# A SIMPLIFIED HOME ENVIRONMENT SYSTEM

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I/We hereby declare that the work in this project is my/our own except for quotations and summaries which have been duly acknowledged.

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I/We hereby declare that we have read this project and in my/our opinion this project is sufficient in terms of scope and quality for the award of the degree of B. Sc. in Computer Science & Engineering

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To my dearest …

Last but not least, I gratefully acknowledge…

**ABSTRACT**

A smart house is one in which electronic appliances and light energy systems are automated and controlled. We design a smart home system & install utilizing Internet of Things in this presentation. We choose it. Because it has an adaptability to change and ability to construct processes quickly. The Remote Process, Simulated System, and Cloud System are the three subsystems that make up the system. An alert system is included in the Remote process (remotely control device) to warn the user if any trouble occurs. The online or web service is a data transmission way to control the grid independently. In this process, registered users can log into the system by which they can check, monitor, change and be notified and alerted for any events that they are registered for. All of the distant business logic is housed in the cloud system. The system functioned effectively, and its cost-effectiveness was demonstrated for at least a middle-class population.

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# CHAPTER 1

# INTRODUCTION

## 1.1 INTRODUCTION

Home automation has been around since the late 1970s, but as technology and services progress, people's expectations of what a home should be and how services should be supplied and accessed at home alter. A smart home is a home with appliances, lighting, heating, air conditioning, televisions, computers, entertainment (audio and video systems), security, and camera systems that can communicate with one another and be controlled remotely via a time schedule from any room in the house, as well as remotely via phone or internet from any location in the world. 2008 (Edmonds & Chandler).

Instead of only making and receiving calls, mobile phones are being used as clocks, calendars, and controls. A mobile device can be used to construct a smart home by configuring gadgets and receiving notifications using the internet. The Internet of Things (IoT) is a network of interconnected computing, mechanical, and digital machines, things, animals, and people with unique IDs that may transport data over a network without requiring human-to-human or human-to-computer communication (Wadhwa & Puri, 2016). There are now and in the future efficient, convenient, and safe ways to reach residences. Regardless of changes in consumer expectations, technological advancements, or other factors, the purpose of a home automation system has remained constant. Smart technologies arose in the late 1990s and early 2000s, with gadgets and devices becoming increasingly ubiquitous and affordable.

The purpose of a home security system is to detect intrusion, or unauthorized entry into a building or protected area, and to prohibit such unwanted access in order to protect personnel and property from harm or damage. For protection against burglary (theft) or property damage, as well as personal protection against intruders, security systems are primarily utilized in residential, commercial, industrial, and military establishments. Car alarms also keep vehicles and their contents safe. Inmates are also monitored by security systems in prisons. Residential home security is the most prominent. Nowadays, any modern automated home must have a home security and surveillance system. The fundamental design of a

security system begins with an analysis of the residents' demands, followed by a survey of existing technology and hardware, an evaluation of system prices, consideration of monitoring options, and ultimately, installation planning. According to the European Institute for Crime Prevention and Control International statistics on crime and control 2011, Bangladesh received 2.2 points and was ranked 53rd in the world for burglaries, and 0.7 points and was ranked 71st in the world for auto theft. Now, the United States, the world's richest country, ranks 6th in auto theft and 9th in burglary [8]. The majority of the burglaries, according to their findings, occurred in residential areas, offices, and banks. Security systems that are not automated have been found to be untrustworthy. The doors were fitted with locks and keys, making them simple to open. Even the human presence of a security guard may not be reliable. Every previous system had a high vulnerability. You can trust your home to keep all of your belongings and appliances safe, and you can leave the house feeling protected. This problem can arise when a home has a security system. As a result, the focus of our research is on maintaining home security.

A smart home is a computing and information technology application that connects a collection of smart devices and household gadgets or appliances capable of exchanging data in order to provide services to residents and facilitate remote home control. As a result, homeowners in their hometown can remotely control and monitor their home appliances. Research and development can focus on two aspects: technological advancement and how technology can be diffused into the market or society, in terms of certain problems with adoption as well as potential prospects for SHT (smart home technologies). To begin, SHT aims to improve the quality of life at home by offering convenient services and features. Second, this technology is used to improve energy efficiency and home utilities as a building system augmentation. The smart home system's precise goals include controlling home appliances, securing connection channels between apps and an embedded system, streaming real-time video from a web camera or security camera, promoting home safety, and supplying energy-efficient features. Smart home automation allows you to control connected home equipment from your smartphone. Thanks to rapid improvements in wireless communication technology in recent years, it is now possible to access or manage household equipment remotely. Smart houses are one example of how the internet of things (IoT) is employed. Data is generated by smart home devices as well. Despite mounting concerns, previous work has addressed enough to manage and analyze personal data. Smart homes are classified by energy, information and communication, security, health, the

environment, home entertainment, and household appliances. When it comes to energy efficiency in smart homes, several things should be considered, including an energy consumption monitoring system, energy use management, and the ability to process data on energy consumption throughout the house [6].

## 1.2 INTERNET OF THINGS (IoT)

The Internet of Things (IoT) is a network of networked computers devices, mechanical and digital machinery, products, animals, and people with unique identifiers and the ability to transfer data without human or computer contact.

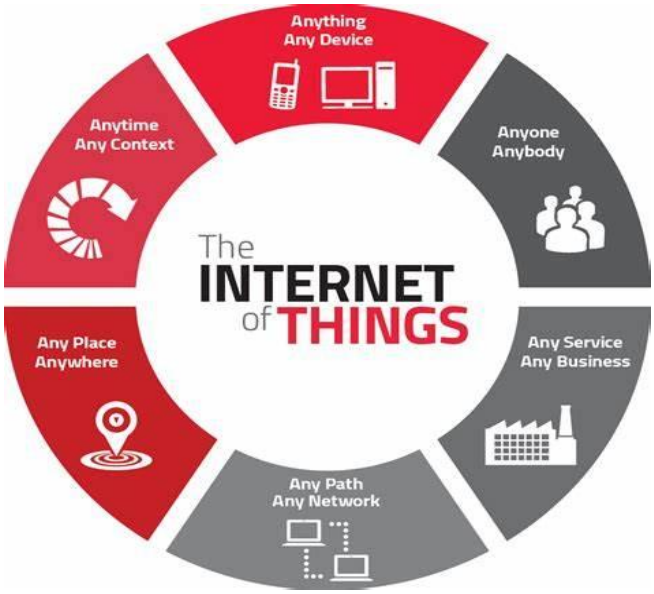



Figure 1.1: The Internet of things

Because of new digital and smart manufacturing technologies, as well as design developments, the Internet of Things (IOT) is a revolutionary technology that is changing many facets of modern life.

Though it started with supply chain management in mind, the Internet of Things has subsequently evolved to cover transportation, utilities, industrial automation, healthcare, building and home automation, and more. The Internet of Things' smart connectivity with existing networks results in omnipresent, computer-sensed data that requires no human engagement.

The Internet of Things (IoT) is a new paradigm of internet-connected things that allows physical objects or things to connect, interact, and communicate with one another via the internet in the same way that humans do today. It connects systems, sensors, and actuators

to the internet in general.

Energy systems, dwellings, industries, cities, logistics, health, agriculture, and other areas can all benefit from the Internet of Things. It is made up of IoT devices with unique identities that can perform remote sensing, monitoring, and actuation. These devices can communicate with one another directly or indirectly, as well as collect data locally or remotely using centralized servers or cloud-based apps. These devices can collect data using various sensors such as temperature, humidity, light, and so on, or they can act on data using actuators such as relays.

It's a global network that uses internet protocols to connect computers, sensors, and actuators. Consider the diagram below, in which a computer uses the internet to connect with a sensor-equipped device. The TCP/IP protocol is used as the internet protocol in such situations.

### 1.2.1 APPLICATIONS FOR THE INTERNET OF THINGS:

- Web application and mobile app enabled wireless and internet linked lights
- Smart lighting by altering ambient circumstances based switching
- Management and control of smart equipment
- Home entertainment management includes things like video, audio, and projectors.

## 1.3 PROBLEM STATEMENT

**Prioritizing Family Safety:** The first thought that springs to mind when it comes to personal and family protection and security. Our home and family require fireproofing. Using a home security system means taking extreme measures to protect our house and family from invaders.

**Advantage of remote monitoring:** While we are away on a long holiday vacation, our piece of mind is critical in terms of house safety and security. Automation combined with live monitoring technologies might alleviate all of our concerns, regardless of where we are in the world. The technique may make it simple to see who enters our home.

**Trying Smart Home Automation for the First Time**: Technology is evolving with solutions in human existence, with security being the world's top concern. Why not take use of this chance, given how good technology enriches our lives? By promoting home automation through the system, we are preserving your taste for real life on this planet.

## 1.4 VISION

- To establish an intelligent smart home environment, we built the following three systems.
- To detect the over temperature, harmful gas leakage and fire.
- Do appropriate action like water sprinkler, gas remover exhaust fan, heating system etc.
- Develop the security system for door lock system using finger print module.
- To monitoring and controlling the home environment using internet at remote area.

## 1.5 OBJECTIVES

The details objective of this project are given below:

- To detect the temperature, harmful gas leakage and fire and do appropriate action like cooling or heating system, exhaust fan, water sprinkler etc.
- To develop the security system for door lock system using fingerprint module/sensor.
- To monitor and control one's owned home from a distant through internet.

