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**K.L.E. COLLEGE OF ENGINEERING AND TECHNOLOGY,
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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

A Internship Report on,

“Smart Dustbin”

Submitted in partial fulfillment for the award of the Degree of

**BACHELOR OF ENGINEERING
IN
COMPUTER SCIENCE & ENGINEERING**

Submitted by,

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Under the Guidance of
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Certificate of Approval of Internship

This is to certify that **Mr. Manjunath Mushi** bearing **USN: 2KD16CS045**, has satisfactorily completed the Internship entitled “**SMART DUSTBIN**” in **Cubiccode Digital Media LLP, Belagavi** for the partial fulfillment of Bachelor of Engineering in Computer Science and Engineering prescribed by the **Visvesvaraya Technological University, Belagavi** for the academic year 2019-20. The report has been approved as it satisfies the academic requirements in Internship prescribed for the Bachelor of Engineering Degree.

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ABSTRACT

In the recent decades, Urbanization has increased tremendously. At the same phase there is an increase in waste production. Waste management has been a crucial issue to be considered. This paper is a way to achieve this good cause. In this paper, smart bin is built on a microcontroller based platform Arduino Uno board which is interfaced with GSM modem and Ultrasonic sensor. Ultrasonic sensor is placed at the top of the dustbin which will measure the stature of the dustbin. The threshold stature is set as 10cm. Arduino will be programmed in such a way that when the dustbin is being filled, the remaining height from the threshold height will be displayed. Once the garbage reaches the threshold level ultrasonic sensor will trigger the GSM modem which will continuously alert the required authority until the garbage in the dustbin is squashed. Once the dustbin is squashed, people can reuse the dustbin. At regular intervals dustbin will be squashed. Once these smart bins are implemented on a large scale, by replacing our traditional bins present today, waste can be managed efficiently as it avoids unnecessary lumping of wastes on roadside. Foul smell from these rotten wastes that remain untreated for a long time, due to negligence of authorities and carelessness of public may lead to long term problems. Breeding of insects and mosquitoes can create nuisance around promoting unclean environment. This may even cause dreadful diseases.

Keywords: IOT, GSM, Node MCU, Arduino

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CHAPTER 1

INTRODUCTION

1.1 WHAT IS INTERNSHIP?

An internship is a period of work experience offered by an employer to give students and graduates exposure to the working environment, often within a specific industry, which relates to their field of study. ‘On-the-job’ experience can be as valuable as anything learned in your studies. An internship gives a student the opportunity for career exploration and development, and to learn new skills. It offers the employer the opportunity to bring new ideas and energy into the workplace, develop talent and potentially build a pipeline for future full-time employees.

After all, we cannot really understand what a job is all about until you have worked in that environment. Internships are great opportunities to speak directly to people who have experience in the role we aspire to; and their knowledge of the job and working environment will give us a greater understanding of what it’s all about and what we need to do to progress. An internship can give us a real insight into the world of work, allowing you to build on the theory you learned at university and helping us to gain practical skills that will help strengthen your CV and make you more employable. Employers benefit from these placements because they often recruit employees from their best interns, who have known capabilities, thus saving time and money in the long run. Typically, an internship consists of an exchange of services for experience between the intern and the organization. Internships are used to determine if the intern still has an interest in that field after the real-life experience.

In addition, an internship can be used to create a professional network that can assist with letters of recommendation or lead to future employment opportunities. Internships offer you the chance to test our skills in real-life situations, explore our career options and gain an insight into an organization or career path. Internship of the best ways to add that practical real-life experience is through an internship. Internships are usually arranged by third-party organizations that recruit interns on behalf of industry groups.

