FABRICATION OF SMART DUSTBIN WITH CRUSHER MACHINE

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ABSTRACT

The "**Fabrication of smart dustbin with crusher Machine**" is a unique solution for discarding and managing waste in both rural and urban regions, because garbage containers in open places are prone to flooding. The smart dustbin is created to address this problem. to keep a clear mind, good health, and neatness while avoiding harmful situations A smart dustbin is an innovative and effective rubbish disposal device. The Arduino UNO microcontroller is used as the microcontroller in this trashcan. With the help of the ultrasonic sensor, the microcontroller opens the dustbin.

It can easily maintain the city clean if it is in charge. The work's main assumption is to develop a specialized waste management system in order to dispose of waste properly and efficiently. We used the crusher machine which will crush and minimizes the wastage so that is easy to collect and handling the wastage.

Keywords: - Smart Dustbin, Sensor, Arduino UNO Microcontroller, Crusher

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1. INTRODUCTION

As a result of urbanization, trash output has risen substantially. To aid with garbage management, the government has put dustbins in public areas. You've probably noticed that public trash cans aren't always clean, and as a result, people avoid using them. In addition, if their lid is left open, flies will fly in and create diseases.

We constructed a 'Smart Dustbin' using an Arduino Uno, a servo motor, and an ultrasonic sensor to solve this problem. As a result, it will automatically open the lid when a human hand is detected. Various factors, such as industrial development, garbage management, the state of the local environment, and the capacity of the receiving media, influence the amount of trash created and its potential repercussions. In cities with developing economies, waste collection systems are overburdened, and dumpsites are poorly managed and uncontrolled, and the problems are worsening.

This sort of waste is divided and deposited based on the type of material and is stored, while the object is crushed into smaller sizes so that a higher quantity may be stored in a smaller space, and the machine will also provide the cost for the product that is being deposited. As a result of this method, the material will be stored in a designated zone, and the environment will be pollution-free.

Under the dustbin, we also employed the crusher. The garbage is crushed into smaller pieces by the crusher, and the waste material takes up less room and is also easier to remove.

2. LITERATURE REVIEW

Smart Garbage Monitoring System with Internet of Things IoT application is used to track, transfer, and receive data in a variety of sectors. This application can be used in a waste dumping system for a variety of reasons, including real-time monitoring of the operational device. Arduino and Raspberry Pi [2] are two examples of technologies that can be used to send and receive data. To collect, alter, and deliver data, these tools use data processing. However,

when addressing data, a modular device, such as RFID, GSM, or GIS [10], is required to identify the sender and receiver. The IoT kit can be used to develop tools for sending data to the system, such as apps or text messages [1].

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Garbage collection system with many apps that has been optimized A garbage system has numerous flaws and is insufficient for today's civilization; it overflows [4], causes hygienic issues, is disorganized, and waste is not collected in a timely manner. Waste must be collected and disposed of without spills or leaks, and it must be portable. To save time and resources, space and structure must be optimized for garbage storage [3]. If the garbage is separated when being discharged, it will be easy to dispose of or recycle. It is a human obligation. Society as a whole must develop the practice of separating waste that can be recycled and reused [7]. To produce an optimum means of disposing of decomposable waste, it is buried or burnt. RFID based Smart Dustbin for Smart Cities The critical importance of using RFID tags in trash cans is to identify them separately in a well-structured ecosystem [12].

As a result, each bin should be assigned an ID and kept in its own location so that when it's collected, the container that has to be disposed of can be identified and the ones that don't may be ignored. An RFID system is made up of a tag and a sensor [9]. When tagged with an Id, the sensor can generate data and transfer it to a system. The display system can be a phone app, a website or PC, or a display coupled to the bin with the chipset [9], allowing RFID a far broader range of applications in a garbage dumping system.

3. PARTS USED

I. Arduino UNO

The Arduino Uno microcontroller board is based on the ATmega328P microcontroller (datasheet). It contains 14 digital input/output pins (six of which are PWM outputs), six analogue inputs, and a 16 MHz clock.

II. Ultrasonic Sensor
Sound waves are used to estimate the distance to an object using an ultrasonic sensor. It calculates the amount of time it takes for sound to fling anything and return it to the sensor. Like sonar, it operates on the frequency of sound waves. Some items are also undetectable by them. The front of this sensor features two holes. The transmitter, which acts like a speaker, broadcasts ultrasonic waves, and the receiver, which acts like a microphone, receives them.