## 1.6 REPORT OUTLINE

Six chapters have been covered in the design and construction of this project. The Chapters and their material are as follows:

- **Chapter 1** (Introduction): This chapter providing the outline, motivation and purpose of the project.
- **Chapter 2** (Literature Review): This chapter explored previous work or study related to this project.
- **Chapter 3** (System Design): The components of this project has been addressed in detail in this chapter.
- **Chapter 4** (Design Methodology): This section covers experimental setup of this project.
- **Chapter 5** (Implementation and Results): Discuss the execution of the project and the performance of the project.
- **Chapter 6** (Conclusion): The overview of this project is explored in more depth in this Chapter. The advantage of the project, the benefit and the possible future work of the project are addressed.

# CHAPTER 02

# LITERATURE REVIEW

## 2.1 RELATED WORKS

ECHO IV and the Kitchen Computer were among the first smart devices designed in the late 1960s, albeit they were not commercially viable. Shopping lists could be made, home temperatures could be adjusted, and appliances could be turned on or off, and the Kitchen Computer, which came out a year later, could even save recipes. GERONTECHNOLOGY was founded in 1991 as a combination of gerontology and technology to improve the lives of elderly people. With the advancement of technology and services, a monitoring system based on a Short Message Service (SMS) was developed to remotely monitor the long-term m levels of elderly people in their natural environments. Each observed individual wears an accelerometer-based portable gadget to measure their mobility. Yen-Shin Lai created an Internet-based monitoring and management of a fuzzy regulated inverter for air conditioning systems in 2002. Client/server, programmable logic controll modules, inverters, induction motors, and temperature sensing modules make up the system. Using Internet Explorer (IE) Brows, the client accepts the co from the user and can also access the database created by the server. The server performs functions such as fuzzy logic control, communication interface between the server and the Program Logic Controller (PLC), and receiving commands from the client. The server also creates a summary of the detected temperature, speed of inverter-controlled motor drives, and reference command. In 2004, Alheraish created a home security system with a GSM cellular communication network, an 89X52 CPU, and a Sony Ericsson GM-47 GSM module. Users can monitor the status of their front door, set a password for their key base lock, and control their home lighting system by SMS with this system. In 2004, Al-Ali and Al-Rousan developed World Wid (WWWW), a Java-based home automation system. A PC-based server attached to an embedded system board controlled the domestic appliances. Vendors can add appliances to the system without having to make major changes to the core. Password protection prevents unauthorized people from accessing household appliances. If the Internet connection is down or unavailable, the embedded system board may still control and run the appliances locally.

Al-Ali (20.) An Analog Devices ADuC812S microcontroller, a Falcon A2D-1 GSM modem, and a battery-powered power source are included in the portable machine in (Cliodhna, 2006). The portable device is coupled to two integrated acceleromes through the microcontroller's analog inputs. The mobility level summa is delivered hourly as an SMS message from the portable device to a remote server for further analysis. Each subject's mobility levels are monitored using custom-designed mobility alert software, and required medical personnel are contacted through SMS anytime the individual's mobility levels deteriorate.

A method for early detection of hypertension and other chronic disorders has been proposed by researchers (Jiang, 2008). The three main components of the proposed design are a wrist Blood Pressure (BP) measurement unit, a server unit, and a terminal unit. Sensor data is gathered and processed by a DSP microcontroller to determine blood pressure. The data is then communicated by SMS to a remote server unit at Community Healthcare Centers/Points (CHC/P), with notification information supplied to the terminal unit to alert users if the patient's blood pressure is abnormal. Chen Peijiang and Jiang Xuehua suggested a method in 2008, detailing a GSM SMS-based remote monitoring system. The monitoring center and the remote monitoring station are both part of the system. A technique for detecting hypertension and other chronic diseases early has been proposed by (Jiang, 2008). A wrist Blood Pressure (BP) measurement unit, a server unit, and a terminal unit are the three primary components of the suggested design.

A technique for detecting hypertension and other chronic diseases early has been proposed by (Jiang, 2008). A wrist Blood Pressure (BP) measurement unit, a server unit, and a display unit make up the suggested design. Blood pressure is measured using data collected by sensors and processed by a microprocessor. The data is then delivered via SMS to a remote server unit at Community He Centers/Points (CHC/P), along with notification information to alert users if the patient's blood pressure is abnormal. Chen Peijiang and Jiang Xuehua presented a paper in 2008 detailing a GSM SMS-based remote monitoring system. The remote monitoring station and the monitoring center are both included. (Jianshe, 2012) proposed a home automation system based on Wireless Sensor Networks (WSNs) and General Packet Radio Service (GPR) that allowed users to manage home equipment and collect data on device status and weather conditions from their mobile devices.

## 2.2 SCOPE OF THE SYSTEM

Scope of this project is to help the home security and home safety of our living life.

Scope of this system are given below:

- Easy to detect the fire, harmful gas, gas leakage, temperature controller.
- Easy to correct action when make a accident like fire extinguisher (water), exhaust fan, room heating etc.
- Unknown person detects and cannot entry the home.
- Real time monitoring at any place.
- Real time load management and controlling.

## 2.3 LIMITATION

- The internet connection is always active, otherwise, the server and hardware information are properly data communication cannot connect properly.
- In this system we represent a demo system for home application, so we use one sensors are used here, but more sensors need to be used at home using the sensor array.
- This system need always power connection, if power losses the system cannot run and work.
- The sensor's performance is not properly professional, so in the future, we used professional sensor for better service.

## 2.4 COMPARATIVE STUDY

| Comparison | Related Project | Proposed System |
|---|---|---|
| **Security System** | No Smart Security System | Used finger snap security system. |
| **Sensor Assembly** | Specific Some Sensor | Multi Sensor application |
| **Health Support Facility** | Available | No Available |
| **Monitoring System** | Physical monitor | Physical and Server based Monitoring |
| **Wireless Communication** | Bluetooth Module | Wi-Fi Module |
| **Cloud System** | Not using cloud system (Short Range) | Using Cloud System (Long Range) |

# CHAPTER 03

# SYSTEM DESIGN

## 3.1 INTRODUCTION

In this chapter, we discuss hardware. This document describes the theoretical information of this project. All functional components of this project are described in great detail. This document can help us quickly understand all device interface specifications. This project consists of an Arduino Nano, Gas Sensor, Temperature Sensor, Flame Sensor, Finger print module, Wi-Fi module, power adapter, relay. All the details of this equipment are discussed below.

## 3.2 ARDUINO NANO

Using open-source hardware and open-source software, Arduino manufactures and markets single-board microcontrollers and microcontroller kits. Arduino boards and software are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL) (GPL). Commercially available Arduino boards come in both pre-assembled and DIY kit form. There are several microprocessors and controllers on Arduino boards. The boards may be linked to expansion boards, breadboards (shields), and other equipment through digital and analog I/O ports. The boards include serial ports that may be used to load software from a personal computer. Microcontrollers support the programming languages C and C++. The Arduino project has a Processing-based IDE in addition to the normal compiler toolchains. This initiative, which was started in 2005 by students at Italy's Interaction Develop Institute (IDI), provides sensors, actuators, and other components for people of all skill levels to develop interactive devices. Beginner-friendly technology includes things like robots, thermostats, and motion sensors.

**Power & Memory**

Using an unregulated 6-20V power source (pin 30), an external 5V power supply (regulated), or an Arduino Mini-B USB connection, you can power an Arduino Nano board (pin 27). When choosing a power source, the densest sources of voltage are taken into consideration.

The internal memory of the ATmega328 is 32 kilobytes (plus 2 KB for the bootloader).

The EEPROM and SRAM of the ATmega328 each have a 1 kilobyte capacity (kb).

### 3.2.1 INPUT AND OUTPUT

A digital input or output may be made available on each of the Nano's 14 pins by using pinMode(), digital Write(), and digital Read() functions. A 5 volt battery is used to power these gadgets, and that's all. Inbuilt pull-up resistors on each pin allow it to deliver or receive current of up to 40 mA. A wide range of pins with particular functionalities are also available, including:

- There is a 1 (TX) and a 0 (RX) for TX and RX (TX). TTL serial data may be sent and received with this device. The relevant pins on the FTDI USB-to-TTL Serial chip are linked to these.
- Two and three interruptions from external sources. These pins may be used to produce programmable interrupts by setting them to low or high values, or to rising or falling edges, depending on the pin value. For further information, see the attach Interrupt() method.
- There are a total of eleven PWM outputs. There are 11 PWM outputs in all. When you use the analogWrite() method, you may produce an 8-bit PWM output.
- MOSI (MOSI) is the first of the four SPIs (SS, MISO, and 13) that make up the SPI (SCK). There are two SPI pins on the Arduino that may be used for SPI communication, however the Arduino language does not currently support this feature.
- There are 13 LEDs in total in this design. A cable connects digital pin 13 to a built-in LED. The LED is turned on when the pin is HIGH; when it is LOW, the LED is turned off. [8]

The Nano has eight analog inputs, each with a ten-bit resolution (i.e., 1024 different values). The analog Reference () function may be altered to vary the measurement range from 0 volts to 5 volts. There is no method to utilize digital pins 6 and 7 as analog pins in any manner whatsoever

- Pins A4 and A5 are used to interact with SDA and I2C. (SCL). With the Wire library, a TWI connection may be made (documentation on the Wiring website).

