IJAREEIE

e-ISSN: 2278-8875
p-ISSN: 2320-3765

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering

Volume 10, Issue 8, August 2021

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

Impact Factor: 7.282

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 8, August 2021 ||

| DOI:10.15662/IJAREEIE.2021.1008027 |

IOT Based Smart Waste Management System

Prof.Bhaskar M K, Rajesh A C, Swaroop M, Vinod S, Vishwas V

Department of Electronics and Communication Engineering, Atria Institute of Technology

Bangalore, India

ABSTRACT: In big cities there has always been a problem of segregation of dry and wet wastes, the conventional methods to achieve this are inefficient and found to be faulty sometimes. To counter this problem here we have come up with a tech savvy approach to separate dry and wet wastes making use of esp 32 at the core of the design and a combination of sensors to build an automated dustbin to separate the different wastes.

KEYWORDS: Internet of Things (IoT), Cloud, Microcontroller, Arduino IDE, Sensors.

I. INTRODUCTION

Waste disposal is a huge cause for concern in the present world. The disposal method of a voluminous amount of generated waste has had an adverse effect on the environment. Unplanned open dumping at landfill sites made by the municipality is a common method of disposal of waste. Human health, plant and animal life are affected due to this method. The harmful method used for waste disposal generates harmful chemicals which contaminate surface and groundwater. It can give rise to disease vectors which spread harmful diseases. This also degrades the aesthetic value of the natural environment and can degrade the aesthetic value of the natural environment and it is an unavailing use of land resources. In India, rag pickers play an important role in the recycling of urban solid waste. Rag pickers and conservancy staff have higher morbidity due to infections of the skin, respiratory, gastrointestinal tract and multisystem allergic disorders, in addition to a high prevalence of bites of rodents, dogs and other vermin. Dependency on the rag-pickers can be diminished if segregation takes place at the source of municipal waste generation. The economic value of the waste generated is not realized unless it is recycled completely. Several advancements in technology have also allowed the refuse to be processed into useful entities such as Waste to Energy, where the waste can be used to generate synthetic gas (syngas) made up of carbon monoxide and hydrogen. The gas is then burnt to produce electricity and steam; Waste to Fuel, where the waste can be utilized to generate biofuels. When the waste is segregated into basic streams such as wet, and dry the waste has a higher potential of recovery and consequently recycled and reused. The wet waste fraction is often converted either into compost or methane-gas or both. Compost can replace demand for chemical fertilizers, and biogas can be used as a source of energy.

II. PROBLEM STATEMENT

Waste management and separation is one of the biggest problems faced in metropolitan cities.Separation of organic and inorganic wastes does not take place in an efficient manner at homes.Even though people usually keep two bins one for each type of waste, sometimes they may put the wrong type of waste in the wrong bin.In regular dust bins there isn't a way to indicate this error.

Objectives

Waste management or waste disposal are all the activities and actions required to manage waste from its inception to its final disposal in proper place.This includes amongst other things collection, transport, treatment and disposal of waste together with monitoring and regulation. It also encompasses the legal and regulatory framework that relates to waste management encompassing guidance on recycling. In this system the wastage is collected from the running train. The sensor is sense the availability of wastage in the tank and send to cloud computing .