III. Servo motor

It is an electrical gadget that can precisely push or spin an item. You'll need a servo motor if you wish to rotate an object at a specified angle or distance. It's only a simple motor that's controlled by a servo mechanism.

A DC servo motor is one that uses DC power as its power source. The motor is an AC servo motor if it is powered by AC electricity.

IV. DC Battery and Charger

A battery is an electrochemical device (comprising one or more electrochemical cells) that may be charged and discharged with an electric current as needed. Batteries are typically made up of a number of electrochemical cells that are coupled to external inputs and outputs and charger is use to charge the battery.

V. Connecting Wires

Connecting wires are used to joint different components i.e., Ultrasonic sensor and servomotor to the Arduino to complete the circuit.

They are also called jumper wires and connect an Arduino board to sensor directly.

VI. Motor and Blade

Electrical energy is converted into mechanical energy using an electric motor. And we used the blade to cut into smaller pieces of garbage.

Fig(1):- Arduino UNO   **Fig(2):-**Ultrasonic senso**r**

Fig(3):- Servo motor   **Fig(4):-** Battery
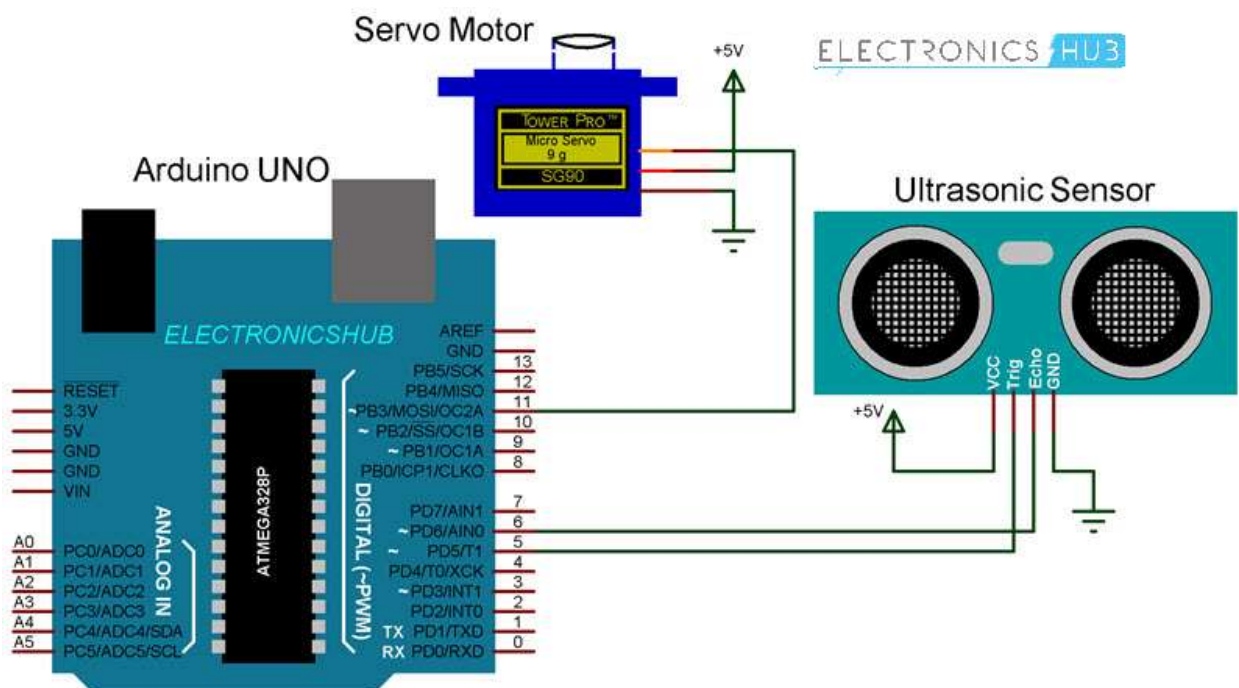
Fig(5):- Charger   **Fig(6):-** Motor

4. CIRCUIT DIAGRAM

The following image shows the circuit diagram of the Smart Dustbin using Arduino. It is a very simple design as the project involves only two components other than Arduino.


