# IoT based Smart Dustbin

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**Abstract - The main aim of the project is to separation of waste at source level to metallic and nonmetallic such that waste is not wasted but their value is understood and can be converted to a source of energy, in a cost-effective way. This system uses metal sensor and ultrasonic sensor to separate the metal waste from the waste in the dust bin. The proposed system consists of two doors and opens depending on the wastes and thedustbin is fully filled its compressed automatically. This system uses a metal sensor to detect the metal parts in the garbage. When it detects the metal, the system will open the corresponding door else for the other waste it will open another door. The ultrasonic sensor will detect the presence of the waste either metal or other waste. Based on the commands given by the metal detector the system wills open door accordingly. The system has motors interfaced with the micro controller.**

## I.INTRODUCTION

Automations gained more importance in the modern era since it requires less cost to operate than a human labor to do the same task. Now a day's industry is turning towards computer-based monitoring of tasks mainly due to the need for the increased productivity and delivery of the final products with maximum quality. Based on the commands given by the metal detector the system wills open door accordingly. The system has motors interfaced with the micro controller. Recycling plays a vital role in saving the environment. It helps in reducing the wastes everywhere and therefore saves the environment from too much pollution. The first step to total waste management is segregation. It is by segregating wastes properly that people can easily identify which materials are recyclable and which are not. Today, only 11% of the total amount of waste in Metro Manila is recycled. This is mainly due to incomplete segregation. A system was developed to automatically segregate plastic bottles and tin cans. The system differentiates the waste based on the sound resonant frequency produced when it hits the platform. After the waste has been identified, it will then be separated in the trash bin. The study, however, showed findings that there were few cases when the system mistakenly identifies the plastic bottle as a tin can especially when its cap hits the platform which means that the system is not accurate enough. (E-waste problems related to trade in wastes and informal recycling in the developing countries address environmental, social, and economic effects. Moreover, given on multiple aspect considerations, it is found that currently recycling fragmentation trade presents.

## II.EXISTING SYSTEM

AT89S52 microcontroller is used to interface the sensor system with GSM system. Sensors are use to monitor the desired information related to the garbage for different selected locations. This will help to manage the garbage collection efficiently. Level detector consists of sensors which are used to detect the level of the garbage in the dustbin. The output of level detector is given to microcontroller. Two sensors are used to indicate the different levels of the amount of the garbage collected in the dustbin which is placed in public area. When the dustbin is filled up to the highest level, Distance sensor sense the level of garbage. This output is given to microcontroller to send the message to the Control room via GSM module. The garbage management in cities has to be effectively and efficiently implemented. The variety of proposals were put self-assured and some of them already implemented. But it cannot be considered as an effective one.

## III.PROPOSED SYSTEM

The working of our Proposed System is when waste is dumped IR sensor detects the entry of the waste. The IR transmitter continuously transmits the signal to detect the presence of obstacle. When the waste is dumped into the bin the receiver receives the reflected signal from the waste and starts the entire process by the activation of microcontroller. The different sensors like IR sensor are used to waste. The proximity sensor is used to detect the metal waste, Gas sensor is used to monitor the toxic gas level of waste. Based on this sensor status the waste is segregated using separation model. The microcontroller in turn activates DC motor by executing program to rotate the motor in the forward direction. Separate container or dustbin metal waste, dry wasted are segregated.
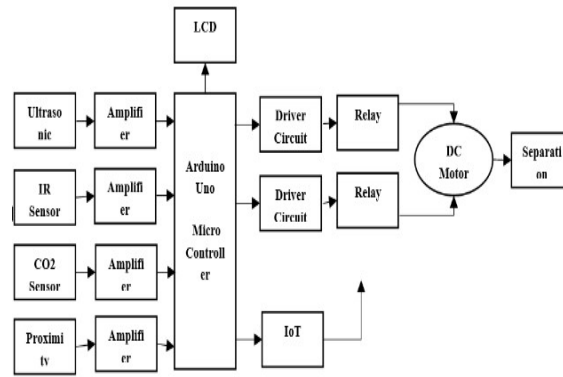
Fig.1.Block Diagram

HARDWARE REQUIREMENTS

- ➢ ARDUINO UNO
- ➢ LCD DISPLAY
- ➢ IR SENSOR
- ➢ ULTRASONIC SENSOR
- ➢ CO2 SENSOR
- ➢ PROXIMITY SENSOR
- ➢ RELAY
- ➢ IOT
- ➢ DC MOTOR

SOFTWARE REQUIREMENT

- ➢ ARDUINO IDE
- ➢ ANDROID STUDIO

PROGRAMMING

The Arduino Uno can be programmed with the Arduino Select "Arduino Uno from the Tools > Board menu (according to the microcontroller on your board). For details, see the reference and tutorials. The ATmega328 on the Arduino Uno comes preboned with a boot loader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol You can also bypass the bootloader and program the microcontroller through the ICSP (In -Circuit Serial Programming) header;

The Arduino integrated development environment (IDE) is a cross-platform application written in Java, and is derived from the IDE for the Processing programming language and the Wiring projects. It is designed to introduce programming to artists and other newcomers unfamiliar with software development. It includes a code editor with features such as syntax highlighting, brace matching, and automatic indentation, and is also capable of compiling and uploading programs to the board with a single click. A program or code written for Arduino is called a "sketch".

