ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

IJARCCE

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 8, Issue 2, February 2019

Smart Waste Segregation System

Jeyapriya.K [1], Lakshmi Priya.P[2], Krishna Pavani.K[3],A.S .Balaji[4]

Student, B.E Computer Science Engineering, Anand Institute of Higher Technology, Chennai, India[1,2,3]

Assistant professor, Anand Institute of Higher Technology, Chennai, India[4]

Abstract: IoT devices can be used to monitor and control the mechanical, electrical and electronic systems which is used in various types of buildings in home automation and building automation systems. The massive amount of waste material is collected, it is difficult to separate and it is unhygienic. In our proposed system the design of new smart dustbin which opens automatically by sensing the waste using the ultrasonic sensor. Here in this method it is designed to sort the trash into metallic waste using the inductive proximity senor, wet waste using the moisture sensor, plastic waste using capacitive sensor and other wastes are thrown separately. Using IOT technology to continuous monitoring the dustbin in order to check whether dustbin is full or not. Infrared sensors sense the amount of waste in the containers if it reached the maximum container capacity, sends instant messages to the user with the help of GSM module which help them to move trash on time. Segregation makes it possible to reuse and recycle the waste effectively. These processes can be used all over the industry to reduce mankind. Smart bin helps to segregates the waste easily and this is helpful for the country for their development.

Keywords: Arduino, GSM, moisture sensor, inductive proximity sensor, capacitive sensor, Infrared sensor

I. INTRODUCTION

The massive amount of waste material is collected, it is difficult to separate and unhygienic. Now a day's garbage is separately thrown i.e. dry and wet. Technology always helps mankind in making life easier. Now presenting an innovative way which revolutionizes the trash management system through this we are taking a step towards clean India. It is designed to sort the trash into metallic waste, wet waste, glass waste and dry waste ready to be processed separately for the next process of operation for this. Using IOT technology to continuous monitoring the dustbin in order to check whether dustbin is full or not. Wireless sensors sense the amount of waste in the containers if it reached the maximum container capacity, sends instant messages to the user which help them to move trash on time.

II. EXISTING SYTEM

In the existing system, it is too difficult for the user to segregate the massive amount of waste. People working on the unhygienic surrounding will cause health issues. It also affects the human who is working on the field of waste segregation by spreading of diseases. To avoid this there is no proper segregation system. Although they use machines for segregation at the end they using the humans for segregation.

III. SYSTEM ARCHITECTURE

The Proposed system aims to produce the smart bin that automatically segregates the waste into four different category such as wet waste, metal waste, plastic and other waste. The Arduino Uno is used as a microcontroller in which all the sensors are connected together. With the help of the Ultrasonic sensor the lid of the bin can be opened automatically and closes when the user is not near the bin. The Message alert is sent to the user to collect the trash when the bin is full using the GSM modem with the Infrared sensor. The capacitive sensor is used to segregate the plastic waste in to the separate bin. This system aims to avoid the use of conveyor belt and thus reduce the space and time consumption. Four servo motors are used to connect with the each lid of the bin that will open and close the lid of the bin. The Infrared sensor are fixed at each part of the bin which will sense the amount of waste in the bin .If the bin is full it will sends an notification to the Arduino which will instructs the GSM modem to sends an alert message to the user.

The bread board is used to connect the entire hardware. The jumping wires are used for connection. The system is powered using the 12v adaptor .All the segregation sensors are fixed at the lid of the bin , connected in such a way that the waste dropped are to contact the sensors. All the sensors get activated when the waste is dumped .Based on the type of waste

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

IJARCCE

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 8, Issue 2, February 2019

dumped; the waste is moved to different bin automatically without the help of conveyor belt. This is an advantage of the proposed system thus saves the time as all the sensors are activated at the same time.

