Automatic Waste Segregation System

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ABSTRACT
Rapid increase in volume and types of solid and hazardous waste due to continuous economic growth, urbanization and industrialization, is becoming a burgeoning problem for national and local governments to ensure effective and sustainable management of waste. It is estimated that in 2006 the total amount of municipal solid waste generated globally reached 2.02 billion tones, representing a 7% annual increase since 2003 (Global Waste Management Market Report 2007). The segregation, handling, transport, and disposal of waste needs to be properly managed to minimize the risk to the health and safety of patients, the public, and the environment. The economic value of waste is best realized when it is segregated. Currently, there is no such system of segregation of dry, wet and metallic wastes at the household level. This paper proposes an Automated Waste Segregator (AWS) which is a cheap, easy to use solution for a segregation system for household use, so that it can be sent directly for processing. It is designed to sort the refuse into metallic waste, wet waste and dry waste. This waste segregator system can easily segregate waste.
Keywords: Arduino uno,Metal detector sensor, Servo motor.

I.NTRODUCTION

According to a sanitation survey called "Swachh Survekshan-2016" conducted by the ministry of urban development under the swatch-bharat mission, it was found that about 50% people in India face the problem of improper waste collection and management. According to centre of science and environment, innovative disposal and recycling methods must be introduced instead of landfill sites. Thus, we have proposed a cost effective "Automatic waste segregator and monitoring system" for proper management of waste. Automatic waste segregator categorizes thewaste as plastic, metallic or organic. The monitoring system helps to monitor the waste collection process. The common method of waste disposal is by unplanned and uncontrolled dumping at landfill areas. This method is hazardous to human health, plant and animal life. When the waste is segregated into basic streams such as plastic, metallic and organic, the waste has a higher potential of recovery, and then, recycled and reused.

II. LITERATURE SURVEY

To better understand the different studies presented and to be able to determine as to what kind of algorithm is to be used best the following are the different studies used the different algorithm and studies where it applies. It also has the strength and weaknesses in which it can be used in deciding as to what algorithm is the right one. There are many systems that can separate waste into different categories. They are the following - Intelligent Waste Separator (IWS)- can replace the traditional way of dealing with waste; The prototype automatically places garbage in altered basins and accepts inbound wastes by using a multimedia embedded processor, image processing specifically using the image recognition algorithm, and machine learning in order to select and separate waste. It developed prototype consists of a shared trash can, with supplementary basins in it, using multimedia technology. - Spot Garbage is a smartphone-based application. It detects a pile of garbage and identifies the location where the garbage is present by using the location access of smartphones. The app uses the convolutional neural networks architecture for identifying wastes in images. - IoT based Waste Collection System using Infrared Sensors- This automatic waste segregator uses a modern classification method known as Convolutional Neural Networks to classify the waste into various categories. This system paves the way to better recycling and reuse processes that helps in efficient waste management.
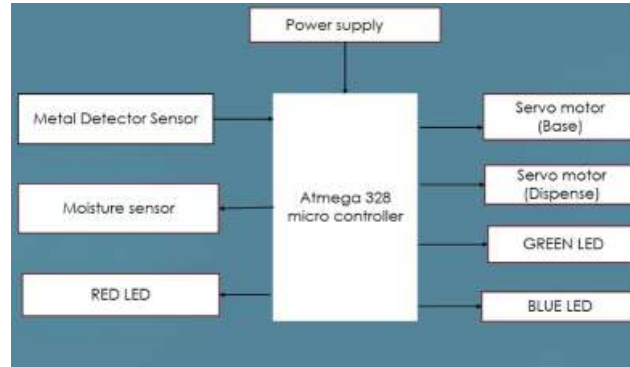
III.BLOCK DIAGRAM

Fig 1: Block Diagram

IV. HARDWARE REQUIREMENTS

ARDUINO UNO

Overview The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USBto-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-toserial converter. DFU mode.

SERVO MOTOR

A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate and object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through servo mechanism. If motor is used is DC powered then it is called DC servo motor, and if it is AC powered motor then it is called AC servo motor. We can get a very high torque servo motor in a small and light weight packages. Does to these features they are being used in many applications like toy car, RC helicopters and planes, Robotics, Machine etc.

RELAY

A relay is an electromechanical switch, which perform ON and OFF operations without any human interaction. General representation of double contact relay is shown in fig. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between control and controlled circuits), or where several circuits must be controlled by one signal.