Arduino programs are written in C or C++. The Arduino IDE comes with a software library called "Wiring" from the original Wiring project, which makes many common input/output operations much easier. Users only need define two functions to make a runnable cyclic executive program. A typical first program for a microcontroller simply blinks an LED on and off. In the Arduino environment, the user might write a program like this:

It is a feature of most Arduino boards that they have an LED and load resistor connected between pin 13 and ground; a convenient feature for many simple tests.[11] The previous code would not be seen by a standard C++ compiler as a valid program, so when the user clicks the "Upload to I/O board" button in the IDE, a copy of the code is written to a temporary file with an extra include header at the top and a very simple main() function at the bottom, to make it a valid C++ program.

IV.SIMULATION DIAGRAM
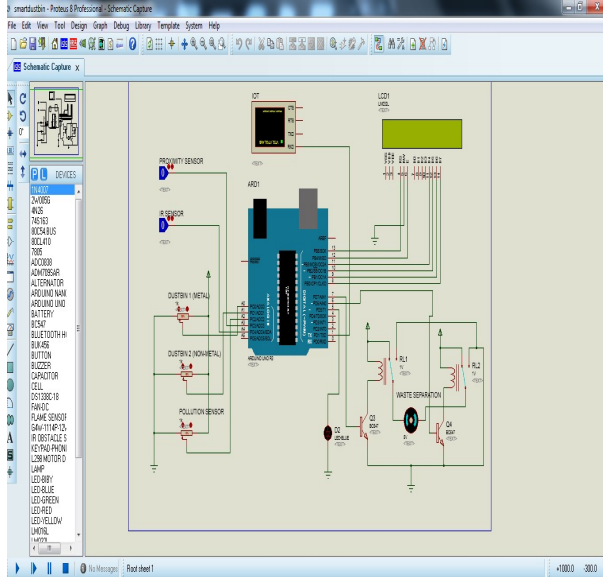
MODE 1 [SIMULATION DIAGRAM OF PROPOSED SYSTEM]



Fig.2. Simulation Diagram of Proposed System

Now run the Proteus Simulation, and if everything goes fine, to press run button and the proteus software running .We have to run the aurdino by using Digital (PWM) and next we have to click the virtual terminal.
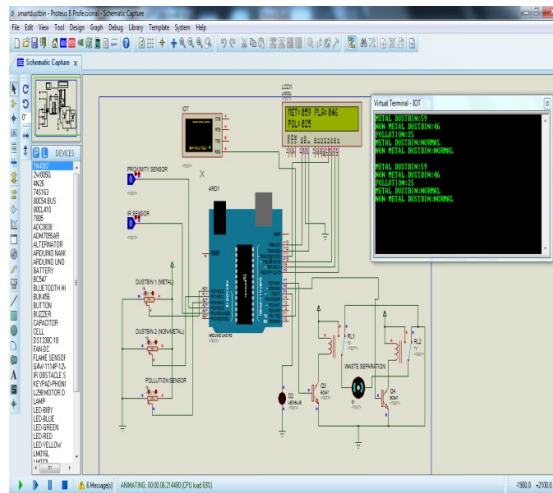
MODE 2 [SCANNING OF METAL WASTE]



Fig.3. Simulation Scanning of Metal Waste

In any electric motor, operation is based on simple electromagnetism. A current-carrying conductor generates a magnetic field; when this is then placed in an external magnetic field, it will experience a force proportional to the current in the conductor, and to the strength of the external magnetic field. As you are well aware of from playing with magnets as a kid, opposite (North and South) polarities attract, while like polarities (North and North, South and South) repel. The internal configuration of a DC motor is designed to harness the magnetic interaction between a current-carrying conductor and an external magnetic field to generate rotational motion.
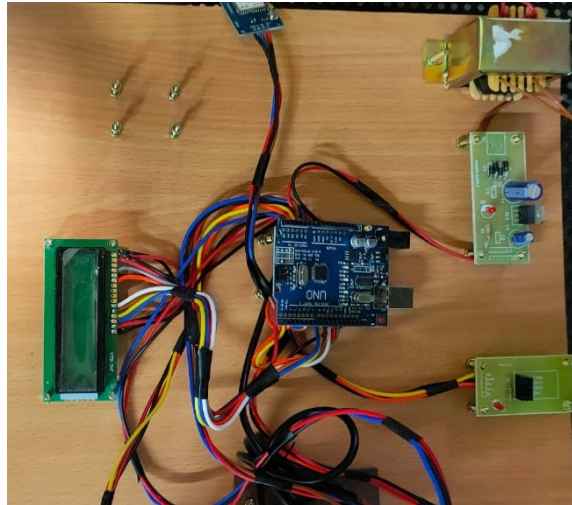
Fig.4. Hardware Module

## V.CONCLUSION

Our system mainly concentrates on separating waste at a less cost. In our system, we have made use of Arduino Uno compared to MSP430 which is costlier. In order to differentiate between wet and dry waste an IR sensor is used instead of a capacitive sensor which increases the complexity by making it difficult to differentiate between dry and wet waste by making use of dielectric values of waste substances. In the former system to separate metallic waste inductive sensors were used which again requires the controller to be preprogrammed with the threshold values, this necessity is removed in our system by making use of a proximity sensor which directly detects metals. At industrial level methods used for segregation of waste are hazardous to human health and also the process involves manual effort and also complete segregation is not obtained. By segregating waste at root source, not only can waste be recycled but beauty of the surroundings can be maintained.

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