Additional pins may be found on the circuit board in the following locations:

- The analog inputs utilize this voltage as a reference, and it is referred to as AREF. In relation to analog sources of information ().
- In other words, start again. In order to reset the microcontroller, this line must be set to LOW. Reset buttons are often tacked on to shields that block the reset button as an afterthought.

### 3.2.2 COMMUNICATION

This board can connect an Arduino Nano to a computer or another microcontroller. Digital pins 0 (RX) and 1 (TX) may be used to connect the ATmega328 to a UART TTL (5V) serial connection (TX). FTDI drivers use an FTDI FT232RL to send USB serial communication to the PC in the Arduino application. In the Arduino software, there is a serial monitor that may be used to transmit and receive basic text data. When data is sent to the PC through the FTDI chip and USB connection, the board's RX and TX LEDs will light up (but not for serial communication on pins 0 and 1). It is possible to serially transmit all of the Nano's digital pins using a Software Serial library. I2C (TWI) and SPI communication are supported by the ATmega328. The I2C bus may be simply connected to the Arduino using the Wire library. Details on SPI are available in the ATmega328 datasheet.

PROGRAMMING

The Arduino Nano may be programmed using the Arduino software (download). Select "Arduino Duemilanove or Nano with ATmega328" from the Tools > Board menu (according to the microcontroller on your board). The preburned bootloader on the Arduino Nano's ATmega328 allows new code to be uploaded without the need of a hardware programmer. To exchange information, the STK500 protocol is used.. If you don't want to use the loader, you may program the microcontroller directly via the ICSP connection (In-Circuit Serial Programming).

**AUTOMATIC (SOFTWARE) RESET**

Prior to uploading, the Arduino Nano (shown in **Fig. 3.1**) may be reset using software running on a connected computer. The reset pin of the Atmega328 is connected to the hardware flow control line of the FT232RL via a 100 nanofarad capacitor (DTR). When the reset line is asserted, the reset line drops long enough to reset the chip (taken low). Uploading code is a feature of the Arduino platform that is used by the software. The bootloader's timeout may be decreased due to the fall in DTR occurring just before upload begins. [8] There are further implications to this set-up. Whenever a new software connection is attempted after the Nano has been linked to a Mac or Linux computer, it resets (via USB). As long as the Nano's bootloader is active, it will remain there. It intercepts data transmitted to the board as soon as a connection is established (i.e. anything other than a new code upload). Waiting a second before delivering data to a sketch on the board after it receives configuration or other data is critical. **Table 3.1** shows the Arduino Nano Specification, whereas **Fig. 3.1** depicts the board's components.

Fig. 3.1 Arduino Nano

Table 3.1: Arduino Specification

| | |
|---|---|
| Microcontroller | ATmega328 |
| Architecture | AVR |
| Operating Voltage | 5 V |
| Flash Memory | 32 KB of which 2 KB used by bootloader |
| SRAM | 2 KB |
| Clock Speed | 16 MHz |
| Analog IN Pins | 8 |
| EEPROM | 1 KB |
| DC Current per I/O Pins | 40 mA (I/O Pins) |
| Input Voltage | 7-12 V |
| Digital I/O Pins | 22 (6 of which are PWM) |

## 3.3 POWER ADAPTER

We'll need two power adapters to operate our project: a 12v 1A power adapter and a 5V 2A power adapter. We use a 5V 2A power adapter to connect with the Arduino and a 12V 1A power adapter to connect with the GSM module. The hardware overview of the power supply is given in **Fig. 3.2** which has a 220 volt AC input and a 05 volt DC 02 amp output voltage.

Fig. 3.2 Power adapter

An electrical device that provides a load with power is known as a power supply. It is the primary function of a power supply to convert incoming electrical current into the voltage, current, and frequency needed to drive a load. This is the reason for the existence of electricity generators and electric motors/power converters. In some cases, power supplies are connected directly to the load appliances they are meant to power, while in others, the power supply is integrated within the appliance itself. “Consumer electronics like desktop computers and other laptops often use this kind of power supply. For example, power supplies may limit the current load resistance to normal limits; they may also shut off the current if there is a power fault; they may exercise to prevent electronic noise from reaching the load; and they may store energy so that even if the source power fails (an uninterruptible power supply) they can still keep the load powered (uninterruptible power supply). [14] An output connection sends electricity to the load from the power supply, whereas a source receives energy. If you're looking for a power source, you may use anything from batteries to fuel cells to generators to alternators to solar power converters. Hardwired circuit connections aren't necessary for every power supply, although the majority of them do. For example, some power supplies provide additional inputs and outputs that may be used for external monitoring and control reasons.

## 3.4 LIQUID-CRYSTAL DISPLAY

Flat-panel displays and other electronically modified optical devices, such as LCDs, employ liquid crystals and polarizers to control the light they output. A reflector or backlight is necessary for the generation of color or monochrome images using liquid crystals. Random visuals or preprogrammed text, numbers, and seven-segment displays (such as a digital clock) may be shown or hidden by LCDs (such as a general-purpose computer display). When it comes to screens, some utilize bigger components while others utilise a grid of small pixels to produce random pictures. LCDs may be switched on or off based on the polarizer setup (negative). Instead of showing white text against a black background, character negative LCDs display white text against a black background that matches the backlight color. Hardware specifications for a 16x2 LCD are shown in **Fig. 3.3**. A total of 32 digits may be shown at a time on this LCD.

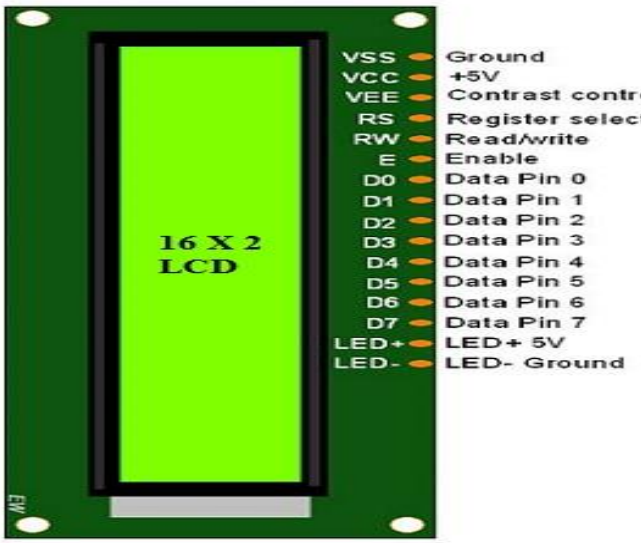



Fig. 3.3 LCD Display

These electronic gadgets include LCD displays that can be found in LCD displays in LCD displays that can be found both inside and outdoors. Digital cameras, calculators, and mobile phones, for example, all feature tiny LCD screens. LCD screens may be found in video gaming consoles, DVD players, and alarm clocks. Displays using liquid crystal displays (LCDs) have mostly replaced monitors using cathode ray tubes (CRTs). CRT and plasma displays may be found in various sizes, from tiny digital watches to large television sets. For a given display size, OLEDs have a lower load and thinner profile than LCDs, and probably lower power consumption, thanks to the use of a single glass or plastic panel instead of two separate glass panels, which rises in thickness with screen size and is more

evident on LCDs (as the display is only "on" where needed and there is no backlight). OLEDs are more expensive due of the necessity for phosphors, which are high-priced EL materials for a particular display size. Recycling technology for OLED displays isn't readily accessible now, although LCDs can be recycled. Phosphors, which are used in OLEDs and other optoelectronic devices, have the potential to induce screen burn-in. LCDs' lifespans have been extended with the development of quantum dot displays.

**Specifications**

- Achieving a result Since the bulk of each pixel is made up of red, green, and blue subpixels, we may use a pixel count of 1024768 to estimate LCD resolution. Few things stayed consistent among LCD screens. To increase the apparent resolution of a display without increasing the actual resolution, Quattron employs sub-pixel sharing between pixels.
- At close range, the resolution of a computer monitor or other display may be described using terms such as "dot pitch" or "pixels per inch." The display density is modest for long-distance viewing on TVs, but excellent for close-range detail on mobile devices. LCD viewing angles may be critical depending on the display and intended use, however certain display technologies only work effectively at specified viewing angles.
- Displaying data at a rate of several times per second is an important consideration when evaluating an LCD display's capacity to properly and swiftly transmit visual changes. Because LCD pixels do not flash between frames, there is no refresh-induced flicker with LCD screens. When the refresh rate is reduced, fast-moving pictures may seem smeared or ghosted. A fast-changing projected image may cause visual abnormalities on any display because of the inherent latency that displays have while delivering an image. The reaction time of each individual pixel is of considerable concern.
- It is possible to characterize the display's color performance in a variety of various ways. It's unfortunate that marketing brochures don't feature color gamut unless they're used by specialists, since it's a measure of how finely the spectrum may be split. Color depth, on the other hand, refers to the available range of hues. Displays are only designed to work within or below a predetermined standard since having a color range that surpasses the information on the screen has no value. White point

correction and gamma correction are two of these extra qualities that help define what color white is and how it compares to other colors. [15]

- It's the difference between a on pixel's brightness and the brightness of an off-pixel's brightness that determines a photo's contrast ratio. To provide lighting, the LCD uses a light valve; the backlight, which may be fluorescent or LEDs, does not. There are several factors that affect how bright an LCD screen may be, including the LCD's transparency and the brightness of its backlight. A longer battery life comes at the cost of increased brightness.