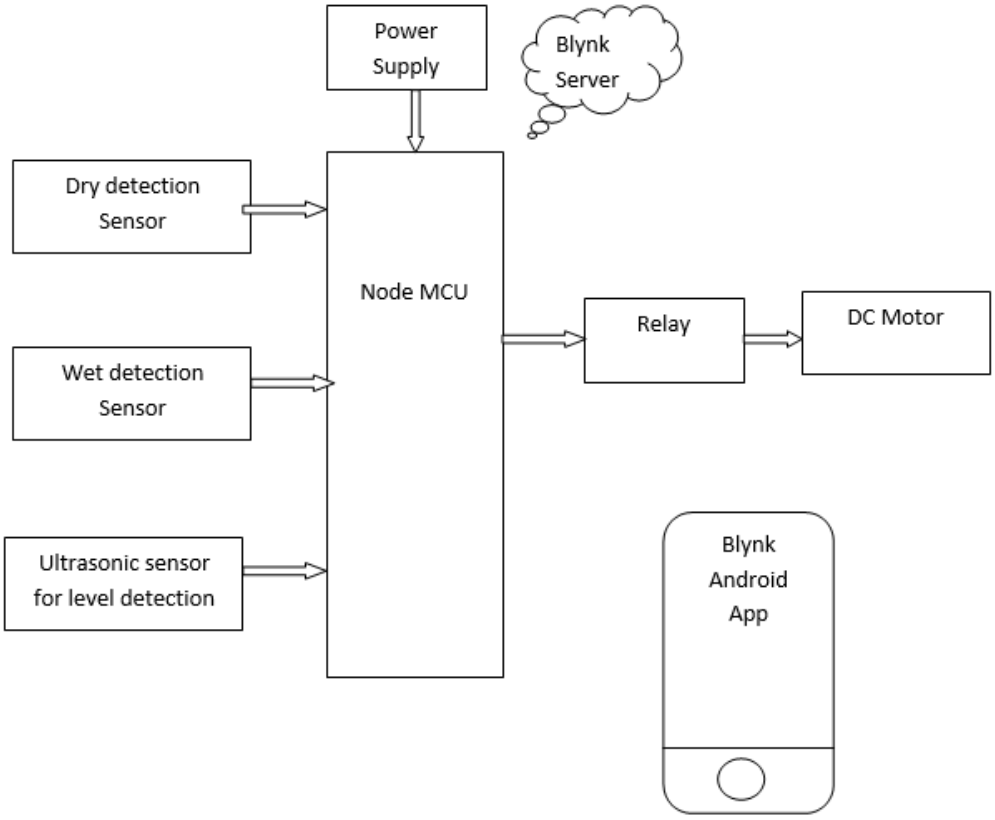
| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 8, August 2021 ||

| DOI:10.15662/IJAREEIE.2021.1008027 |

III. METHODOLOGY

Block Diagram



Working Principle:

The working principle of the project is as follows:

When we supply the power to the micro controller the ir sensor ultrasonic sensor dry wet detection sensors are get powered up. The waste enters the conveyer belt motor turns on.

The waste is sensed by the moisture sensor that weather it is dry waste or wet waste. If the waste has some humidity it is detected as wet waste and relay will turned on towards right side and the waste is pushed into the wet waste bin. Or else dry waste will be detected and the servo motor will be turned towards left and the waste will be pushed towards the dry bin. And the information about the dry or wet and metal waste will be displayed in the blynk app and the level waste in both the bin can be detected using the ultrasonic sensor and will be displayed in the blynk app.

Finally the wastes are dropped into the respective bins and the segregation process is completed.

Hardwares used:

A. ***Ultrasonic Sensor***:-

The ultrasonic sensors are generally used to measure distances by using ultrasonic waves. The sensor emits an ultrasonic wave and receives the reflected wave back from the target.

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

|| Volume 10, Issue 8, August 2021 ||

| DOI:10.15662/IJAREEIE.2021.1008027 |

B. ***IR Sensor:-***
The IR Sensor emits in order to sense some aspects of the surroundings.

C. ***Rain drop sensor:-***
Moisture Sensor measures the volumetric water content in the soil. Reflected microwave radiation is affected by the soil moisture and is used for remote sensing hydrology and agriculture.

D. ***DC Motor****:-*
DC motor which is connected to the digital pins of Arduino.
And serial monitor is used for the display.

Software used: Arduino IDE
Arduino nodmcu is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board. To do so you use the Arduino programming language (based on Wiring), and the Arduino Software (IDE), based on Processing.
Over the years Arduino has been the brain of thousands ofprojects, from everyday objects to complex scientific instruments. A worldwide community of makers - students, hobbyists, artists, programmers, and professionals - has gathered around this open-source platform, their contributions have added up to an incredible amount of accessible knowledge that can be of great help to novices and experts alike.