MOISTURE SENSOR

The working of the soil moisture sensor is pretty straight forward. The more water in the soil means better conductivity and will result in a lower resistance. The less water in the soil means poor conductivity and will result in a higher resistance.The Soil Moisture Sensor uses capacitance to measure dielectric permittivity of the surrounding medium. In soil, dielectric permittivity is a function of the water content. The sensor creates a voltage proportional to the dielectric permittivity, and therefore the water content of the soil.

METAL DETECTION SENSOR

Inductive Proximity Sensor ("prox" "sensor" or "prox sensor" for short) is an electronic oscillator consisting of an inductive coil made of numerous turns of very fine copper wire, a capacitor for storing electrical charge, and an energy source to provide electrical excitation. The size of the inductive coil and the capacitor are matched to produce a self-sustaining sine wave oscillation at a fixed frequency. The coil and the capacitor act like two electrical springs with a weight hung between them, constantly pushing electrons back and forth between each other. Electrical energy is fed into the circuit to initiate and sustain the oscillation. Without sustaining energy, the oscillation would collapse due to the small power losses from the electrical resistance of the thin copper wire in the coil and other parasitic losses.

VOLTAGE REGULATOR

Voltage regulators comprise a class of widely used ICs. Regulator IC units contain the

circuitry for reference source, comparator amplifier, control device, and overload protection all in a single IC. IC units provide regulation of either a fixed positive voltage, a fixed negative voltage, or an adjustably set voltage. The regulators can be selected for operation with load currents from hundreds of milli amperes to tens of amperes, corresponding to power ratings from milli watts to tens ofwatts.

A fixed three-terminal voltage regulator has an unregulated dc input voltage, Vi, applied to one input terminal, a regulated dc output voltage, Vo, from a second terminal, with the third terminal connected to ground.

RECTIFIER
The Power supplies are designed to convert high voltage AC mains electricity to a sustainable low voltage supply for electronic circuits and other devices. A power supply can be broken down into a series of blocks, each of which performs a particular function. A DC power supply which maintains the output voltage constant irrespective of AC mains.

MEMORY
The ATmega328 has 32 KB (with 0.5 KB used for the boot loader). It also has 2 KB of SRAM and 1 KB of EEPROM.

SOFTWARE REQUIRED

ARDUINO IDE
The Arduino Integrated Development Environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of third-party cores, other vendor development boards.

C++ PROGRAMING LANGUAGE
C++ is a powerful general-purpose programming language. It can be used to develop operating systems, browsers, games, and so on. C++ supports different ways of programming like procedural, object-oriented, functional, and so on. This makes C++ powerful as well as flexible.

VI.RESULT AND DISCUSSION

Fig 2: Project Kit

VII.CONCLUSION AND FUTURE WORK
This project proposes an Automated Waste Segregator (AWS) which is a cheap,easy to use solution for a segregation system for household use, so that it can be sent directly for processing.

Experimental results show that the segregation of waste into metallic, wet and dry waste has been successfully implemented using the AWS.

REFERENCES

[1]. Prof. R.M.Sahu, AkshayGodase, Pramod Shinde, Reshma Shinde, "Garbage and Street Light Monitoring System Using Internet of Things" INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS,INSTRUMENTATION AND CONTROL ENGINEERING, ISSN (Online) 2321 – 2004, Vol. 4, Issue 4, April 2016.

[2]. Kanchan Mahajan, Prof.J.S.Chitode, "Waste Bin Monitoring System Using Integrated Technologies", International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) Vol. 3, Issue 7, July 2014.

[3]. Md. Shafiqul Islam, M.A. Hannan, Maher Arebey , Hasan Basri , "An Overview For Solid Waste Bin Monitoring System", Journal of Applied Sciences Research, ISSN 181-544X, vol.5,lssue4, February 2012.

[4]. Twinkle sinha, k.mugesh Kumar, p.saisharan, "SMART DUSTBIN", International Journal of Industrial Electronics and Electrical Engineering, ISSN: 2347-6982 Volume-3, Issue-5, May2015.

[5]. Richu Sam Alex, R NarcissStarbell, "Energy Efficient Intelligent Street Lighting System Using ZIGBEE and Sensors", International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-3, Issue-4, April 2014.