## 3.5 RELAY

Electricity to control a relay, which is a switch of a different sort. There are solid-state relays and other operating principles that can be employed to activate switches in numerous relays, but electromagnetism is the most common. To regulate low-power circuits, relays may be utilized, provided that both systems are electrically separated. A single signal may be used to operate many circuits. Long-distance telegraph networks used early relays as amplifiers, retransmitting signals between them. Early computers and telephone exchanges relied heavily on relays for logic operations for many years. You'll need a contactor or relay capable of handling high power in order to directly operate an electric motor or other load. Instead of using mechanical components, solid-state relays handle power using semiconductor chips. Even if digital devices like "protection relays" are still widely utilized in the modern world, more complex devices like "relays with calibrated operating characteristics and numerous operational coils" are becoming more commonplace. A diagram of the 05-pin relay is shown in **Fig. 3.4.**

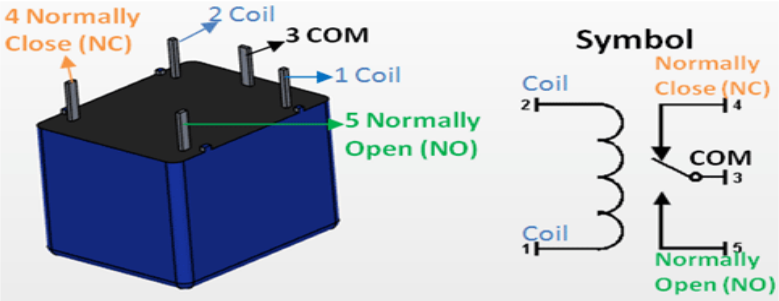



Fig. 3.4 Relay

### 3.5.1 RELAY SWITCH CIRCUIT

Electromechanical devices are those in which an electromagnet affects the condition of two moving contacts. Examples include providing high-power AC circuits or heating elements while using just a small amount of electrical energy to operate the relay coil. Electromechanical relays are output devices (actuators) in electrical circuits that may perform a wide range of tasks. To pick from a variety of shapes and sizes. This circuit may be used in low-power electrical and computer devices to switch huge currents or voltages from ON to OFF. When working on tiny electrical projects, transistors and MOSFETs are often utilized as the principal switching devices because of their ability to rapidly switch DC (ON-OFF) control of the relay coil. You may switch relays in a variety of methods.

### 3.5.2 NPN RELAY SWITCH CIRCUIT

In the illustration, an NPN transistor switch, TR1, is used as a standard relay switch. When a transistor's base voltage is 0, an open switch may be generated (or negative). If the Base does not have any current flowing through it, no current can move via a relay coil. [18] If the NPN transistor is saturated by a large enough positive current, the flow of current from Base to Emitter (B to E) governs the larger relay coil current. Saturation is accomplished in most bipolar switching transistors by feeding a relay coil current into the collector that is 50-800 times greater than the base current required. The BC109's beta value () is now approximately 290 at 2mA. (Datasheet). **Fig. 3.5** shows the relay-based NPN transistor switching circuit.

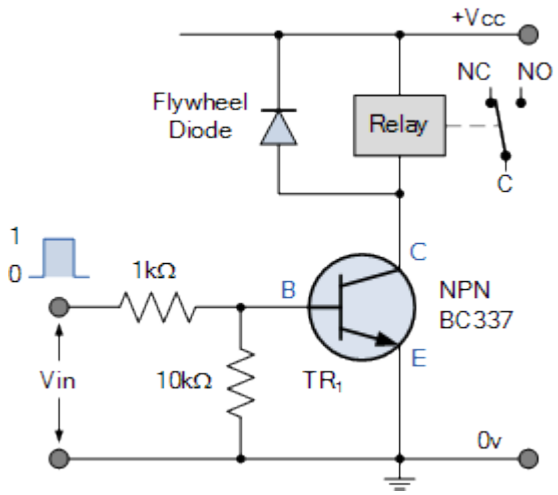



**Fig. 3.5** NPN Relay Switching Circuit

The relay coil is both an electromagnet and an inductor, so it's important to keep that in mind. When the transistor switches power to the coil, the coil's DC resistance causes the largest amount of current to flow, as indicated by Ohms Law (I = V/R). The relay coil's magnetic field preserves some of this energy. The relay coil's current is lowered and the magnetic field is lessened as a consequence of shutting off the transistor. In order to keep the relay coil current flowing, the magnetic field's stored energy must be released, therefore a reverse voltage rises across the coil. For example, a long amount of time allowing the voltage to build up might destroy the switching NPN transistor as a result.

## 3.6 FLAME SENSOR MODULE

Flame detector is a sensor designed to detect and respond to the presence of a flame or fire, allowing flame detection. Responses to a detected flame depend on the installation, but can include sounding an alarm, deactivating a fuel line (such as a propane or a natural gas line), and activating a fire suppression system. A flame detector can often respond faster and more accurately than a smoke or heat detector due to the mechanisms it uses to detect the flame. This IR sensor is integrated with the ESP8266 via D0 pin. The IR sensor will send a binary 0 or 1 only when the fire is detected, to the ESP8266.

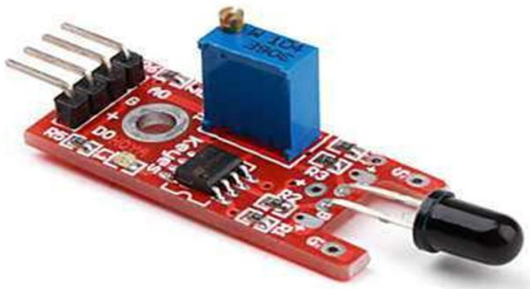


Fig 3.6: Flame sensor

### 3.6.1 SPECIFICATIONS FOR FLAME SENSORS

- Detects a flame or a light source with a wavelength between 760nm and 1100nm.
- 20cm (4.8V) Detection distance: 100cm (1V)
- It has a detection angle of around 60 degrees and is flame spectrum sensitive.
- Module readings are stable thanks to the LM393 comparator chip.
- The detecting range can be adjusted.

- 3.3V-5V operating voltage
- Analog and Digital Output
- "AO analog voltage output "DO digital switch outputs (0 and 1)
- Digital switch output indication with power indicator [9]

### 3.6.2 SPECIFICATIONS FOR FLAME SENSOR INTERFACE

1) 3.3V-5V voltage (VCC)

2) GND

3) DO — digital output interface on the board (0 and 1)

4) AO (analog output interface on a board) [9]

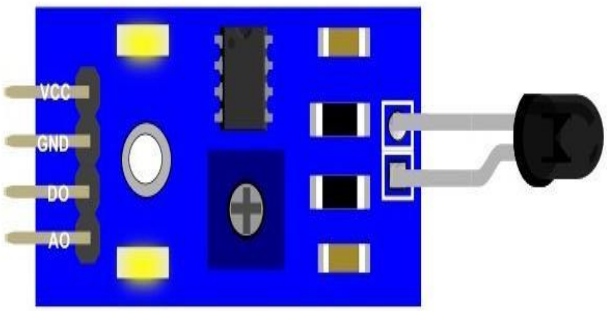



Fig 3.7: Schematic Layout of Flame sensor

### 3.6.3 FLAME SENSOR ELECTRICAL MEASURES

The YG1006 NPN phototransistor sensor and the LM 393 comparator chip are among the components in the flame sensor module that we used in our project. Typically, the sensor functions at a voltage range of (3.3V - 5V). The YG1006 sensor is an infrared-sensitive NPN silicon phototransistor with a high speed and sensitivity.

At 25°C, the absolute maximum measurements are as follows:

Table 3.2: The electro-optical characteristics of YG 1006 sensor

| Parameter | Symbol | Rating | Units |
|---|---|---|---|
| Collector-Emitter-Voltage | Vceo | 30 | V |
| Emitter-Collector-Voltage | Veco | 5 | V |
| Collector Current | IC | 20 | mA |
| Operating Temperature | Topr | -25` to +85` c | `C |
| Storage Temperature | Tstg | -40` to + 85` c | `C |
| Lead Soldering Temperature | Tsol | 260 | `C |

The LM 393 comparator chip is another important part of the flame sensor module. The LM393 series is a pair of independent precision voltage comparators that can operate on a single or split supply. These devices are intended to provide a common mode range–to–ground level operation with a single supply. With input offset voltage parameters as low as 2.0 mV, this device is ideal for a wide range of consumer and industrial electronics applications.