1.2 COMPANY PROFILE

1.2.1 ABOUT COMPANY

Cubiccode is one of the fastest and consistently growing companies in the Web Development, Digital Marketing, Growth Hacking, IoT, Mobile Application Development, Software Solutions & IT Service sector with hundreds of happy clients across the nation. Cubiccode provide numerous digital solutions for clients of all sizes across different sectors, ranging from small businesses to global corporations. Right from the start to the finish, its customized online solutions and web solutions are targeted towards only one goal: enhancing the online presence of customers and making their business thrive to the core. Cubiccode does it all. From applying ideas, creating great designs, and implementing it, and much more, basically. Whose mission is to provide considerable results that turn traffic into business. By understanding that each and every business is different and the demands of every client are individualistic and tailor their strategies to suit the needs of the clients with the intention of maximizing the effectiveness for all digital solutions. It is a professional organization with wide experience in this sector providing the best solution for businesses to help them grow. Cubiccode is recognized in Top 10 web development start-ups of 2019 by Silicon India and was awarded the title of Most Outstanding Web Development Company 2019 - Karnataka at AI Global Excellence Awards 2019.

1.2.2 SERVICES

They have been designing, developing, applying ideas, implementing, optimizing, and providing numerous digital solutions for over hundreds of their clients, belonging to various Industry dimensions.

- **Website Designing and Development:** Their web applications are easy to use and personally tailored to each business needs which are equipped with new technologies.
- **Mobile Application Development:** Intuitive designs combined with compelling user experience are what makes their apps stand ahead in the digital age.
- **Software Solutions and IT Services:** They offer business software solutions that meet business requirements and to help business grow.

- **Growth Hacking Strategies:** Cubiccode helps start-ups and well-established companies to achieve rapid and sustainable growth.
- **Digital Marketing and Online Sales:** They enhance customer's digital marketing ROI (Return on Investment), with their strategies and algorithm bidding and cross channel audience targeting techniques.
- **Cubiccode's Training School:** Cubiccode Digital Media LLP is an ISO 9001:2015 certified company. It is also a market leader in providing high level training services provider from, Digital Marketing, Web Development, IoT & Embedded Systems, Software Testing, Brand Management, Internet Sales, Advertising, and Online Strategy Building and Reputation Management. Their courses are designed for beginners as well as working professionals looking to advance in their career and also to establish individuals & organizations aiming to expand their Market reach.
- **Other Services:** Through their portfolio of companies they have the capability to deliver a broad range of quality services and solutions to meet your business needs. Here is a listing of other services and solutions provided by the Cubiccode.

- | | |
|------------------------------|-----------------------|
| • Lead Generation | • System Integration |
| • Customer Acquisition | • Motion Graphics |
| • Analytical Reporting | • Visual Graphics |
| • Data Management | • Product Photography |
| • Digital and Brand Strategy | • Brand Management |
| • Content Development | • Embedded Systems |

Operating nationwide over a couple of years, Cubiccode company's services are widely acknowledged within the Digitalization community for quality and up to date information. Their success and distinguished reputation are down to our commitment to the industry, a high-level expertise, sector knowledge, cultural diversity, and work experience. Their students are best known to industry-ready to meet the demands and goals of client.

1.3 OBJECTIVES ACHIEVED THROUGH INTRENSHIP

1. Throughout my internship, I learnt different aspects of embedded systems and IoT.
2. Learned about architecture of Internet of Things (IoT).
3. Got hands-on experience on programming hardware with Python 3,C++.
4. To understand the requirement of clients, formulating strategies for clients, executing those strategies to achieve their product objectives.
5. Understood the change in consumer buying behavior in IoT-oriented era.
6. To understand the behavior in the corporate world and the interactions in the corporate world.
7. Importance of IoT and its applications in present era and to get an idea about the various usage of IoT, its importance and most importantly its day to day applications.
8. Development of skills such as teamwork, communication.

1.4 WEEK WISE DESCRIPTION

1. **Week 1:** Fundamentals of IoT, embedded systems, Arduino, programming Arduino, Introduction to basic electronic components & sensors.
2. **Week 2:** Introduction to Raspberry pi hardware, installing OS, python 3 programming for raspberry pi.
3. **Week 3:** Obtaining client requirements, selecting IoT platforms, identifying the hardware, literature survey, implementation up to 50%.
4. **Week 4:** completion of implementation, testing and performance analysis.