CODE

```
#include <Servo.h>
Servo myservo;
int pos = 20;
const int trigPin = 5;
const int echoPin = 6;
const int led = 13;


long duration;
float distance;


void setup()
{
  myservo.attach(11);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(led, OUTPUT);
  myservo.write(pos);
}


void loop()
{
  //Serial.begin(9600);
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);


  duration = pulseIn(echoPin, HIGH);
  distance = 0.034*(duration/2);
  //Serial.println(distance);
  if (distance < 27)
  {
   digitalWrite(led,HIGH);
   myservo.write(pos+160);
   delay(1000);
  }
  else
  {
   digitalWrite(led,LOW);
     myservo.write(pos);
  }
  delay(300);
}
```
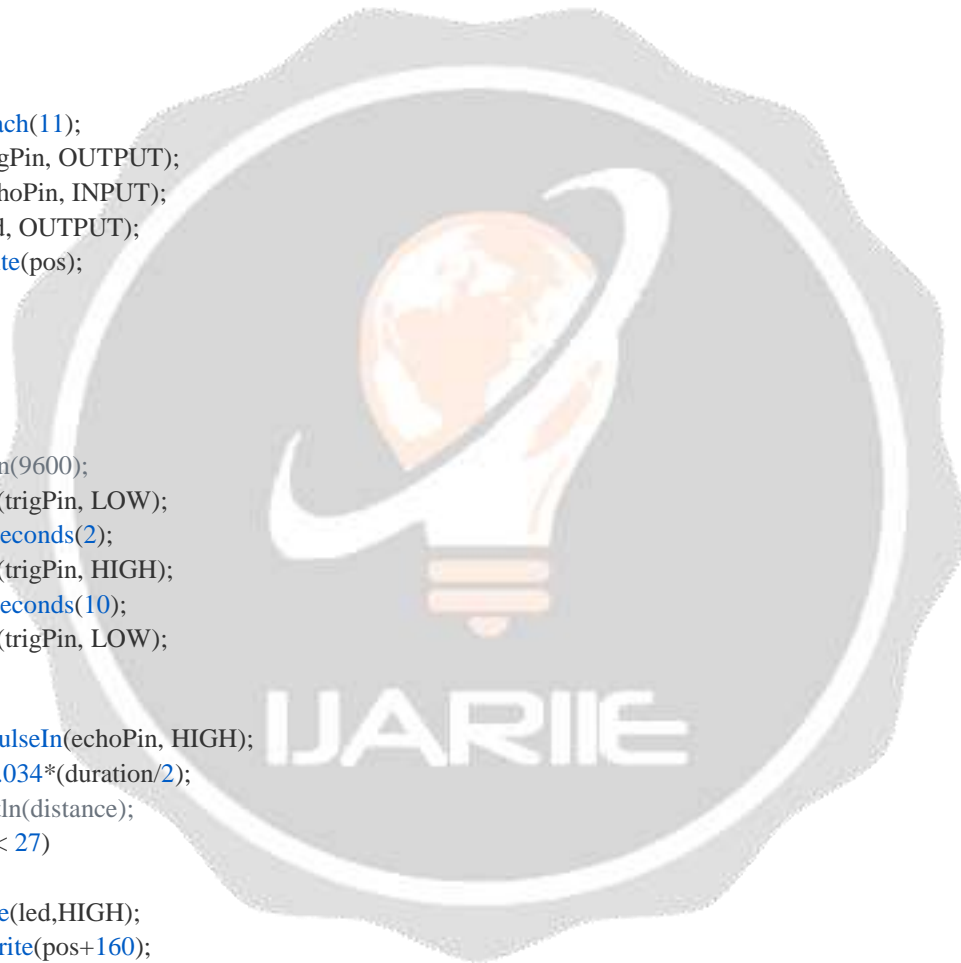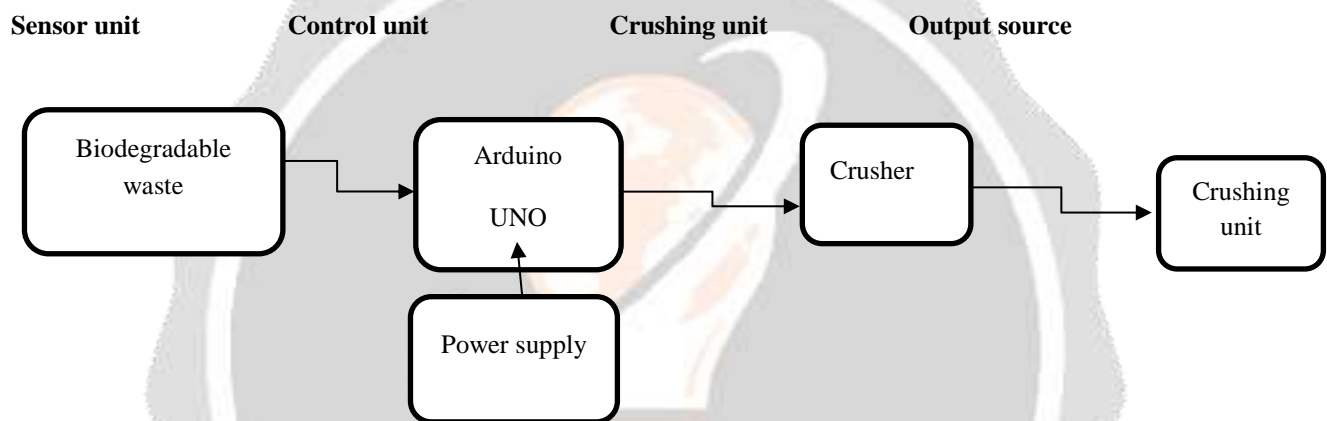
5. WORKING

