

Dry and Wet Waste Segregation System (Automatic Waste Segregation using Smart Dustbin)

KANUPRIYA¹, SHEENAM KHAN², SHIVANI SHARMA³, ANCHAL PAL⁴, SHIVANI RANI⁵
ELECTRONICS AND COMMUNICATION ENGINEERING
SHRI RAM GROUP OF COLLEGES, MUZAFFRANAGAR

Abstract:- It is observed in past few years that urbanization increase largely and due to this there is a large increment in the waste production. Due to this the waste management becomes a very crucial topic in consideration. In this paper we introduce the concept of smart dustbin which uses the microcontroller for its operation. This smart dustbin uses Arduino microcontroller which is interfaced with ultrasonic sensor. The ultrasonic sensor is placed inside the dustbin which measures the status of the dustbin. The microcontroller Arduino is programmed in such a way that the empty part of the dustbin is displayed on the screen in terms of percentage of height. When the dustbin is completely full the display shows zero percent empty. After throwing waste people can reuse the dustbin. once the smart dustbins are implemented on the large scale by replacing the traditional dustbin. The waste can be managed properly because it can avoid the unnecessary lumping of waste on roadside. This smart dustbin can foul smell from these waste that remain untreated for a long time, due to negligence of authorities and carelessness of public may lead to long term problems. if the waste is not dump on at accurate time it introduce the new problems such as breed of insects, mosquitoes etc these insects create nuisance around unhealthy environment. It produces fearful diseases. This paper deal with Wet and Dry waste separately.

Keywords:- GSM, IR sensor, LCD Display, Servo motor, Moisture sensor, Buzzer, Ultrasonic sensor.

I. INTRODUCTION

The AWS (automatic waste segregation) is a garbage level indicator. It is used Arduino Uno microcontroller. Using this system we are going to measure the waste level by using the ultrasonic sensor and we are going to separate the dry and wet waste together. When a signal is received by dustbin it opens automatically. This dustbin also consist of level sensing ultrasonic sensor constantly monitor the level of garbage in the dustbin and it automatically detect if it is about to fill up. In this system we mainly concentrate on separating dry and wet waste at a less cost. This microcontroller base smart dustbin employs moisture sensor to segregation effectively.

In this paper we focus mainly to segregate of waste material in particular metal, dry and wet waste. Smart microcontroller base dustbin assists to create a clear, safe and more hygienic environment. It also enhances the efficiency with reducing management cost and stop road-side waste emissions.

For busy places such as campuses, park area, airport, bus stand etc the smart dustbin is best and dry waste includes items like bottle, cans, clothing plastic etc. the food items, soiled food wrappers, hygiene product, yard waste, tissues and paper towels etc are comes under the category of wet waste. When the waste is divided into basic streams such as dry, wet and metallic, the waste has the greater potential of recovery and consequently recycled and reuse. The compost or methane or both are made by using wet waste. The fertilizer demand is full filled with the help of compost and biogas demand can be full filled with the help of methane. The waste which can be recycled or reused is the metallic or plastic waste. The purpose of the paper is to segregate the waste automatically. It is a cheap and easy method for segregation system at households. This is for sorting the metallic waste, wet waste and dry waste.

II. LITRATURE SURVEY

Amrutha Chandra Mohan says that there is no such system which separates the dry and wet waste into categories and at household level the metallic waste. At house hold level a automated waste segregation system (AWS) can be used which sent the waste directly for processing unit. The automated segregation system uses inductive sensor to identify the metallic items and capacitive sensor to separate the dry and wet depending upon the set threshold value. However, it cannot segregate ceramic into dry waste because it has the higher relative dielectric constant as compared to other dry wastes that are segregated. By reducing noise we can increase the accuracy level as well as the efficiency. The ultrasonic sensor is used by Nishigandha Kothari to monitor the garbage collection. When the waste reaches the sensor level an interrupt is sent to the microcontroller which works as per the given conditions.

III. METHODOLOGY

As we know that Arduino Uno board consist of ATmega328AVR which is the heart of the board as shown in Fig.1. In this paper we describe the effective use of smart dustbin which uses the various devices such as microcontroller, The microcontroller digital pins D7 and D8 are connected with ultrasonic sensor echo pin and trigger pin. The ground pins GND of microcontroller and supply pin (+5V) are connected with ultrasonic board ground pin and supply pin respectively. The digital pin D9 of Arduino is connecting with the pulse width modulation (PWM) pin of servomotor. Here the servomotor is used to open the cap of dustbin.

For this project and components used, the preset level of distance between dustbin and hand is fixed to 30 to 70 cm.