1.5 INTRODUCTION OF WORK/PROJECT

1.5.1 INTERNET OF THINGS

The **Internet of things (IoT)** is a system of interrelated computing devices, mechanical and digital machines provided with unique identifiers (UIDs) and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction. IoT (Internet of Things) is creating a giant network where all the devices are connected to each other and providing them with the capability to interact with each other. This is driving the automation to a

next level where devices will communicate with each other and make decisions on their own with less or without any human interventions. The ‘Thing’ in IoT can be any device with any kind of built-in-sensors with the ability to collect and transfer data over a network with less or without manual intervention. In the consumer market, IoT technology is most synonymous with products pertaining to the concept of the "smart home", covering devices and appliances (such as lighting fixtures, thermostats, home security systems and cameras, and other home appliances) that support one or more common ecosystems, and can be controlled via devices associated with that ecosystem, such as smartphones and smart speakers. The embedded technology in the object helps them to interact with internal states and the external environment, which in turn helps in decisions making process. In a nutshell, IoT is a concept that connects all the devices to the internet and let them communicate with each other over the internet. IoT is a giant network of connected devices – all of which gather and share data about how they are used and the environments in which they are operated. IoT system architecture, in its simplistic view, consists of three tiers: Tier 1: Devices, Tier 2: the Edge Gateway, and Tier 3: the Cloud. Devices include networked things, such as the sensors and actuators found in IIoT equipment, particularly those that use protocols such as Modbus, Bluetooth, ZigBee, or proprietary protocols, to connect to an Edge Gateway. The Edge Gateway consists of sensor data aggregation systems called Edge Gateways that provide functionality, such as pre-processing of the data, securing connectivity to cloud, using systems such as Web Sockets, the event hub, and, even in some cases, edge analytics or fog computing. Edge Gateway layer is also required to give a common view of the devices to the upper layers to facilitate in easier management. The final tier includes the cloud application built for IIoT using the micro services architecture, which are usually polyglot and inherently secure in nature using HTTPS/OAuth. It includes various database systems that store sensor data, such as time series databases or asset stores using backend data storage systems (e.g. Cassandra, PostgreSQL).

The most important features of IoT include artificial intelligence, connectivity, sensors, active engagement, and small device use. A brief review of these features is given below –

- AI – IoT essentially makes virtually anything “smart”, meaning it enhances every aspect of life with the power of data collection, artificial intelligence algorithms, and networks. This can mean something as simple as enhancing your refrigerator and cabinets to detect when milk and your favourite cereal run low, and to then place an order with your preferred grocer.
- Connectivity – New enabling technologies for networking, and specifically IoT networking, mean networks are no longer exclusively tied to major providers. Networks can exist on a much smaller and cheaper scale while still being practical. IoT creates these small networks between its system devices.
- Sensors – IoT loses its distinction without sensors. They act as defining instruments which transform IoT from a standard passive network of devices into an active system capable of real-world integration.
- Active Engagement – Much of today's interaction with connected technology happens through passive engagement. IoT introduces a new paradigm for active content, product, or service engagement.
- Small Devices – Devices, as predicted, have become smaller, cheaper, and more powerful over time. IoT exploits purpose-built small devices to deliver its precision, scalability, and versatility.

IoT ADVANTAGES:

- Improved Customer Engagement – Current analytics suffer from blind-spots and significant flaws in accuracy; and as noted, engagement remains passive. IoT completely transforms this to achieve richer and more effective engagement with audiences.
- Technology Optimization – the same technologies and data which improve the customer experience also improve device use, and aid in more potent improvements to technology. IoT unlocks a world of critical functional and field data.
- Enhanced Data Collection – Modern data collection suffers from its limitations and its design for passive use. IoT breaks it out of those spaces, and places it exactly where humans really want to go to analyse our world. It allows an accurate picture of everything.

IoT DISADVANTAGES:

- Security – IoT creates an ecosystem of constantly connected devices communicating over networks. The system offers little control despite any security measures. This leaves users exposed to various kinds of attackers.
- Privacy – the sophistication of IoT provides substantial personal data in extreme detail without the user's active participation.
- Complexity – Some find IoT systems complicated in terms of design, deployment, and maintenance given their use of multiple technologies and a large set of new enabling technologies.
- Flexibility – Many are concerned about the flexibility of an IoT system to integrate easily with another. They worry about finding themselves with several conflicting or locked systems.
- Compliance – IoT, like any other technology in the realm of business, must comply with regulations. Its complexity makes the issue of compliance seem incredibly challenging when many consider standard software compliance a battle.

IoT Hardware

IoT Hardware components can vary from low-power boards; single-board processors like the Arduino Uno which are basically smaller boards that are plugged into mainboards to improve and increase its functionality by bringing out specific functions or features (such as GPS, light and heat sensors, or interactive displays). A programmer specifies a board's input and output, and then creates a circuit design to illustrate the interaction of these inputs and outputs.

Another well-known IoT platform is Raspberry Pi , which is a very affordable and tiny computer that can incorporate an entire web server. Often called “RasPi,” it has enough processing power and memory to run

Windows 10 on it as well as IoT Core. Raspberry Pi exhibits great processing capabilities, especially when using the Python programming language.

The most important hardware in IoT might be its sensors: Image Sensors, Accelerometers, Magnetometers, Pressure Sensors, Humidity Sensors, Light Sensors, Temperature sensors, Proximity Sensors;

1.5.2 SMART DUSTBIN

Rapid increase in population leads to waste generation. Mostly in our daily life we encounter dustbins that are excessively full and garbage spilling out of them. This kind of situation is neither good for our environment nor for our advancement. This problem leads to huge number of diseases as large number of insects and mosquitoes breed on the waste accumulated in this garbage. With the advent of technologies, all the things around us are getting smarter. Since with the motive of a smart city, there is a need for smart waste management. The worst thing is that some portion of waste is burned only on streets and dumpsites, which release harmful furan and dioxins in the environment. This harmful gas leads to various types of chronic and respiratory diseases. This project depicts the model of a smart trash can for malls, airports, hospitals, schools and colleges. Smart dustbin is the new motive which uses sensors for trash level detection and notifies the concerned authority.

CHAPTER 2

LITREATURE SURVEY

- [1] Parveen Sultana, Sreecharan Challa and Senthil Jayavel “IOT Based Garbage Monitoring system” in 2017 Volume 116 No. 12 special issue. International Journal of Pure and Applied Mathematics.**

Used IR sensor, Infrared frequencies are affected by sunlight, dust , and also black surface.Store data on server and hence cost is high.

- [2] IoT Based Smart Garbage and Waste Collection Bin by S.S.Navghane, M.S.Killedar, Dr.V.M.Rohokale. International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE) Volume 5, Issue 5, May 2016.**

Used IR sensors, Internet connection is needed to work smoothly, because they used mobile app to monitor status, and cost is also high.

- [3] A Survey on Garbage Collection and Monitoring System for Smart cities using IOT Neha shinde, Sayli Bhambre, Shraddha Thakur, Varsha Devkule; International Research Journal of Engineering and Technology (IRJET) Volume: 05 Issue: 02 | Feb-2018.**

"Smart Garbage Bin", which will alarm and inform the authorized person when the garbage bin is about to fill. Then message will be send to the authorized person to collect the garbage from the particular area. The authorized person will sends the message from his web application to the garbage collectors by sending a SMS.

- [4] The Design and Implementation of Smart Trash Bin, Fady E. F. Samann, Academic Journal of Nawroz University (AJNU).**

This system is based on Arduino Nano board and an ultrasonic sensor to monitor the fullness level of the container and give SMS alerts using a GSM module. The system is powered by lithium battery power bank supported by solar cell panel. The system provides an option of charging external portable devices using the power bank.

CHAPTER 3

SYSTEM REQUIREMENT SPECIFICATION

A System Requirements Specification (SRS) (also known as a Software Requirements Specification) is a document or set of documentation that describes the features and behaviour of a system or software application. It includes a variety of elements (see below) that attempts to define the intended functionality required by the customer to satisfy their different users.

3.1 Software Requirements:

Arduino IDE 1.6.7:

The Arduino IDE is a cross-platform application for Windows, Linux that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The source code for the IDE is released under the GNU General Public License, version 2.

Programming language:

Embedded C is set of language extensions for the C programming language by the C Standards Committee to address commonality issues that exist between C extensions for different embedded system. Embedded C is one of the most popular and most commonly used programming languages in the development of embedded system. Embedded C is perhaps the most popular languages among embedded programmers for programming embedded systems. There are many popular programming languages like assembly, BASIC, C++ etc. That is often used for developing embedded system but embedded C remains popular due to its efficiency, less development time and portability.

3.2 Hardware Requirements

Arduino UNO: Arduino UNO is an open source electronics platforms based on easy – to-use hardware and software. Arduino boards are able to read inputs-light on sensors, finger on a button and turn it into an output. Arduino is a physical computing device

based on simple I/O operations and used to implement the program written in Arduino IDE.



Figure 1: Arduino UNO

1. USB Connector

This is a printer USB port used to load a program from the Arduino IDE onto the Arduino board. The board can also be powered through this port.

2. Power Port

The Arduino board can be powered through an AC-to-DC adapter or a battery. The power source can be connected by plugging in a 2.1mm center-positive plug into the power jack of the board.

The Arduino UNO board operates at a voltage of 5 volts, but it can withstand a maximum voltage of 20 volts. If the board is supplied with a higher voltage, there is a voltage regulator (it sits between the power port and USB connector) that protects the board from burning out.

3. Microcontroller

It is the most prominent black rectangular chip with 28 pins. Think of it as the brains of your Arduino. The microcontroller used on the UNO board is Atmega328P by Atmel (a major microcontroller manufacturer). Atmega328P has the following components in it:

- **Flash memory** of 32KB. The program loaded from Arduino IDE is stored here.
- **RAM** of 2KB. This is a runtime memory.
- **CPU**: It controls everything that goes on within the device. It fetches the program instructions from flash memory and runs them with the help of RAM.

- **Electrically Erasable Programmable Read Only Memory (EEPROM)** of 1KB. This is a type of non-volatile memory, and it keeps the data even after device restart and reset.

Atmega328P is pre-programmed with bootloader. This allows you to directly upload a new Arduino program into the device, without using any external hardware programmer, making the Arduino UNO board easy to use.

4. Analog input pins

The Arduino UNO board has 6 analog input pins, labeled “Analog 0 to 5.” These pins can read the signal from an analog sensor like a temperature sensor and convert it into a digital value so that the system understands. Although these pins are labeled analog and are analog input by default, these pins can also be used for digital input or output.

5. Digital Pins

You can find these pins labeled “Digital 0 to 13.”. When used as output, these pins act as a power supply source for the components connected to them. When used as input pins, they read the signals from the component connected to them. When digital pins are used as output pins, they supply 40 milliamps of current at 5 volts, which is more than enough to light an LED. Some of the digital pins are labeled with tilde (~) symbol next to the pin numbers (pin numbers 3, 5, 6, 9, 10, and 11). These pins act as normal digital pins but can also be used for Pulse-Width Modulation (PWM), which simulates analog output like fading an LED in and out.

6. Reset Switch

When this switch is clicked, it sends a logical pulse to the reset pin of the Microcontroller, and now runs the program again from the start. This can be very useful if your code doesn't repeat, but you want to test it multiple times.

7. Crystal oscillator

This is a quartz crystal oscillator which ticks 16 million times a second. On each tick, the microcontroller performs one operation, for example, addition, subtraction, etc.

8. TX – RX LED

TX stands for transmit, and RX for receive. These are indicator LEDs which blink whenever the UNO board is transmitting or receiving data.

GSM SIM900

- The main objectives of GSM module are to utilize it as a communication contrivance. A GSM modem is a standard GSM mobile phone with a congruous cable and a software driver to connect to a serial connector on our computer.
- GSM/GPRS-compatible Quad-band cell phone, which works on a frequency of 850/900/1800/1900MHz and which can be used not only to access the Internet, but also for oral communication (provided that it is connected to a microphone and a small loud speaker) and for SMSs



Figure 2: GSM SIM900

Ultrasonic Sensor HC SR-04

HC-SR04 is an ultrasonic ranging module that provides 2 cm to 400 cm non-contact measurement function. The ranging accuracy can reach to 3mm and effectual angle is < 15°. operating voltage 5V.

VCC: The Vcc pin powers the sensor, typically with +5V.

Trigger: Pin is used to trigger the ultrasonic sound pulses.

Echo: Echo pin is an Output pin. This pin goes high for a period of time which will be equal to the time taken for the US wave to return back to the sensor.

Ground: This pin is connected to the Ground of the system.



Figure 2: Ultrasonic sensor HC-SR04

Battery: One 12V battery to power GSM module.

One dustbin container to collect the garbage , on which the overall system is mounted.

CHAPTER 4

SYSTEM DESIGN

A smart bin is built on a microcontroller based platform Arduino Uno board is developed, dustbin is fitted with a ultrasonic sensor which can gives the status of the waste present in the dustbin to the municipal authority, that is in turn connected to the GSM module which sends message to the mobile number of the concerned authority.

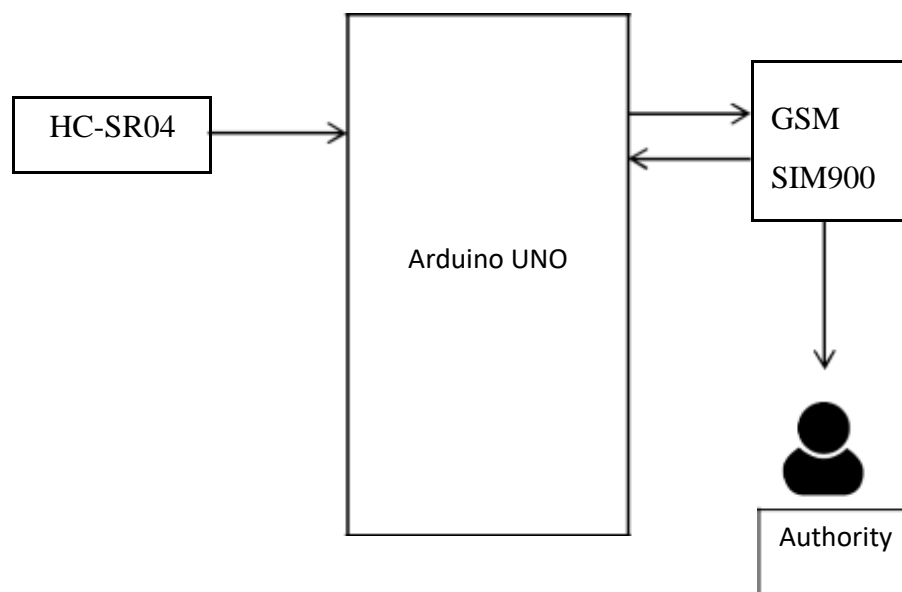


Fig 4.1 Block diagram of smart dustbin using Arduino.

Circuit connection

- Connect the VCC and the ground of the ultrasonic sensor to the 5V and the ground of the Arduino. Then connect the TRIG and ECHO pin of ultrasonic sensor to the pin 11 and 12 of the Arduino respectively (any other pin can be used).
- Connect the RX pin of the Arduino with the TX pin of the GSM module the TX pin of the Arduino with the RX pin of the GSM module.
- Connect the GND of the Arduino to the ground of the module. Also, the GSM module needs an external 12v supply.

