Automatic Waste segregation using IOT

Presented by :

Omkar Chougule

Sadiya Gorwade

Kunal Jadhav

Shivani kamble

Preshita kamble

Abhinandan Bindage

Introduction

▶ Things(Embedded devices) that are connected to Internet and sometimes these devices can be controlled from the internet is commonly called as Internet of Things. In our system, the Smart dust bins are connected to the internet to get the real time information of dustbins.

▶ In the world, waste management has become a big issue. We see that the garbage bins are placed at public places are overflowing due to increase in the waste every day. Waste is also not well separated. It is mixed with dry and wet waste so we cannot recycle it.

▶ To avoid this we are planning to develop IOT based automatic dry and wet waste segregation System. Where we use Moisture Sensor for detection of moisture, IR sensors- It detects the level of the dust in dustbin and sends the signals to microcontroller i.e, ESP-32. From which we can segregate the waste and alert the people about level of waste in dustbin.

Related Work

Research paper 1: Smart Dustbin Wet and Dry waste Segregator with Alert System

▶ In this Model of waste segregator Arduino Uno Microcontroller is used. It forms the heart of the system. It is based on the ATmega328 (data sheet).

▶ IR sensor is used to Detect whether There is any kind of waste present in dustbin. it works using a particular light sensor.

▶ Moisture sensor is also used in this module. It uses capacitance to measure Dielectric permittivity of the surrounding medium, thus it helps to differentiate between Wet waste and Dry waste

▶ Gear motor is attached to the primary dustbin and it helps in clockwise and anticlockwise movement of the bin.

▶ In this way the segregation of the waste into the Dry and Wet Waste is Carried out.

Limitations :

▶ It can Segregate only one type of waste at a time with an assigned priority for Wet and Dry waste.

Research paper 2: Segregation of waste using IOT

In this they came to know that it is really important to segregate the waste for reusing it so they have made system by using the Arduino Uno and Moisture Sensor to segregate the waste according to the threshold moisture value

Our Project Work :

The objective of this project is to study the characteristics of the waste according to that we segregate the waste by using the moisture sensor by accurate value of the moisture and also we can detect the dustbin **is** full or not.

Problem Statement

Across the urban areas , the ineffective segregation of household waste at the source has led to numerous challenges ,today we segregate the waste manually as dry and wet. So our proposed work focuses on design and developing smart waste collection model that allow automatic segregation of dry and wet waste.

Problem Description

▶ Automatic Dry and Wet Waste Segregation is a much-needed process in metro cities and urban areas due to spreading of diseases.

▶ When organic waste (wet waste) and non-organic waste (dry waste) mixed and decomposes in a low-lying area then it produces harmful greenhouse gases as a byproduct of the decomposition process.

▶ Separating different types of waste from each other i.e. segregation makes it possible to use and recycle the waste in an efficient way.

▶ By using IOT based mechanism which includes sensors , microcontrollers we segregate the waste according to their moisture value and also give alert message about dustbin level.

Objectives

1) To sort the dry and wet waste automatically .

2) To calculate the moisture of waste and segregate it.

3) To check dustbin level and if it is full then it alert through message.