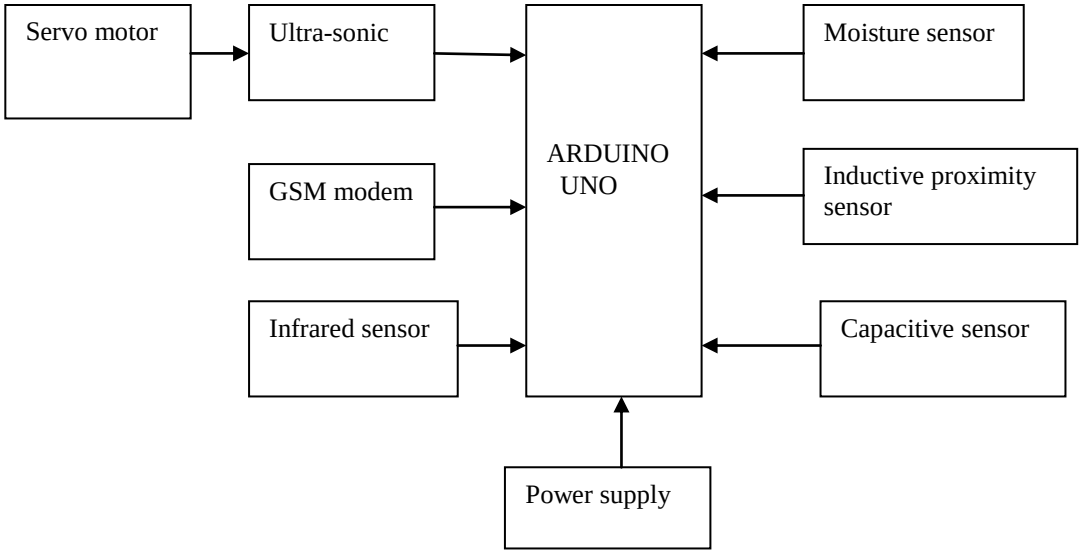


Figure: Block diagram of the System

IV. SYSTEM REQUIREMENTS

HARDWARE DESCRIPTION:

A. ARDUINO MICROCONTROLLER:

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board -- you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++, making it easier to learn to program. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

DOI 10.17148/IJARCCE.2019.8226

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

IJARCCE

International Journal of Advanced Research in Computer and Communication Engineering

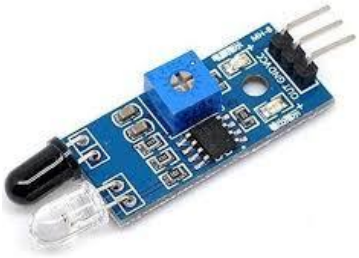
Vol. 8, Issue 2, February 2019

B. GSM MODULE:

GSM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. A GSM digitizes and reduces the data, then sends it down through a channel with two different streams of client data, each in its own particular time slot. The digital system has an ability to carry 64 kbps to 120 Mbps of data rates.There are various cell sizes in a GSM system such as macro, micro, Pico and umbrella cells. Each cell varies as per the implementation domain. There are five different cell sizes in a GSM network macro, micro, Pico and umbrella cells. The coverage area of each cell varies according to the implementation environment.

C. INFRARED SENSOR:

Infrared radiation is an electromagnetic wave with wavelength of 700nm to 1 mm. It is emitted by objects with temperature above 0 Kelvin. Furthermore, intensity and wavelength of infrared radiation depends on the temperature of the object. The infrared sensors are the sensors that detect/measure infrared radiation or change in the radiation from outer source or inbuilt source. Also sensors that use the property of infrared radiations to detect the changes in surrounding are termed as infrared sensors



D. ULTRASONIC SENSOR:

As the name indicates, ultrasonic sensors measure distance by using ultrasonic waves. The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emission and reception. An optical sensor has a transmitter and receiver, whereas an ultrasonic sensor uses a single ultrasonic element for both emission and reception. In a reflective model ultrasonic sensor, a single oscillator emits and receives ultrasonic waves alternately. This enables miniaturization of the sensor head.

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

IJARCCE

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 8, Issue 2, February 2019

E. INDUCTIVE PROXIMITY SENSOR:

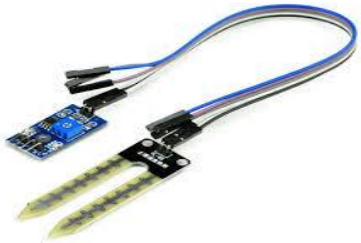
An inductive sensor is a device that uses the principle of electromagnetic induction to detect or measure objects. An inductor develops a magnetic field when a current flow through it; alternatively, a current will flow through a circuit containing an inductor when the magnetic field through it changes. This effect can be used to detect metallic objects that interact with a magnetic field. Non-metallic substances such as liquids or some kinds of dirt do not interact with the magnetic field, so an inductive sensor can operate in wet or dirty conditions.

