

Proficient Waste Management Implementation System Using Internet of Things

¹Dr.B.Paulchamy, ²R.Punitha, ³M.Shenbaga Priya, ⁴S.Manikandan, ⁵K.Monisha and ⁶S.Chanthira kumar

¹Professor & Head, ²Assistant Professor, ^{3,4,5,6}UG Student, Department of ECE, Hindustan Institute of Technology, Coimbatore, Tamilnadu, India.

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ABSTRACT

Waste Management may defined as the discipline associated with the control of generation, collection, storage, transfer and transport processing and disposal of waste accord with the best principle of public health. Nowadays the Dustbins placed in public are get overflow due to increase in waste in cities. Due to the lack of resource the municipal corporation does not get information about overflow dustbins. This may lead to unhygienic condition in cities and cause health hazard. The IOT may the solution for this problem The Internet of Things is the network of physical devices embedded with software and sensors and network connectivity which is enables these objects to collect and exchange data. We can develop Smart Garbage Collector System Using IOT. The main purpose of this system is to develop the system which uses the information collected from sensors to manage the collected garbage. In this we are used arduino microcontroller, two keys for motor operation forward and reverse and LCD for displaying the status which attaches with IOT.

Keywords: IR Sensor, IOT, Arduino Microcontroller and Wi-Fi.

1. INTRODUCTION

Environment gets polluted due to irregular disposable of waste. Due to this, people get difficulty in transportation as well as unhygienic health problems. To overcome this, IOT helps people to face such difficulties. The message will be intimated to the corporation when the dustbin gets overloaded. This technique can be processed using Arduino microcontroller through which an IR sensor is also placed. When the waste is placed on the conveyor belt, using forward and reverse direction the motor gets operated by switching the key by the people who dispose the waste. The sensor is used to sense the dustbin when it gets overloaded and signal is passed through microcontroller and the collected garbage gives information to IOT. Hence finally web page shows the output for the status of waste which is disposable or non-disposable to the corporation that the garbage is full.

2. LITERATURE SURVEY

Many times, in our city we see that the garbage bins or dustbins placed at public places are overloaded. It creates unhygienic conditions for people as well as ugliness to that Place leaving bad smell. To avoid all such situations we are going to implement a project called IoT Based Smart Garbage and Waste Collection bins. These dustbins are interfaced with microcontroller based system having IR wireless systems along with central system showing current status of garbage, on mobile web browser with html page by Wi-Fi. Hence the status will be updated on to the html page.

Major part of our project depends upon the working of the Wi-Fi module; essential for its implementation. The main aim of this project is to reduce human resources and efforts along with the enhancement of a smart city vision. This paper presented by Alexey Medvedev Pert Fedchenkov, Arkady Zaslavsky helps to analyze the factor influencing waste management. Dispose of waste can be monitored using IOT which is shown on LCD display.

ARDUINO MICROCONTROLLER

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worrying too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again. "Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

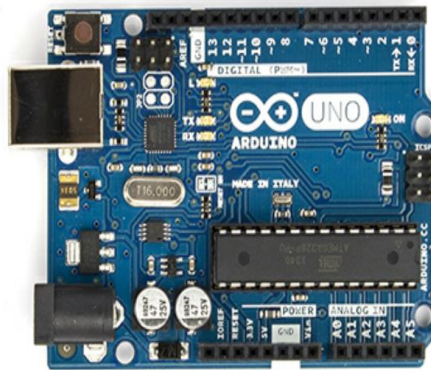


Fig: 1 Arduino UNO Module

IR SENSOR

The two basic parts for working with IR are the emitter and the detector. The emitter is typically an LED that emits near-infrared light. A typical wavelength is 880nm, which is just beyond the human eyes ability to see. A typical IR detection system will use two emitters. By controlling when the emitters are active, the detection system can determine simple directional information: Left, Right, or Front. There are several types of detectors for IR light. There are photo-diodes, photo-transistors, and a couple others. Usually, you buy IR emitter/detector pairs, which are tuned for each other. This is recommended when buying surplus, since chances are someone has verified they work together.

The other important detector for working with IR is a detector module, such as the Sharp GP1U5 (also the G1U52X) module. This module contains the IR detector and a small circuit that detects a 40 kHz modulation (i.e. the IR light is flashing on and off at about 40 kHz). The nice part about using a modulated light is the ability to reject noisy light signals. The world is full of light sources. Being able to detect a certain quality of a light, such as flashing at 40 kHz, means you can filter out much of the light you don't want. The above photo shows these parts installed on the front of a robot. The Sharp IR detector module is the square box at the top of the frame, and the emitters are enclosed in aluminum tubes near the bottom.

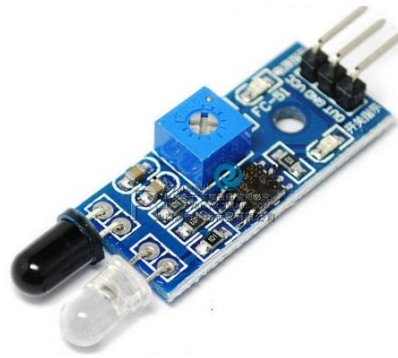


Fig: 2 Component of the IR detection system

3. EXSISTING WORK

Municipal waste management system is not effective and it is not able to maintain hygienic standards as well. Due to the ignorance the cities remains unhygienic and due to this the many health issues are arise. For efficient waste management there is need of information about conditions of all Dust Bins in cities.