- **Inexpensive** - Arduino boards are relatively inexpensive compared to other microcontroller platforms. The least expensive version of the Arduino module can be assembled by hand, and even the pre-assembled Arduino modules cost less than $50
- **Cross-platform** - The Arduino Software (IDE) runs on Windows, Macintosh OSX, and Linux operating systems. Most microcontroller systems are limited to Windows.
- **Simple, clear programming environment** - The Arduino Software (IDE) is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well. For teachers, it's conveniently based on the Processing programming environment, so students learning to program in that environment will be familiar with how the Arduino IDE works.
- **Open source and extensible software** - The Arduino software is published as open source tools, available for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR C programming language on which it's based. Similarly, you can add AVR-C code directly into your Arduino programs if you want to.
- **Open source and extensible hardware** - The plans of the Arduino boards are published under a Creative Commons license, so experienced circuit designers can make their own version of the module, extending it and improving it. Even relatively inexperienced users can build the breadboard version of the module in order to understand how it works and save money.

IV. RESULTS AND ANALYSIS

The waste is sensed by the moisture sensor that weather it is dry waste or wet waste. If the waste has some humidity it is detected as wet waste and relay will turned on towards right side and the waste is pushed into the wet waste bin. ▪ Or else dry waste will be detected and the servo motor will be turned towards left and the waste will be pushed towards the dry bin. ▪ And the information about the dry or wet and metal waste will be displayed in the Blynk app and the level waste in both the bin can be detected using the ultrasonic sensor and will be displayed in the blynk application. ▪ Finally the wastes are dropped into the respective bins and the segregation process is completed.

V. CONCLUSIONS

Implementation of this system at a local level like societies, educational institutes, etc. can reduce the burden on the local authorities. The automatic waste segregator is one small step towards building an efficient and economic waste collection system with a minimum amount of human intervention and also no hazard to human life. Using a conveyor belt makes the system far more accurate, cost-effective and also easier to install and use at a domestic level. Segregating all these wastes at a domestic level will also be time-saving. While implementing our system we came

| e-ISSN: 2278 – 8875, p-ISSN: 2320 – 3765| www.ijareeie.com | Impact Factor: 7.282|