• Inclusive Single–Supply Range: 2.0 Vdc to 36 Vdc

• Split–Supply Range: ±1.0 Vdc to ±18 Vdc

• Very Low Current Drain Self-determining of Supply Voltage: 0.4 mA

• Low Input Bias Current: 25 nA

• Low Input Offset Current: 5.0 nA

• Low Input Offset Voltage: 2.0 mV (max) LM393A 5.0 mV (max) LM293/393
Input Common Mode Range to Ground Level

• Differential Input Voltage Range Equal to Power Supply Voltage

## 3.7 MQ2 GAS SENSOR

The MQ2 sensor series includes a small heater as well as an electrochemical sensor. At room temperature, they react with a variety of gases. As the output of each sensor, an analog signal can be read with an analog input of the Arduino. The whole system's principal goal is to identify dangerous gas and radiation leaks. If poisonous gases or radiation are prevalent in industrial regions, the gases or radiation are mostly affected by the industries and the people who live nearby. Continuous inhaling of some gases causes human death, and the environment is damaged by this gas or radiation. If the gases remain odorless, people will be exposed to them for an extended period of time, perhaps causing major health problems. CO (carbon monoxide) is an odorless gas that causes confusion and fainting at concentrations greater than 350 parts per million (ppm) and will almost surely kill a person at higher levels. Because each gas has its own physical and chemical properties, evaluating them without specialized equipment is impossible. Toxic gases exist at various levels depending on their concentration and density. Gas sensor that works Each gas molecule absorbs distinct wavelengths of IR light. Wavelengths were used to identify gases. working radiation detector Every minute, it tallies the number of counts detected by the Geiger tube.

The temperature sensor measures the current temperature and transmits the information to the Ardunio Uno R3 board. The Ardunio board microcontroller is already set up to work with gas and radiation monitoring levels. If the sensor value level is high, the nearest fire station is notified, with the goal of saving businesses and people's lives. The device's LCD display displays any leakage time indicator display that occurs. The data transmission rate of the Wi-Fi module is very high. Compared to the signature module.

Table 3.3: MQ2 Gas Sensor Pin Configuration

| **Pin No:** | **Pin Name:** | **Description** |
|---|---|---|
| **For Module** | | |
| 1 | Vcc | This pin powers the module, typically the operating voltage is +5V |
| 2 | Ground | Used to connect the module to system ground |
| 3 | Digital Out | You can also use this sensor to get digital output from this pin, by setting a<br>threshold value using the |
| 4 | Analog Out | This pin outputs 0-5V analog voltage based on the intensity of the gas |
| **MQ2 Gas Sensor Pin Description** | | |
| | H -Pins | Out of the two H pins, one pin is connected to supply and the other to ground |
| | A-Pins | The A pins and B pins are interchangeable. These pins will be tied to the Supply voltage. |
| | B-Pins | The A pins and B pins are interchangeable. One pin will act as output while the other will be pulled to ground. |

Fig 3.8: Gas Sensor Module

### 3.7.1 MQ 2 GAS SENSOR FEATURES

- Operating Voltage is +5V, Analog output voltage: 0V to 5V
- Can be used to Measure or detect LPG, Alcohol, Propane, Hydrogen, CO and even methane
- Digital Output Voltage: 0V or 5V (TTL Logic)
- Preheat duration 20 seconds, Can be used as a Digital or analog sensor, The Sensitivity of Digital pin can be varied using the potentiometer

### 3.7.2 SCHEMATIC DIAGRAM OF MQ2 GAS SENSOR

Measuring the PPM is the way to go if we want to be more precise with our readings. It can also help us differentiate between different gases. As a result, we can utilize a module to directly measure PPM. The basic wiring for the sensor is shown below, derived from the datasheet. The procedure for measuring PPM with a MQ sensor is the same, however there are a few constant values that vary based on the MQ sensor type.

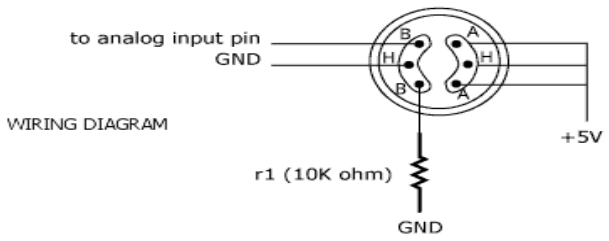



Fig 3.9: The schematic diagram of MQ 2 Gas Sensor

## 3.8 WI-FI MODULE (ESP8266)

It is possible to host the ESP8266's Wi-Fi networking operations on an application processor or offload them. If the ESP8266 is the sole processor in the device, it may be booted from flash memory. The self-contained ESP8266 Wi-Fi Module, which has an integrated TCP/IP protocol stack, may be used to connect any microcontroller to a Wi-Fi network. Any processing unit other than the ESP8266 may take over control of all Wi-Fi networking capabilities. One of the most popular low-cost boards with a rapidly expanding ecosystem is the ESP8266. The development and stress on the module may be decreased by utilizing sensors or other application-specific devices with the GPIOs of this module. In order to reduce the amount of external circuitry required, on-chip integration of the front-end module is used. **Fig. 3.9** shows the ESP8266 Wi-Fi module.

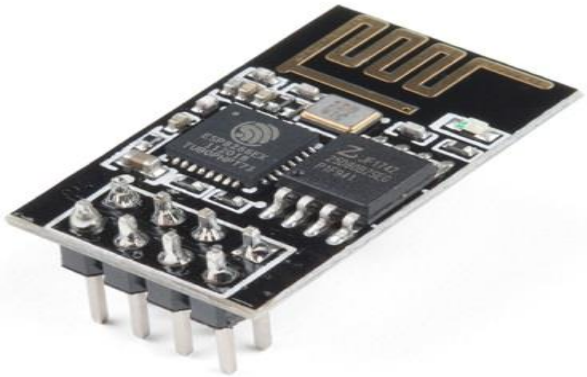


Fig. 3.10 Wi-Fi Module (ESP8266)

### 3.8.1 WI-FI MODULE (ESP8266) PIN CONFIGURATION

The ESP-8266 Wi-Fi Module Pin configuration and pin diagram operating method are presented in **Table 3.4,** as well as the alternative function of pin configuration.

**Table 3.4**: Wi-Fi Module (ESP 8266) Pin Configuration

| Pin Number | Pin Name | Normally used for | Alternate purpose |
|---|---|---|---|
| 1 | Ground | Connected to the ground of the circuit. | |
| 2 | TX | Connected to Rx pin of programmer to upload program. | Can act as a General-purpose Input/output pin when not used as TX. |
| 3 | GPIO-2 | General purpose Input/output pin. | |
| 4 | CH_EN | Chip Enable – Active high | |
| 5 | GPIO-0 | General purpose Input/output pin. | Takes module into serial programming when held low during start up |
| 6 | Reset | Resets the module. | |
| 7 | RX | General purpose Input/output pin. | Can act as a General-purpose Input/output pin when not used as RX [13] |
| 8 | VCC | Connect to +3.3V only | |

### 3.8.2 WI-FI MODULE (ESP8266) FEATURES

Wi-Fi Module that is low-cost, small, and powerful

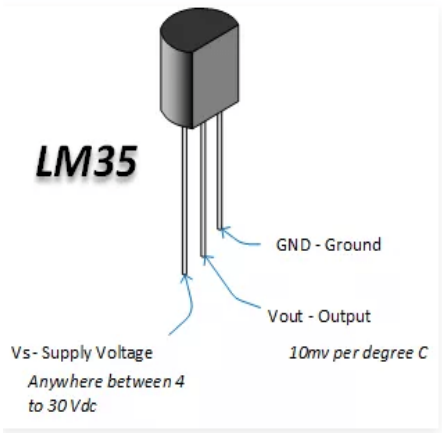
- Input/Output Voltage: 3.6V (max)
- Input/Output Voltage: 3.6V (max)
- Input/Output Source Current: 12mA
- Power Supply: - (+3.3V)
- Input/Output Voltage: 3.6V (max)
- Aids in deep sleep (10uA)

## 3.9 Temperature Sensor LM 35

The LM35 series are precision integrated-circuit temperature devices with an output voltage linearly-proportional to the Centigrade temperature. The LM35 device has an advantage over linear temperature sensors calibrated in Kelvin, as the user is not required to subtract a large constant voltage from the output to obtain convenient Centigrade scaling. The LM35 device does not require any external calibration or trimming to provide typical accuracies of ±¼°C at room temperature and ±¾°C over a full −55°C to 150°C temperature range. Lower cost is assured by trimming and calibration at the wafer level. The low-output impedance, linear output, and precise inherent calibration of the LM35 device makes interfacing to readout or control circuitry especially easy. The device is used with single power supplies, or with plus and minus supplies. As the LM35 device draws only 60 µA from the supply, it has very low self-heating of less than 0.1°C in still air.

### 3.9.1 FEATURES

- Calibrated Directly in Celsius (Centigrade)
- Linear + 10-mV/°C Scale Factor
- 0.5°C Ensured Accuracy (at 25°C)
- Rated for Full −55°C to 150°C Range
- Suitable for Remote Applications
- Low-Cost Due to Wafer-Level Trimming
- Operates From 4 V to 30 V
- Less Than 60-µA Current Drain
- Low Self-Heating, 0.08°C in Still Air
- Non-Linearity Only ±¼°C Typical
- Low-Impedance Output, 0.1 Ω for 1-mA Load




## 3.10. FINGERPRINT MODULE

Biometric identification based on an impression of the ridges in the skin of a finger is regularly used as evidence in criminal investigations. This optical biometric fingerprint reader/sensor (R305) module has a TTL UART interface enabling direct connections to a microcontroller UART.

### 3.10.1 HOW DOES A FINGERPRINT SENSOR WORK

An optical scanner uses a strong light to capture a digital image of your fingerprint. A light-sensitive microchip scans the ridges and valleys of the fingerprint, transforms them to 1s and 0s, and generates the user's unique code to create the digital image.