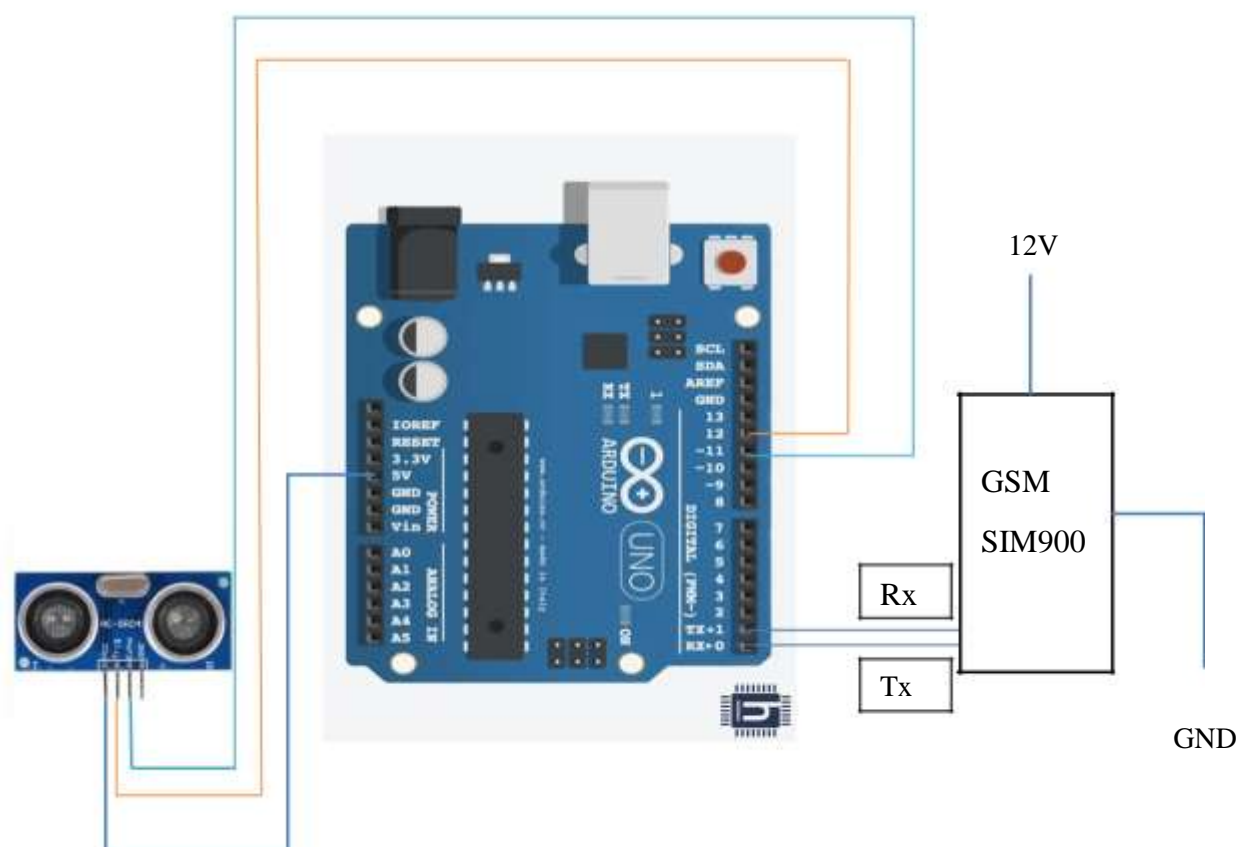


Fig 4.2 Circuit diagram of smart dustbin using Arduino.

GSM 900A modem is used to send the messages. It consists of a GSM/GPRS modem with standard communication interfaces like RS-232 (Serial Port), USB, so that it can be easily connected to the other devices. The ultrasonic sensor is used to find the height of garbage filled at different intervals of time. Arduino Uno board is used as microcontroller platform. Interfacing is done between GSM modem and Arduino board by connecting RX pin of modem to TX pin of board and vice-versa. ECHO and TRIGGER pins of sensor is connected to digital pins 11 and 12 of Arduino board. Arduino board works at 5V power supply and GSM modem requires 2A to power on. Threshold distance is set at some height. During the course of garbage accumulation, whenever the height of the garbage increases above threshold value, GSM modem is activated to send an alert signal to the concerned authority through an SMS. As soon as an SMS alert is received, concerned authority can place orders to the workers for cleaning the filled bins on time without allowing them to overflow.