F. INDUCTIVE PROXIMITY SENSOR:

A capacitive sensor is a proximity sensor that detects nearby objects by their effect on the electrical field created by the sensor. Simple capacitive sensors have been commercially available for many years, and have found a niche in non-metallic object detection, but are limited to short ranges; typically less than 1 cm. capacitive sensors have some similarities to radar in their ability to detect conductive materials, while seeing through insulating materials such as wood or plastic.

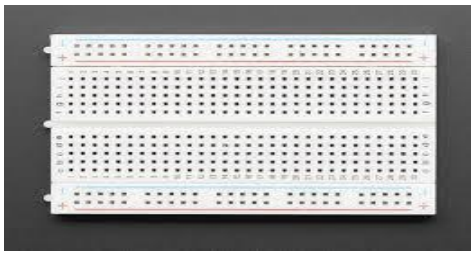
G. MOISTURE SENSOR:

A soil **moisture sensor** measures the quantity of water contained in a material, such as soil on a volumetric or gravimetric basis. To obtain an accurate measurement, a soil temperature **sensor** is also required for calibration.



H. BREAD BOARD:

A **breadboard** is a widely used tool to design and test circuit. It is easier to mount components & reuse them. It consists of an array of conductive metal clips encased in a box made of white ABS plastic, where each clip is insulated with another clips. There are a number of holes on the plastic box, arranged in a particular fashion. A typical bread board layout consists of two types of region also called strips. Bus strips and socket strips. Bus strips are usually used to provide power supply to the circuit. It consists of two columns, one for power voltage and other for ground.