Fig. 3.11: Fingerprint module

## 3.11 COST OF THE COMPONENTS

The below table 3.5 of Cost of these project equipment's are given below:

Table 3.5: Cost of the Components

| SL. No | Components Name | Quantity | Unit Price (BDT) | Total Price(BDT) |
|---|---|---|---|---|
| **01** | Arduino Nano | 02 | 350 | 700/- |
| **02** | LCD Display | 02 | 300 | 600/- |
| **03** | Power Supply | 02 | 250 | 500/- |
| **04** | Temperature Sensor | 01 | 70/- | 70/- |
| **05** | Flame Sensor | 01 | 110/- | 110/- |
| **06** | Gas Sensor | 01 | 80/- | 80/- |
| **07** | Pump Motor | 01 | 140/- | 140/- |
| **08** | Wi-Fi Module | 01 | 295/- | 295/- |
| **09** | Panel Indicator | 06 | 30/- | 180/- |
| **10** | Relay Circuit | 03 | 40 | 120/- |
| **11** | Switch | | | 20/- |
| **12** | PVC Board | 01 | 400 | 400/- |
| **14** | Others | | | 1000/- |
| | **Total** | | | **4215/-** |

# CAHPTER 04

# DESIGN METHODOLOGY

## 4.1 INTRODUCTION

This chapter contains the methodology of our project. The project block diagram and flow chart, the step by step working process of our project is shown through the block diagram and flow chart. The project circuit diagram are shown clearly in below Figures. The circuit diagram shows how the components of the project are connected to the circuit diagram.

## 4.2 BLOCK DIAGRAM

The below fig. 4.1 show the whole system block diagram, which are included the controlling device, controlling device to input output configuration etc.

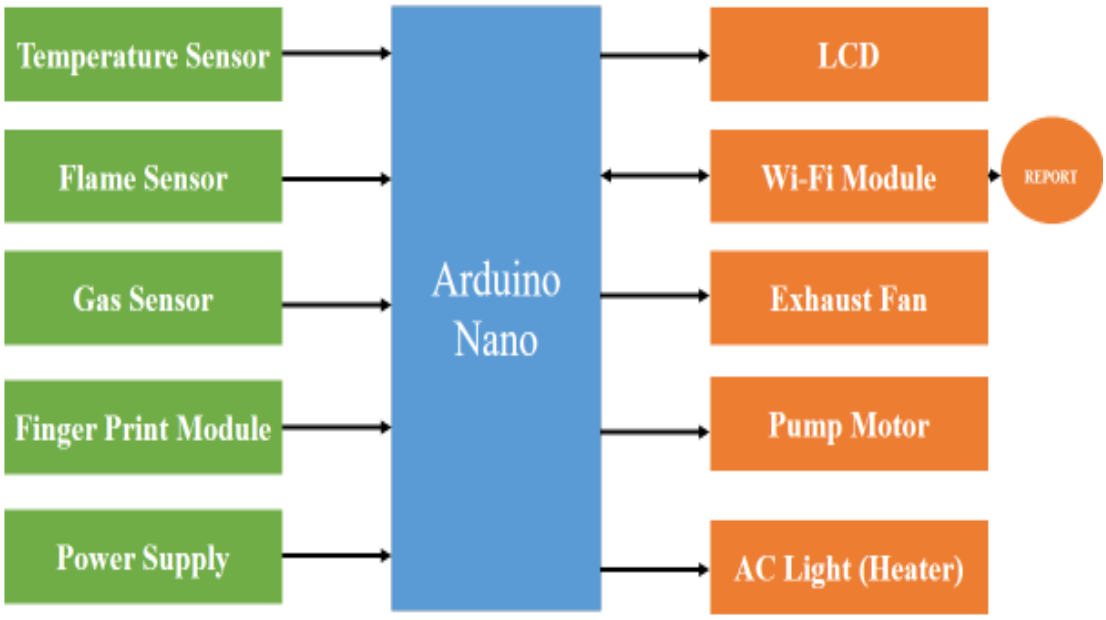



Fig. 4.1: System Block Diagram

## 4.3 SDLC MODEL

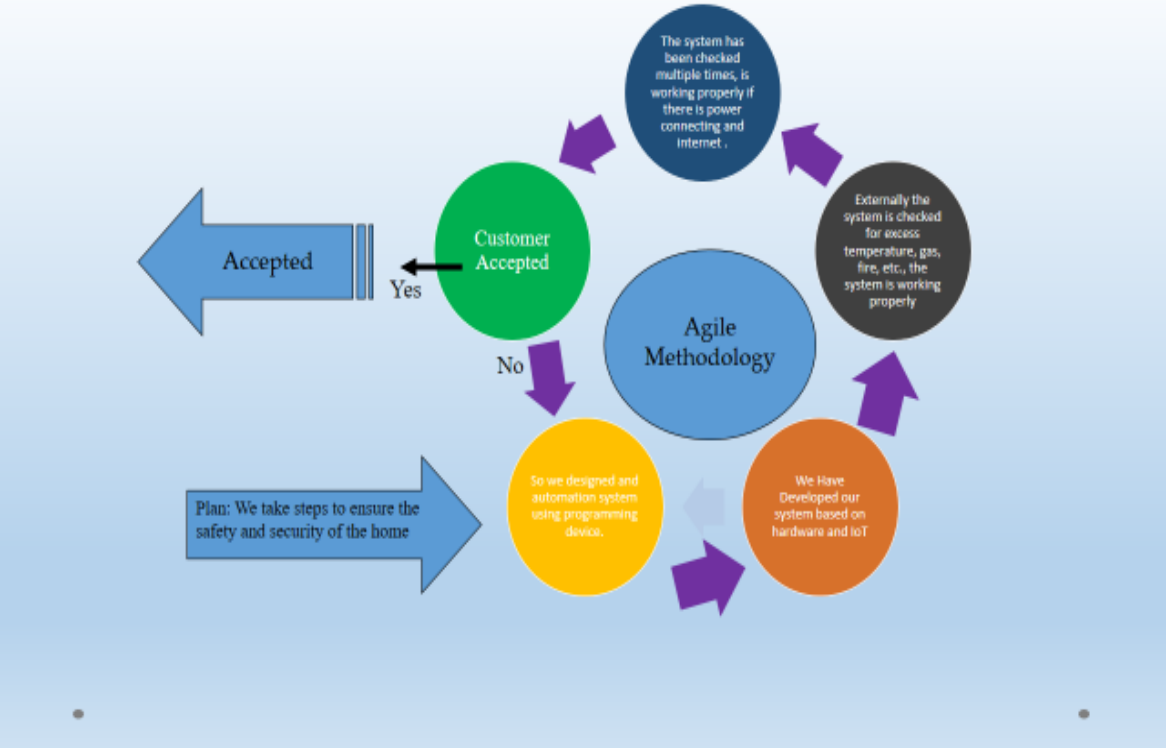



Fig 4.2: Agile Methodology

## 4.4 FLOW CHART

The below fig. 4.3 show the whole system flow chart, which are included whole system working process, work done to step by step, checkup the condition of sensor etc. We see that 1st columns represent the home security purpose, like check the authority finger, if the finger match, this person allow to entry the home, the door open. 2st columns are represent the all sensor activates, those sensor check the preset value of programming, the arduino nano check the real time value and do the actual action. 3st columns are show server based data communication, if internet are available, the data communication are properly.