Architectural Diagram
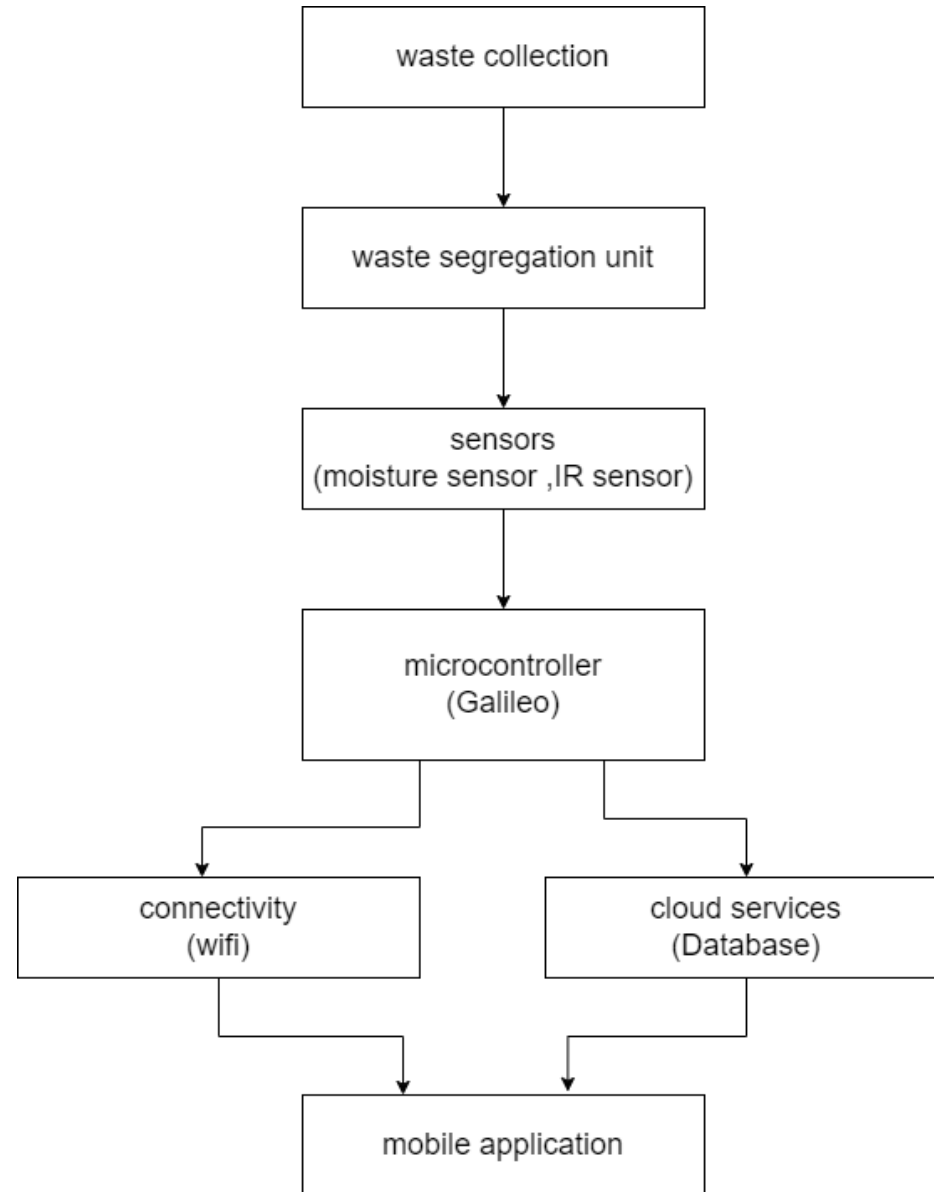
Methodology

- **Sensors :** IR sensor is used For Detecting the presence of any waste in Dustbin and for detecting wet or dry waste a moisture sensor can be used. In this process if moisture sensor output is high than the threshold value then the servo motor will move towards WET compartment else it moves towards the Dry compartment

- **Microcontroller :** The ESP-32 Microcontroller is used to receive the data sent by the multiple transmitters and process the data and the same data transmitted to the Client i.e., mobile application.

- **Waste Collection bins :** Separate bins for dry and wet waste to collect waste material at the source.

- **Connectivity:** This layer provides connectivity option Like Wi-Fi to transfer data from the microcontroller to the Mobile Application.

- **Data Storage And Analysis :** Database system to store and manage data collected during the segregation process. Data analysis tools to generate report on waste segregation ,recycling rates and system performance.

- **Mobile Application:** The user interface allows administrators and users to monitor and control the waste segregation system, providing real-time data visualization and control features.

Facilities Required

Hardware :

- ESP-32 Microcontroller
- Servo Motor
- IR Sensor, Ultrasonic Sensor, Moisturizer Sensor
- Wi-fi Module (ESP8262)
- LCD (16x2)
- Adapter and Aluminum foil

Software :

- Mobile Application – BLYNK App.
- Database System – PowerBI.

Cost of Model

- ESP-32 – (Rs.500)

- IR sensor – Rs.100.

- LCD (16X2) – Rs.266.

- Servo motor – Rs.150.

- Ultrasonic Sensor – Rs.100.

- Moisturizer Sensor – Rs.179.

Total cost = Rs.1295.

References

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