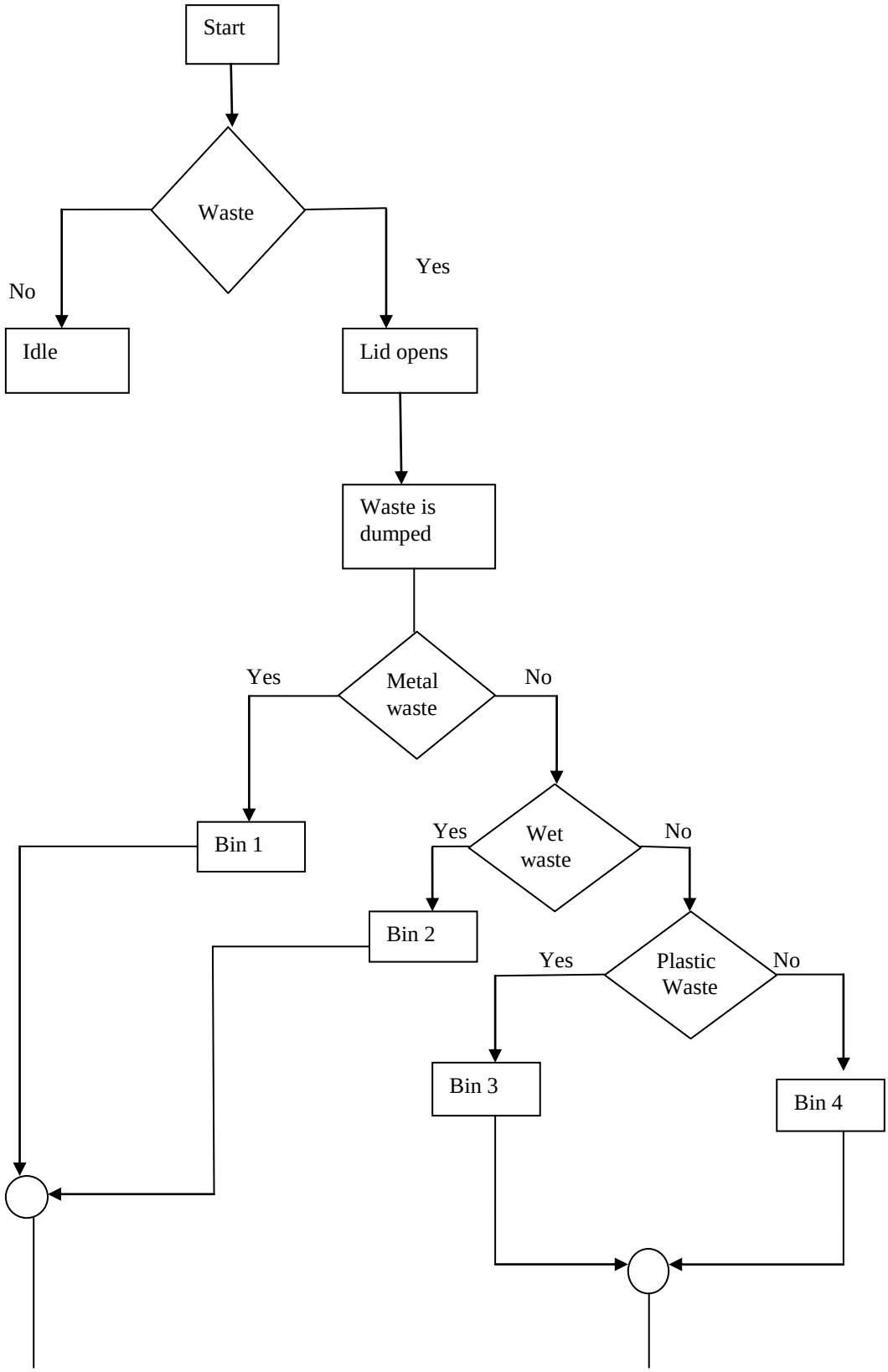
IJARCCE

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 8, Issue 2, February 2019

FLOW CHART



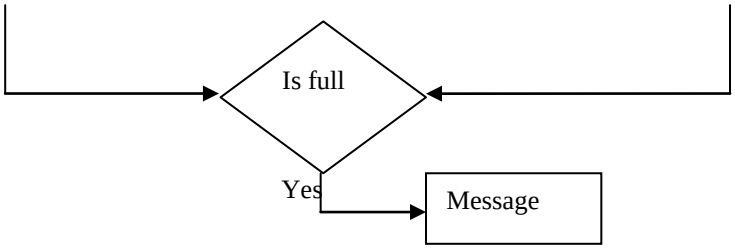
DOI 10.17148/IJARCCE.2019.8226

ISSN (Online) 2278-1021
ISSN (Print) 2319-5940

IJARCCE

International Journal of Advanced Research in Computer and Communication Engineering

Vol. 8, Issue 2, February 2019



V.APPLICATIONS

1. Industries.
2. Garbage collection
3. Logging, timber mills
4. IT companies
5. Schools/Education etc.

VI. CONCLUSION AND FUTURE ENHANCEMENT

The proposed system is very useful in improving the efficiency of solid waste disposal system. It reduces the segregation time. The proposed system would be able to monitor the solid waste collection process and management of the overall collection process. The waste segregator that can segregate wet, metal and plastic. This can be largely implemented in various municipal corporations and places like airport or railway stations, taking into consideration various factors such as reduction in manpower, increase speed of waste management, reliability and reasonable cost. The proposed system can be used in future such a way that the machine learning technology can be added to predict the status of the bin future. This helps the management to predict in advance. The image processing technology improves the segregation process.

REFERENCES

[1]. [1] MR. PAVAN KUMAR, MR. RAGHAVENDRA SINGH BHADAURAI, MR. PRASHANT HONGEKAR, MR. VIVIEK KUMAR ,“ Smart waste management system “ PROJECT REFERENCE NO.: 39S_BE_0321

[2]. [2] Cicerone Laurentiu Popa , George Carutasu 2, “Smart City Platform Development for an Automated Waste Collection System” , *Sustainability* 2017, *9*(11), 2064; https://doi.org/10.3390/su9112064.

[3]. [3] Mario Prist, Massimo Grisostomi and Matteo Pirro , Solid Waste Management Architecture using Wireless Sensor Network technology, IDEA Soc. Coop. a r.l. Website: http://www.idea-on-line.it

[4]. [4]Shyamala S.C, Kunjan Sindhe, Vishwanth Muddy, Chitra C N,” Smart waste management system, © September” , 2016 IJSDR | Volume 1, Issue 9

[5]. [5]M. Fazio, M. Paone, A. Puliafito and M. Villari, “Heterogeneous Sensors Become Homogeneous Things in Smart Cities“ .2012 Sixth International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing.