contrary, they pervade the area surrounding the site and wherever the wastes are generated, spread, or accumulated. Unless an organic waste is appropriately managed, its adverse impact will continue until it has fully decomposed or otherwise

stabilized. Uncontrolled or poorly managed intermediate decomposition products can contaminate air, water, and soil resources[3].

Epidemiological studies:

Studies have shown that a high percentage of workers who handle refuse, and of individuals who live near or on disposal sites, are infected with gastrointestinal parasites, worms, and related organisms. Contamination of this kind is likely at all points where waste is handled. Although it is certain that vector insects and rodents can transmit various pathogenic agents (amoebic and bacillary dysentery, typhoid fever, salmonellosis, various parasitoses, cholera, yellow fever, plague, and others), it often is difficult to trace the effects of such transmission to a specific population[21] Because of all such environmental and health hazards find waste management project highly beneficial to society.

II. LITERATURE SURVEY

A.Related work:

The NOWASTE project targets biodegradable waste produced by households. The project is testing what it calls a “waste-eating robot” - a household anaerobic appliance, half the size of a dishwasher, into which kitchen waste can be put. The machine shreds and compacts the waste, separates liquids from solid matter and creates a “pre-compost” that can be collected by municipalities as part of their regular waste collection rounds.

B.Existing system

1) Using a mobile phone to control movable LEGO robot supported technology:

Technology becomes more and more advanced in all areas. Smart phones technology and assistant robots can be devoted to help us and improve our life. According to the World Health Organization (June 2011) [1] over a billion people live with some form of disability. This corresponds to about 15% of the world's population. Between 110-190 million people have very significant difficulties in functioning. According to this statistics it is important to think and attempt to use the technology of robots to assist them, and to make them feel that they can live in a normal way and feel comfortable in their environment. Here decided to help disabled people with movement difficulties by combining the technology of smart phones and mobile robots to provide them with a system that can control an assistant robot supported by arm using an Android mobile phone. This will increase their self-confidence because it will allow them to bring things from the surrounding environment without any other help from other persons[3].

2) Humanoid Robots – From Fiction to Reality?:

Humanoid robots have been fascinating people ever since the invention of robots. They are the embodiment of artificial intelligence. While in science fiction, human-like robots act autonomously in complex human-populated environments, in reality, the capabilities of humanoid robots are quite limited. This reviews the history of humanoid robots, discusses the state-of-the-art and speculates about future developments in the field.

3) Mechatronics application to automatically sort objects with a robotic arm:

This presents a mechatronics application to automatically sort objects with a robotic arm. The robotic arm picks similar objects and moves them in order to read the information contained in tags. In this way, the arm is able to place the objects in different final positions depending on the captured information. The starting position of a box is perceived by processing an image acquired by means of a webcam. The reading is made by using a Reader placed in a pre-fixed location inside the work space of the robotic arm. The movement of the robotic arm is guaranteed by an accurate kinematic model. The robotic arms are widely used in industry, but most of them are programmed to follow a previously learned trajectory. Very few robots are able to make real-time decisions and so they may not be considered smart systems. One example of smart robotic arm is provided by a device which can sort some objects taking advantage of the information contained in tags glued on the basis of the same objects. These systems can be used in several applications for protecting the environments aimed to automatize the process of waste stocking and disposal simply differentiating the tag information.

III. PROPOSED SYSTEM

In an attempt to accelerate the pace of its industrial development. An economically developing nation may fail to pay adequate attention to solid waste management. For that purpose we are designing a robot which help you to manage waste. In this system we design a robot which is controlled by android application .Robot sense the material like metal, paper, plastic and according to that it kept in the compartment which we have. At robot camera is there for giving location to user .user can perform activity such as LEFT, RIGHT, REVERSE, FORWARD. The data will go into the DTMF decoder and IC used is 8870 for converting keypad tone from cellphone to electrical signal. User controls robot by using Wi-Fi network at the robot there is receiver which sense the signal from mobile and according to that microcontroller (89S52) will work and send signal to the motor driver circuit by using this system manual labor is avoided.

Due to the implementation of modern solid waste management practices, both the public health and the quality of the environment are benefited directly and substantially. A modern solid waste management program can be implemented for a reasonable cost. This is an important fact because there are ample known situations where solid waste management costs in developing countries are high and the level of service low. But, if the underlying reasons for these situations are analyzed, then one can see in many cases that cost-effective waste management systems would result if the identified deficiencies in the systems were remedied.

The proposed system enables the user to get its waste separated automatically. It can occur manually at the household but this system makes the separation automated using robots. A robotic waste sorting system consists of an android application in order to guide the robot, sensors to identify and separate out a wide range of materials including plastic, paper, glass, metal.

The proposed system provided the following features:

- 1) Manual labour is avoided.

- 2) We can remotely controlled the robotic arm so stinking problem can be avoided.
- 3) This method is cost effective as we have just interface the hardware with the android phone.
- 4) The very initiative and easy to use system.
- 5) Thus the proposed system will be useful and can be used at government level and domestic level.

IV. SYSTEM DESIGN

A. Block Diagram

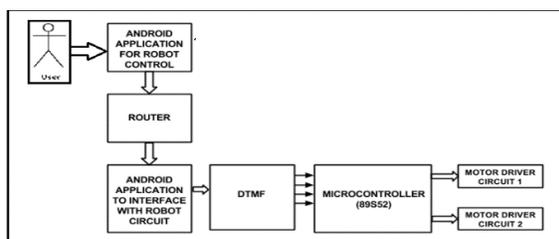


Figure 4.1: Block Diagram

Figure 4.1 signifies the working of robot. The block diagram gives an elaborate flow of the working of system.