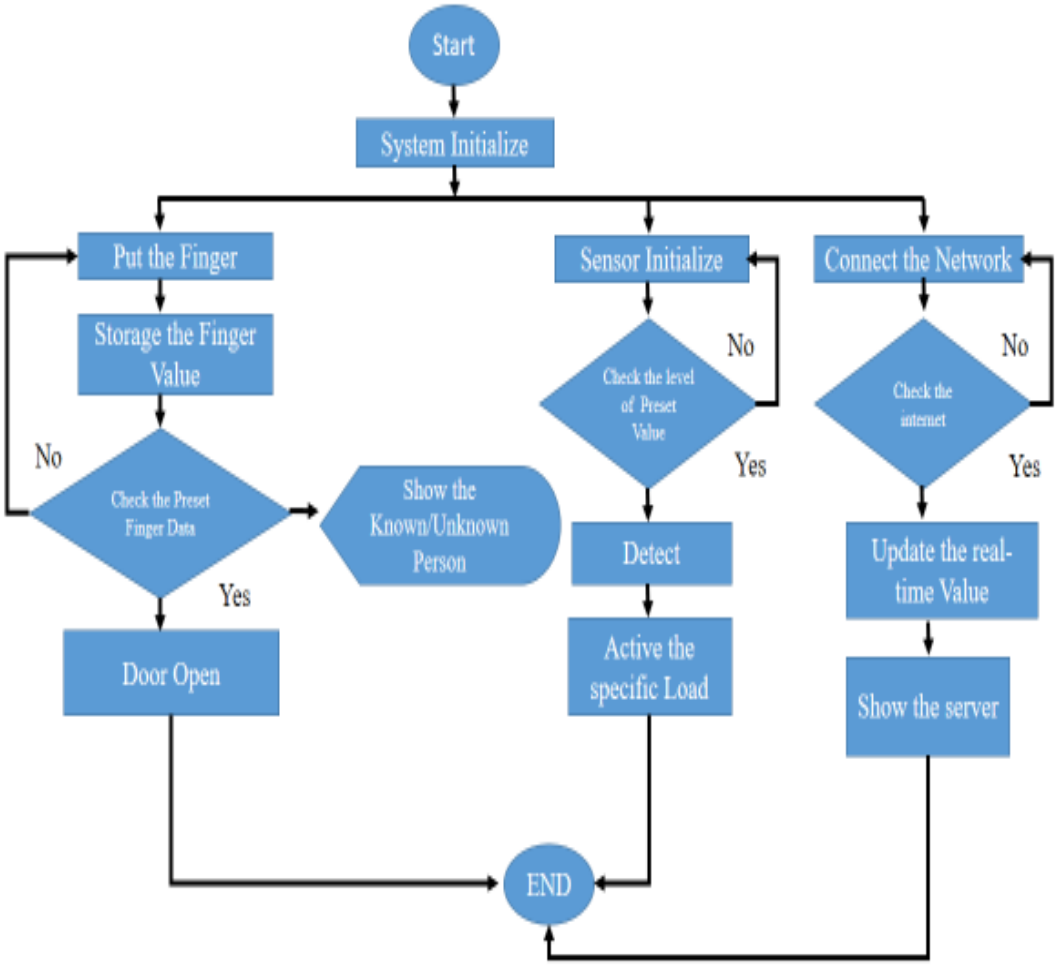



Fig. 4.3: System Flow Chart

## 4.5 CIRCUIT DIAGRAM

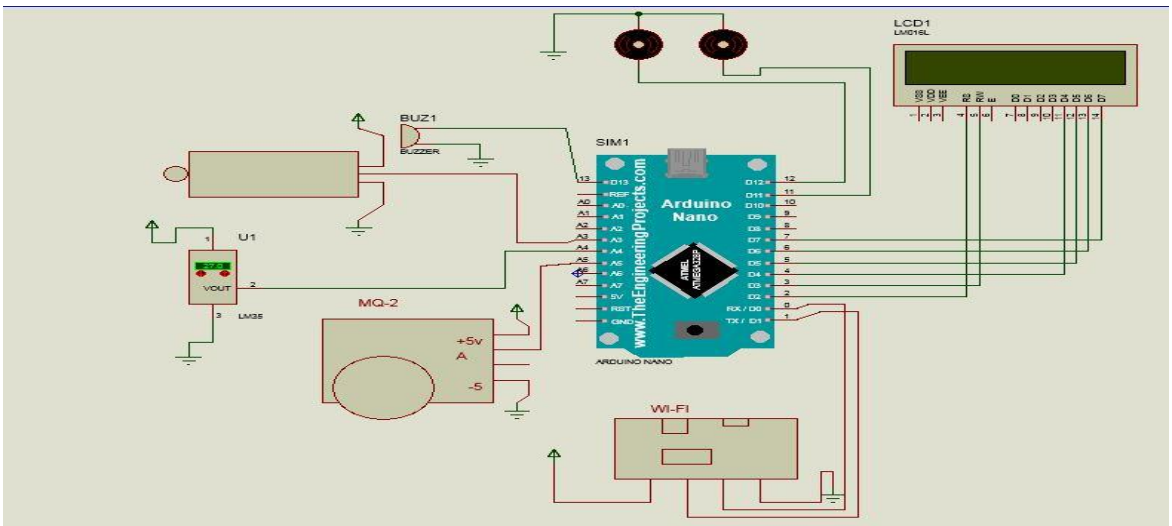



Fig. 4.4: Home Environment Monitoring & Controlling

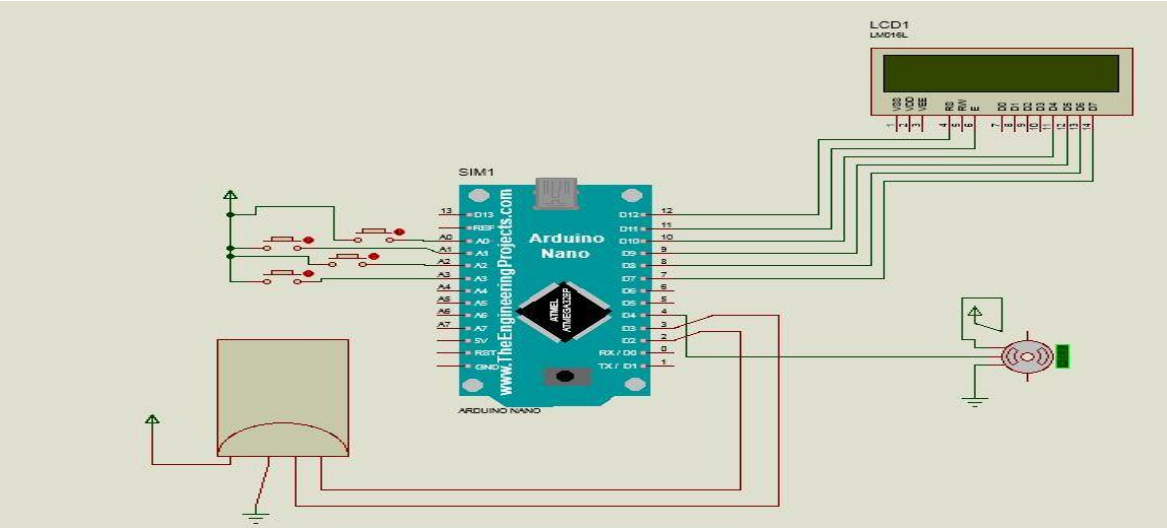



Fig. 4.5: Home Security System

Our whole system is controlled by Arduino Nano. This is a microcontroller device, which is working the instruction of programming. Our whole system is controlled by Arduino Nano. This is a microcontroller device, which is working the instruction of programming. We used the temperature sensor to measure the room temperature. This temperature sensor gives the 10mv reference the per degree Celsius temperature. this analog value is read and updated this value at the server. Similarly, the gas sensor detects gas leakage and the flame sensor detects fire. The pump motor turn on when flame sensor detect the fire and the exhaust fan turn on when gas leakage detect. We also used a finger print module for door lock security system. In this project, we are considered two power sources by making reference values. We used 3.3 volt supply for Wi-Fi module and all the other parts are functioned by 5 volt SMPS (switched-mode power supply). Wi-Fi module controlled by standard set of AT (Attention) commands. Then the arduino-nano is started and simultaneously the Wi-Fi module is powered and connection is established between Wi-Fi module and access point through which can upload and access the sensor value over internet. The control taken through the user are send by arduino nano and uploaded over the cloud server, then from the cloud server the controller retrieves the data through Wi-Fi module and performs the required action, depending on the control signal provided by the user. All the programing in this project is done in Arduino IDE software. The design is based on ATmega328 integrated with AVR processor, which is a member of the AVR family of general-purpose 8-bit microprocessors. The AVR family offers high performance for very low-power consumption and gate count.

# CHAPTER 05

# IMPLEMENTATION AND RESULT

## 5.1 INTRODUCTION

This chapter contains the total system result, hardware picture, controlling method of the project. Our project operate by product weight measure, product separator, product metal detector, slots fully fill-up notification etc.

## 5.2 HARDWARE RESULT

The below figure 5.1 and 5.2 are show home security purpose fingerprint module result, the authority add finger, when a member entry at home, at first put the finger at fingerprint module. When match the finger snap the door open and member entry the home.


Fig. 5.1: Finger Checkout


Fig. 5.2: Security Door Open/Close

The below figure 5.3 and 5.4 are show sensors data at hardware and server. The LCD shown the home temperature value, flame condition, gas level etc. the Wi-Fi module update the those sensor data at server. The user Login the server through the user ID and Password. When input the correct user ID and Password, the user monitoring the sensor data at any place.


Fig. 5.3: Sensor Data Show the LCD

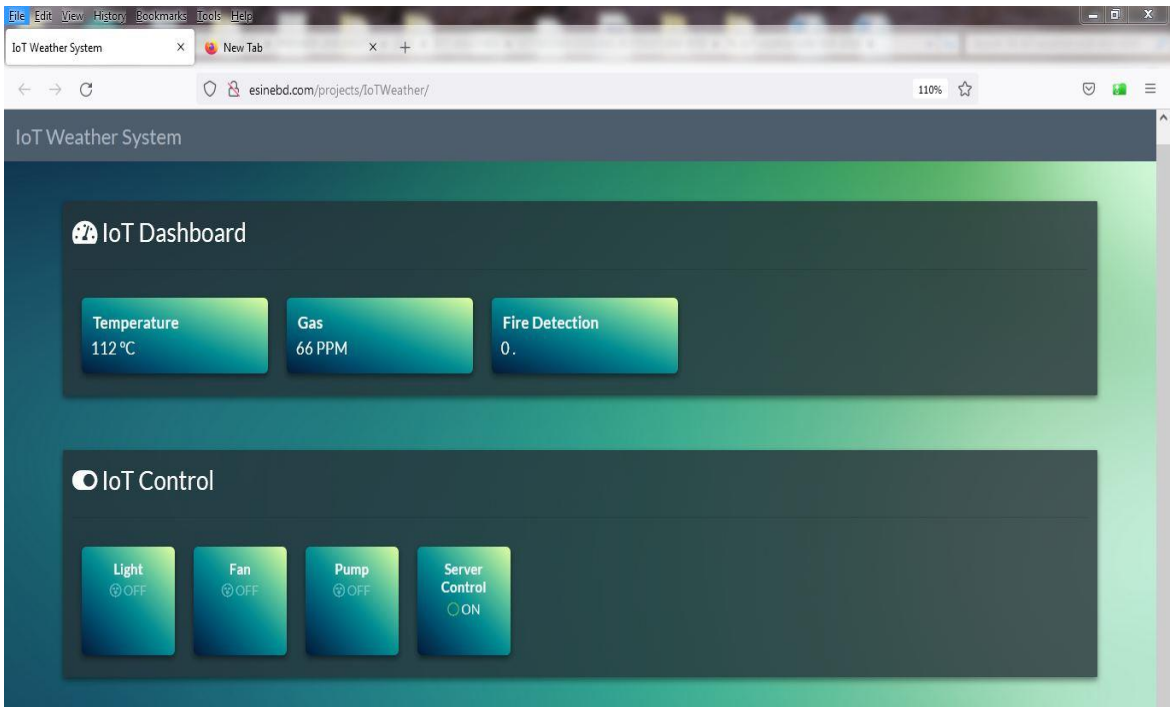



Fig. 5.4: Sensor data at server

## 5.3 HARDWARE IMPLEMENTATION

The below figure 5.4 is show the whole project hardware overview and mention the whole system all parameter.