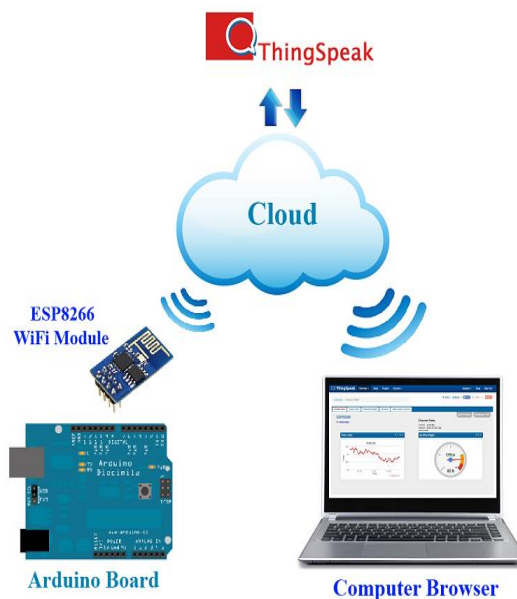


Fig: 3 Information to IoT using WIFI

4. PROPOSED METHOD

The collection of degradable and non-degradable waste separately which is placed in a conveyor belt on which the degradable waste is collected on left side and non-degradable waste collected on right side which can be accelerated using a 12V DC motor. The system will get the input through the dust collecting person through switches and sends signal to the Arduino microcontroller. The collected waste are recycled using a sprayer that can be reused as soil fertilizer for future scope.

BLOCK DIAGRAM

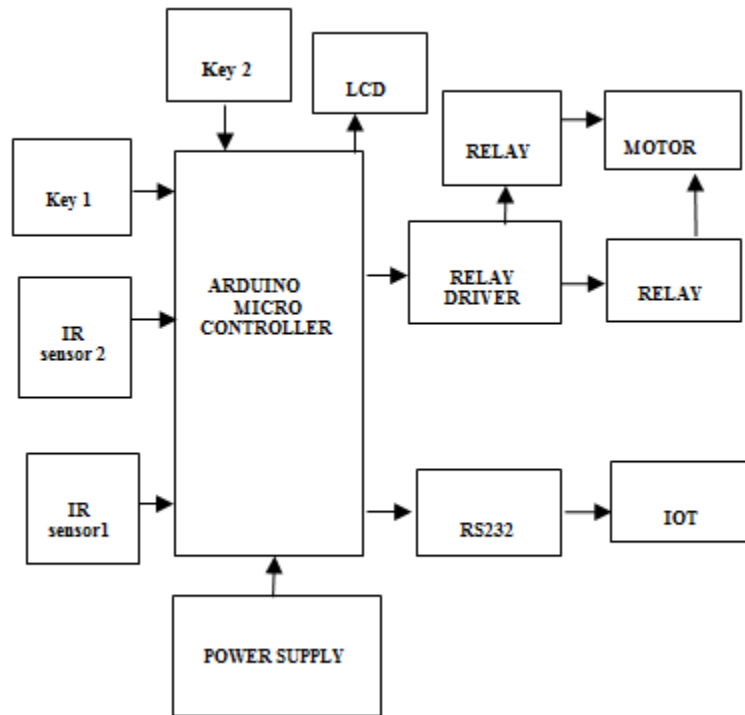


Fig: 4 Block diagram of Waste Management System

The Internet of Things (IoT) is the network of objects such as physical things embedded with electronics, software, sensors, and connectivity, enabling data exchange. ESP8266 is a low cost WiFi microcontroller chip that has the ability to empower IoT and helps the exchange of information among various connected objects. ESP8266 consists of networkable microcontroller modules, and with this low cost chip, IoT is booming. This book will help deepen your knowledge of the ESP8266 WiFi chip platform and get you building exciting projects. Kick-starting with an introduction to the ESP8266 chip, we will demonstrate how to build a simple LED using the ESP8266.

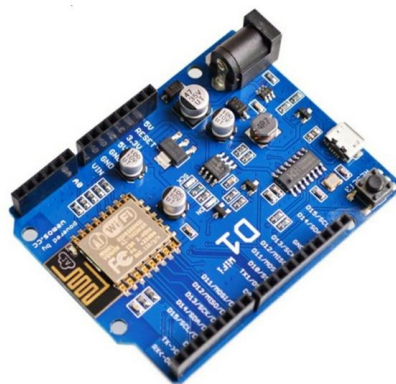


Fig: 5 WIFI Module

You will then learn how to read, send, and monitor data from the cloud. Next, you'll see how to control your devices remotely from anywhere in the world. Furthermore, you'll get to know how to use the ESP8266 to interact

with web services such as Twitter and Facebook. In order to make several ESP8266s interact and exchange data without the need for human intervention, you will be introduced to the concept of machine-to-machine communication. The latter part, focuses more on projects, including a door lock controlled from the cloud, building a physical Bitcoin ticker, and doing wireless gardening.

RELAY DRIVER (ULN2003)

The ULN2001A, ULN2002A, ULN2003 and ULN2004A are high Voltage, high current Darlington arrays each containing seven open collector Darlington pairs with common emitters. Each channel rated at 500mA and can withstand peak currents of 600mA. Suppression diodes are included for inductive load driving and the inputs are pinned opposite the outputs to simplify board layout. These versatile devices are useful for driving a wide range of loads including solenoids, relays DC motors; LED displays filament lamps, thermal print heads and high power buffers. The ULN2001A/2002A/2003A and 2004A are supplied in 16 pin plastic DIP packages with a copper lead frame to reduce thermal resistance. They are available also in small outline package (SO-16) as ULN2001D/2002D/2003D/2004D.

5. CONCLUSION

we conclude that disposing of waste using IoT can be obtained through microcontroller and the corporation get information about the status of dustbin that is disposable or non-disposable waste are full or not. Hence this process can be monitored using html webpage respectively. Using this implementation we can be free from dust, cleanliness, pollution, good health condition etc... in our surroundings. Finally we can keep our environment neat and clean.

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