1) Microcontroller: AT89S52

The AT89S52 is a low-power, high-performance CMOS 8-bit microcontroller with 8K bytes of in-system programmable Flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry standard 80C51 instruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with in-system programmable Flash on a monolithic chip, the Atmel AT89S52 is a powerful microcontroller which provides a highly-flexible and cost-effective solution to many embedded control applications[4].

The AT89S52 provides the following standard features: 8K bytes of Flash, 256 bytes of RAM, 32 I/O lines, Watchdog timer, two data pointers, three 16-bit timer/counters, a six-vector two-level interrupt architecture, a full duplex serial port, on-chip oscillator, and clock circuitry. In addition, the AT89S52 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The Idle Mode stops the CPU while allowing the RAM, timer/counters, serial port, and interrupt system to continue functioning. The Power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip functions until the next interrupt or hardware reset.

Microcontroller is low power, high performance 8 bit CMOS microcomputer with 8kb of EPROM. The output of this micro controller controls different motor driver circuit. Microcontroller is low power, high performance 8 bit CMOS microcomputer with 8kb of EPROM. Signal from DTMF is taken by the microcontroller to drive. Microcontroller gives the corresponding signal to every respected blocks for operations

2) DTMF Switches (Dual-tone multi-frequency signaling)

The user will give the directions to the car either left,

right, forward and backward with the mobile phone. The data will go into the DTMF decoder and IC used is 8870 for converting keypad tone from cellphone to electrical signal which is provided to microcontroller for further processes.

3) Motor Driver1, 2

This block takes various commands from the Micro controller and gives commands to the different motors that will run the device. Basically this block will drive the whole assembly of motors. Motor driver 1st is used to drive the base vehicle, 2nd for robotic arm up and down and open and close mechanism.

B. Working

- 1) Connection between the phones from WIFI via WIFI router.
- 2) After the interfacing between the two android phones, the command given by the user's phone is transmitted to the other phone placed on base vehicle.
- 3) The command pressed from phone will generate the tone which is given to the DTMF (Dual Tone Multiple Frequency).
- 4) This tone is converted to binary codes which is given to microcontroller as input.
- 5) From microcontroller it will control the motors of Robot for further functions.
- 6) There is robotic arm on robot which will be use for waste segregation.
- 7) The robotic arm will pick up one type of waste and put it in another waste box.
- 8) Similarly it will segregate all waste, without any manual labor.

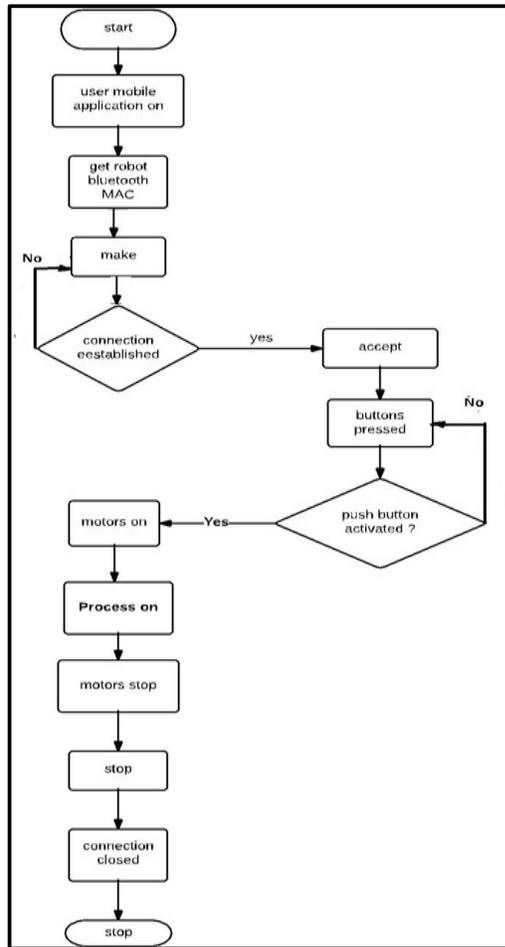
C. Advantages

- 1) Manual labour is avoided.
- 2) We can remotely controlled the robotic arm so stinking problem can be avoided.
- 3) This method is cost effective as we have just interface the hardware with the android phone.

D. Disadvantages

- 4) We cannot segregate liquid waste.
- 5) Again after segregation we have treat it in another plant

V. FLOW CHART



5.1. Logical flow of the system

Initially user mobile application must be on and get robot Bluetooth Mac. Thus connection need to be made with the robot. The user press the buttons on its application ie. Left, right, forward, backward. When push button are activated the motors are on and the process gets started. When the connection is stopped motors get off and connection is

closed.

VI. SYSTEM REQUIREMENTS

A. *Minimum Hardware requirements*

- 1) AT89S52
- 2) Motor driver L293D
- 3) DTMF
- 4) 7809 Regulator
- 5) Bridge rectifier
- 6) DC motor
- 7) Robotic arm

B. *Minimum Software requirements*

- 1) Android coding
- 2) Eagle---For circuit schematic
- 3) Diptrace---PCB layout
- 4) Keil--- For Microcontroller

VII. CONCLUSION

RE-BIN provides us with automation, conserves cost. It will be implemented in a fully automated environment where the time and energy of the human beings will be saved. Because of all such environmental and health hazards we find waste management project highly beneficial to society. RE-BIN will be integrated in day-to-day life due to which the usage of cash will be reduced to a great extent, manual labor and stinking problem will be reduced.

VIII. REFERENCE

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- [2]<http://www.wasteventures.org/files/2013/04/Waste-Ventures-Impact-Report-2010-2013.pdf>
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