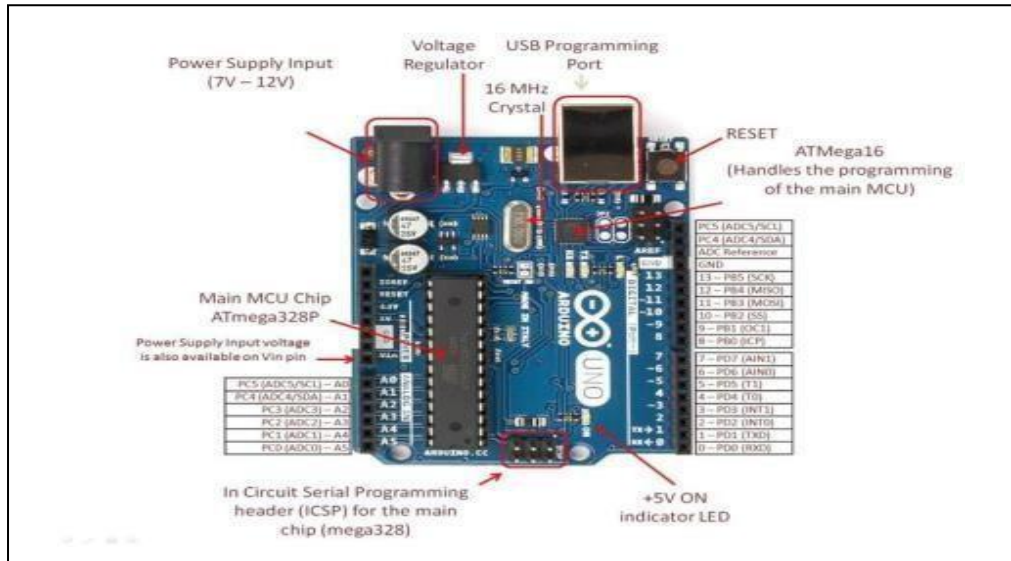


Fig. 1: Arduino Uno

The microcontroller Arduino is an open source code microcontroller that runs on ATmega 328P micro-controller. This board is developed by Arduino.cc which is an Italy based hardware company. This microcontroller uses the certain numbers of digital I/O pins and analog I/O pins which are used for data as well as control transmission. The microcontroller Arduino Uno has 14 I/O digital pins and 6 I/O analog pins. The IDE (Integrated Development Environment) is used to program the board. It supports the embedded C and its back end is constructed with JAVA. The code can be uploaded using the Arduino Uno USB port on the board. This USB port of Arduino Uno can also be used for providing the power to the board by connecting it with a laptop or PC etc. The Arduino Uno consists of an input power jack along with a USB port. A 9V external battery can also be used to power the Arduino board. The very common sensor used in the field of electronics is an IR sensor. This sensor has a large number of applications at the domestic level as well as at the industrial level. For the transmission and reception purpose the IR module consists of an IR module transmitter as well as a receiver and this module is operated at 5V. This IR module can be used to detect the distance up to 15 cm. The heat and motion in the surrounding can be detected using an IR sensor. The IR module functioning is quite easy as the module consists of a transmitter as well as a receiver. When the IR module is powered, the IR transmitter starts to transmit continuous IR waves if an obstacle is placed in the path of the waves. The wave is reflected back and it is received by the IR receiver.

The GSM-900 GSM/GPRS module is a readily available GSM/GPRS module, which can provide the network connectivity to your project.

IV. RESULT AND CONCLUSION

At the local level such as society's educational institute, park area, building area etc the implementation of the system is very effective. It reduces the work load of the local authorities. The automatic waste segregation (AWS) system is a small step towards the waste collection smartly. It is also a cost-effective and requires the minimum human intervention. It does not have any hazard to human life. To increase the accuracy of the system we use the conveyor belt. It is less expensive and easy to install. It is for domestic level. To save time this segregating system is very efficient at the domestic level. When we implement this system we come across many challenges like the range of IR sensor, accuracy of moisture etc but with the help of some modification we make the system very efficient and more reliable.

REFERENCES

- [1.] Narayan Sharma, Nirman Singha, Tanmon-dutta "SmartBins Implementation for SmartCities" in Sept 2015 Volume 6 issue 9.
- [2.] Twinkle Sinha, K. Mugesh Kumar, and P. Saisharan "SmartDustbin" in May 2015 Volume 3 issue 5.
- [3.] Bikramjit Singh and Manpreet Kaur "SmartDustbins for SmartCities" in 2016, Volume 7.
- [4.] Jyoti Savakare, Shubhangi Solunke, Rahul Tagal pallewar, Mahesh Bhagwat "Smart Garbage Monitoring System with Compressing Mechanism" Issue 6 Volume 6.
- [5.] Kannapiran Selva raj and Dr. Arvind Chakrapani "Smart Dustbin Monitoring System" using LAN server and Arduino in April 2017, volume 2 issue 6.