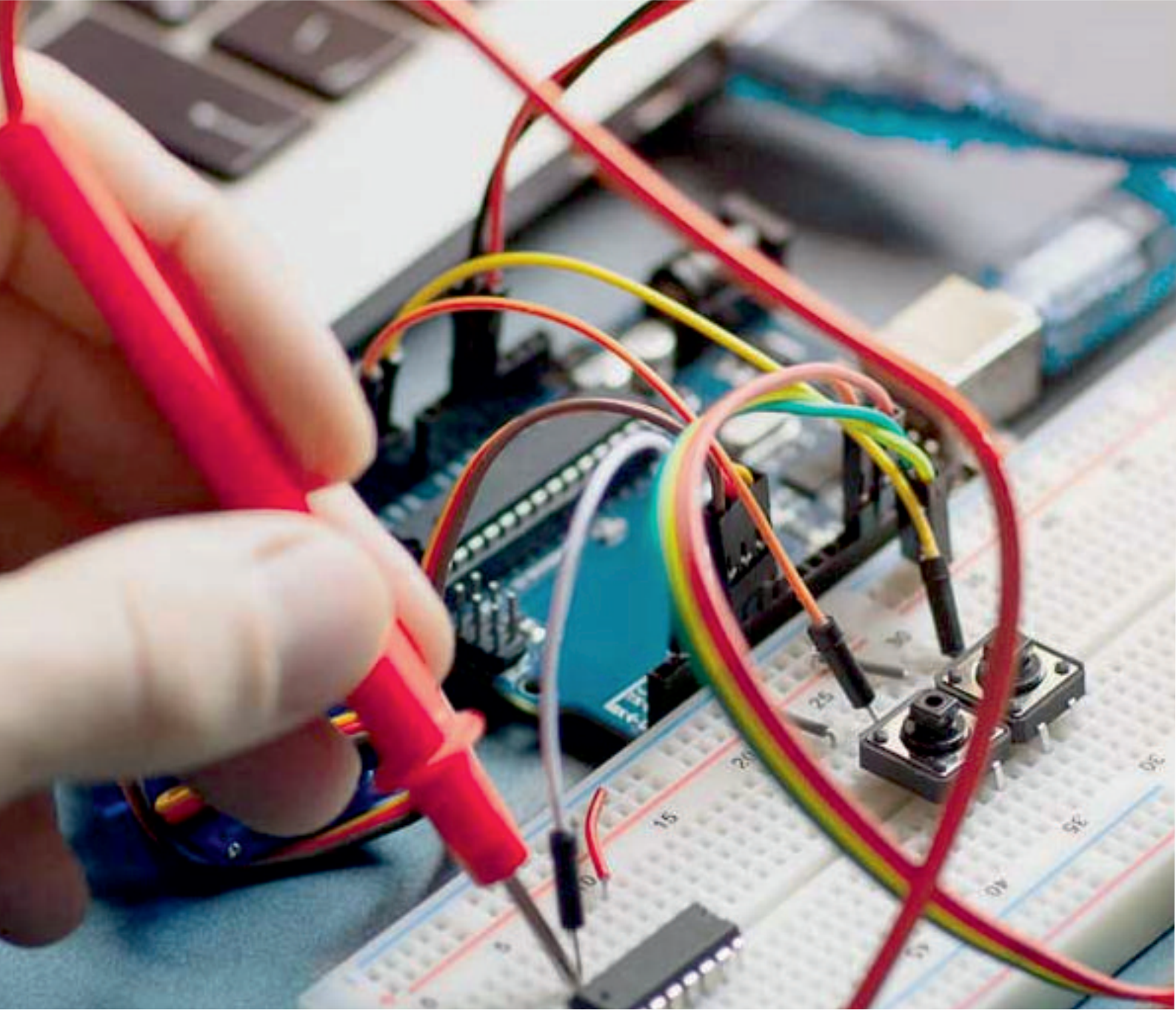
|| Volume 10, Issue 8, August 2021 ||

| DOI:10.15662/IJAREEIE.2021.1008027 |

across many problems like, the accuracy of the moisture sensor, adjusting the range of ultrasonic sensors and some more, but using some modifications we tried the make the system as reliable as possible.This type of product can be used in housing societies, offices, etc. Since it is cost effective, it can be implemented on a large scale as well with some modifications. Using a robotic arm along with a conveyor belt will make the process of segregation easier. Also, more sensors can be used to segregate biodegradable and non-biodegradable waste, plastics, recyclable waste, e-waste, and medical waste.

REFERENCES

[1].Michael Christopher Xenya, Emmanuel D'souza, Koffie-OclooD.Woelerm, Robert NiiiAdjel-Laryea, EkowBaah-Nyarkoh (2020) - A Proposed IoT Based Waste Bin Management System with an Optimized Route.
[2]. K Lova Raju, Abbas Hussain, Umesh Chandra, V Naga Phanendhra, D Narendra (2019) -IoT Based Dust Bin Monitoring System using Node MCU
[3]. Pallavi K N, Ravi Kumar V, Chaithra B M (2017) – Smart Waste Management using Internet of Things
[4]. Whai-En Chen, Yu-Huei Wang, Po-Chuan Huang, Yu-Yun Huang, Min-Yan Tsai (2018) - A Smart IoT System for Waste Management
[5]. KhanakerFoysal Haque, RIfatZabin, Kumar Yelamurthi, Prasanth Yanambaka, Ahmed Abelgawad, (2020) – An IoT Based Efficient Waste Collection System with Smart Bins (WF-IoT)
[6]. Muruganandam S, Ganapathy V, Balaji R (2018) - Efficient IOT Based Smart Bin for Clean Environment
[7]. S Vinoth Kumar, T Senthil Kumaran, A Krishna Kumar (2017) - Smart Garbage Monitoring and Clearance System using Internet of Things
[8]. V Aswin Raaju, J MapillaiMeeran, M Sasidaran, Prem kumar MK - (2019) - IoT Based Smart garbage Monitoring System
[9]. Megha S Chaudri, Bharti Patil, Vaishali Raut (2019) – IoT Based Waste Collection Management System for Smart Cities
[10]. Eyhab Al-Masri, Ibrahim Diabate, Richa Jain, Ming Hoi Lam and Swetha Reddy Nathala (2018) -Recycle.io: An IoT Enabled Framework for Urban Management



INNO SPACE
SJIF Scientific Journal Impact Factor

Impact Factor: 7.282

doi cross ref

ISSN INTERNATIONAL STANDARD SERIAL NUMBER INDIA

निस्केयर NISCAIR

International Journal of Advanced Research

in Electrical, Electronics and Instrumentation Engineering

9940 572 462 6381 907 438 ijareeie@gmail.com

www.ijareeie.com

Scan to save the contact details