CHAPTER 5

TESTING

Testing is evaluation of the system against requirements gathered from users and system specifications. Testing is conducted at the phase level in software development life cycle or modules. Testing comprises of validation and verification of system from end to end before it goes live for end user. By performing the system testing, organizations make sure that the system performing properly and can be acceptable by real time users.

5.1 Unit testing:

In computer programming, a unit test is a procedure used to validate that a particular module of source code is working properly. The procedure is to write test cases for all functions and methods so that whenever a change causes a regression, it can quickly be identified and fixed. Ideally, each test case is separate from the others; constructs such a mock objects can assist in separating unit tests.

In smoke detector at starting we have to check all the components are to be required to our system and next connection properly and check whether the code is working properly or not. If any problems are occurred then you make connection again.

5.2 Assembling testing:

Testing can combine a range of parts in an assembly for easy installation the customer's product. Testing the materials, machinery and know how to create assemblies for its customers which save time and money.

- All the required components are collected & checked for good condition before mounting.
- Initially the components with small height are mounted.
- Before mounting each component the leads are cleaned properly to achieve good soldering.
- The extra leads of the components remaining after soldering are cut out properly.

- After the soldering the system is ready use for users.

5.3 Validation Testing:

Validation testing is a concern which overlaps with integration testing. The modules which are validated in customer relationship management system are Login form, enquiry form, quotation form, purchase form and invoice form. Validation is a dynamic mechanism of validating and testing the actual products of customer relationship management system. It is to check whether software meets the customer expectations and requirements and also generally follows after verification. After deployment there can be many other validations which can enhance the user experience with security.

5.4 Hardware testing:

- The electronic components are mounted and soldered, before all the components are checked for the respective voltages and current.
- After the components are soldered the connectivity is checked using multi meter. If the problem is found the connection is done again.
- The common test platform is to ensure consistency in hardware and software test procedures from the conceptual and design phases through manufacture and distribution.
- After building the whole circuit we test it, This project should satisfy some features. Features to be tested as follows:
- The ultrasonic sensor should give proper output. To check whether the output is accurate or not, the output of the sensor will be checked against a meter tape.
- The Arduino board should show the distance in the serial monitor.
- The GSM module should send messages after the specified delay. If the text messages are reaching the phone that means the GSM module is working.

CHAPTER 6

SNAPSHOTS



Fig 1: Smart dustbin setup ultrasonic sensor fitted at the top

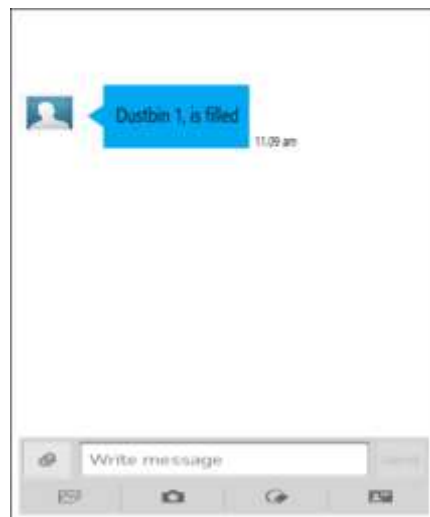


Fig 2: Smart dustbin filled SM

CONCLUSION

The project titled “Smart Dustbin” Is aimed at implementing a safe and clean environment. Our idea based intelligent garbage based system, when implemented on a large scale and in the long run can get high satisfying outputs. By implementing this system of garbage disposal and collection we can reduce the pollution cost by the stinking garbage that we come across along the road paving way for clean environment and healthy disease free environment. By implementing this project we will avoid over flowing of garbage from the container in residential area.