In this Dustbin, we employed an ultrasonic sensor to detect the object and automatically open the lid. The presence of a person or an object is detected by the Ultrasonic Sensor in this Smart Dustbin, and the message is delivered to the Servo Motor through Arduino Uno. The Dustbin Cap will automatically open for your garbage when a person approaches a Smart Dustbin and close after a short amount of time.

Smart Dustbin, as the name implies, works intelligently or as an automatic dustbin. It works like this: when you go up to this dustbin, a servo motor opens it automatically and after some time, it closes the lid automatically.

We used a crusher machine, which will reduce waste and make collection and processing easier.

6. BLOCK DIAGRAM

7. APPLICATIONS

1. Save time: Working faster or more efficiently to complete a task in a shorter amount of time. We'll save time if we take this route along Mercer Street. Meal preparation on the weekend saves me time throughout the week. The terms "save" and "time" are often used interchangeably.

2. Less trash: By reducing trash, we can have a smaller impact on our agriculture and freshwater ecosystems. We can even lessen the frequency with which natural disasters strike our communities all over the world.

3. Reduce odor: The lid of the dustbin closed after a certain time therefore we can reduce odor.

4. Protect the environment: Wet wastes, such as leftover foods, vegetables, peels, and other wet wastes, should be placed in an organic dustbin to be composted later. Waste segregation can assist relieve the weight of garbage on already overburdened landfills, lowering pollution levels.

5. Eco-friendly: It is eco-friendly because it reduces pollution and make environment clean.

8. RESULTS AND CONCLUSION

As a result, the Smart Dustbin Using Arduino and crusher is successfully designed. People may dispose of garbage without having to touch the dustbin, and the lid remains closed to keep flies out. The development of a smart dustbin management system using IoT as hardware and the ionic framework as software in this project ensures that dustbins

are cleaned as soon as the rubbish level reaches its limit. In this project we also used a crusher which will crushes and minimizes the wastage and it will be easy to collect and handle the wastage.

If the dustbin is not cleaned within a certain amount of time, the record is forwarded to a higher authority, in this case the administrator, who can take necessary action against the offending employee.

A waste collection and monitoring team that has been assigned to gather garbage from the city can be adequately led in their collection efforts.

The environment will be clean and safe as a result of this process, and waste will be stored in a specific location. As a result, this initiative will be beneficial and contribute to a pollution-free environment.

9. FUTURE SCOPE

The authors are always striving to improve the Smart Dustbin in order to overcome a variety of current flaws. The issues of foul odor and manual controlled mobility necessitate a future scope that includes an odor control device to eliminate the bad odor of organic waste. In order to fulfill the need of an autonomous dustbin, a GPS module for course planning and an ultrasonic sensor for obstacle avoidance can be integrated. Dustbins, on the other hand, will in the future not only notify about their contents, but also about their location, making it easier to locate and empty them.

By segregating and classifying both renewable and non-renewable elements, this initiative will be advantageous in the future. In the future, technology may be used to provide aid in malls and other public settings. More futures can be added to mobile phones, laptops, and other electrical equipment, such as chargers.

We can also use the solar pannel for power supply instead of electricity.

10. REFERENCES

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