Fig. 5.5: Hardware Overview

## 5.4 IMPLEMENTATION TOOLS

- Operating system
  - Windows 10
- Programming Language
  - C/C++
  - HTML, CSS & Javascript
- IDE
  - Arduino IDE
  - Brackets (text editor)

## 5.5 Summary

A hardware implementation means that the job is done using a physical device or electronic circuit as opposed to being done by a computer program. A hardware implementation often takes longer to create and that can make it more expensive. It is usually faster to operate and has the virtue of not being readily tampered with or reprogrammed once built. Using IoT to Run Applications on Embedded Systems in a Simplified Home Environment System The Embedded System Design Security Crisis.

# CHAPTER 06

# CONCLUSION

## 6.1 INTRODUCTION

This is the final chapter of this report. In this chapter, we will discuss about the conclusion of the project. We will also discuss about the limitation, future improvements, application and advantage of this project.

## 6.2 CONCLUSION

Because Android is supported by the majority of new gadgets, integrating them into a home automation system will be simple and seamless. The Internet of Things (IoT) has allowed all items on the planet's surface to be brought together under one roof, allowing data to be shared through interconnection and communication. As a result, smart home automation is now achievable, with minimal human intervention. Time management, financial management, and energy efficiency and conservation have all benefited from home automation.

## 6.3 FUTURE IMPROVEMENT

- In future we will be added a robotic arm for product placed in the measuring section.
- We can add a conveyor belt for the product shifting slot to the packaging area.
- We add a product counting system for individual products.
- We will use metallic structures to make our system strong and long-lasting.
- We will make all the electronics parts water resistant so that there is no problem while working.
- We will bring the whole system under CC camera so that we can protect the product from theft.

## 6.4 APPLICATIONS

It has numerous applications.

- High-end construction
- Shopping mall - Hospital - Movie theater - Shoe factory - Clothing factory
- Food processing plant - Manufacturing industries

## 6.5 ADVANTAGES

- It may provide the finest home experience for the owner by automatically applying the optimal temperature to the room.
- Using multisensory such as fire sensors and gas leakage sensors, it can save lives.
- We implemented an automation system to save electricity.
- Because the entire system is connected to the internet, it can be managed remotely by any smart device.
- It is simple to maintain and move to new futures.
- Using a finger print system, improve security.

# REFERENCE


[1]. Electronics for You Magazine, Smart Homes Technology Vol. 43, No. 10.

[2]. Tabinder Akter, Mahfuja Akter, Mohammad,Mozammel Hoque, Md. Afzalur Rab & Dr MdHabibur Rahman, Design, Development and Performance Study of Microcontroller-Based Home Security System Using Mobile Phone Global Journal of researches in engineering Electrical and Electronics, Volume 12 Issue 6 Version May2012. 37

[3]. Sudhaker Samuel. The 8051 Microcontroller and Embedded Systems Using Assembly and C 2nd Edition by Muhammad Ali Mazidi, Janice Gillispie Mazidi and Rolin D.McKinlay,Sheikh Izzal Azid, Sushil Kumar, Analysis andPerformance of a Low Cost SMS Based HomeSecurity System International Journal of SmartHome Vol.5, No. 3, July, 2011.

[4]. Inderpreet Kaur,Microcontroller Based HomeAutomation System withSecurity, InternationalJournal of Advanced Computer Science andApplications (IJACSA), Vol. 1, No. 6, December 2010.

[5]. Y.-K.Choi, K.-M. Kim, J.-W. Jung, S.-Y. Chun, and K.-S. Park. K Hagiwara, Y. Chigira, N. Yoshiura, and Y. Fujii Acoustic intruder detection system for home security , The e-VigilanteNetwork Project, SICE 2004 Annual Conference.

[6]. kiprakis, A.E.Wallace, analysis of an intelligent security system,EEE Preceding on generation, Transmission and Distribution,2008,volume:151,IssIue:5,pages:611-618 vi, 41

[7]. http://www.nationmaster.com/compare/Bangladesh/United-States/Crime27 September, 2013

[8]. http://www.hsmc-ul.com/customer-info/security-history 27 September, 2013 vi,2, 12

[9]. http://www.protectyourhome.com/history-home-security 27 September, 2013 2

[10]. http://www.elecfreaks.com/wiki/index.php?title=RFID / NFC Shield 27 September, 2013 15

[11]. http://www.elecfreaks.com/wiki/index.php?title=File:Arduino Shield NFC 27 September, 2013

[12]. http://en.wikipedia.org/wiki/Radio-frequency identification 27 September, 2013vi, 16, 25, 26

[13]. http://rapidnfc.com/blog/72/the difference between nfc and rfid explained vi, 32, 33

[14]. http://www.differencebetween.net/technology/difference-between-rfid-and-nfc/ 28 September, 2013 vi, 34

[15]. http://www.electroschematics.com/7642/pic16f877a-datasheet/ 28 September,2013 vi, 10

[16]. http://www.ladyada.net/learn/sensors/pir.html 28 September, 2013 vi, 37

[17]. http://www.seattlerobotics.org/guide/servos.html 28 September, 2013 vi, 11, 41

[18]. International Research Journal of Engineering and Technology (IRJET)
Industrial Automation using IoT
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[19] TOXIC GAS DETECTION AND MONITORING UTILIZING INTERNET OF THINGS
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Industrial Safety Parameters Monitoring in IOT Environment
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[21] IoT Based Industrial Parameters Monitoring and Alarming System using Arduino - A Novel Approach
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# APPENDIX

```
#include<SoftwareSerial.h>
#include<LiquidCrystal.h>

#definefireA3
#definebuzz13
#definelight10
#definefan11
#definepump12


#definewifiSerial

LiquidCrystallcd(7,6,5,4,3,2);
SoftwareSerialgsm(9,8);

constcharnum[]="01515674815";
StringwifiSSID="iot";
StringwifiPASS="12345678";
StringHOST="iotweathermonitor.000webhostapp.com";

intgas,temp;
boolserverMode=0;
boolsmsFlag=false;

voidsetup(){
wifi.begin(115200);
lcd.begin(16,2);

pinMode(fire,INPUT);
pinMode(buzz,OUTPUT);
pinMode(light,OUTPUT);
pinMode(fan,OUTPUT);
pinMode(pump,OUTPUT);

wifi.println("AT+CWMODE=1");
checkResponse();
wifi.println((String)"AT+CWJAP=\""+wifiSSID+"\",\""+wifiPASS+"\"");
checkResponse();
}

voidloop(){
gas=analogRead(A5);
temp=analogRead(A7);
temp=temp*0.4887;

checkServer();
delay(500);
if(serverMode==0){
if(temp>32)digitalWrite(light,1);
elseif(temp<28)digitalWrite(light,0);

if(gas>100)digitalWrite(fan,1);
elseif(gas<100)digitalWrite(fan,0);

if(!digitalRead(fire))digitalWrite(pump,1);
```

```
elsedigitalWrite(pump,0);

lcdprint(0,0,(String)temp+(char)223+"CG:"+gas+"F:"+!digitalRead(fire)+"");
lcdprint(0,1,(String)"L="+digitalRead(light)+"F="+digitalRead(fan)+"P="+digitalRead(pump)+""+
serverMode);

send2Server();
delay(500);
}

voidlcdprint(bytex,bytey,Stringtxt){
lcd.setCursor(x,y);
lcd.print(txt);
}

voidsend2Server(){
 Stringpost=(String)"GET/update_machine.php?&temp="+temp+"&gas="+gas+"&fire="+
!digitalRead(fire)+"HTTP/1.1";
intindex=post.length()+66;

wifi.println("AT+CIPMUX=0");
checkResponse();
wifi.println("AT+CIPSTART=\"TCP\",\""+HOST+"\",80");
checkResponse();
wifi.println((String)"AT+CIPSEND="+index);
checkResponse();
wifi.println(post);//2
wifi.println("HOST:"+HOST);//8+35
wifi.println("Connection:Close\r\n");//21
checkResponse();
}

voidcheckServer(){
 Stringpost=(String)"GET/stat_machine.phpHTTP/1.1";
intindex=post.length()+66;

wifi.println("AT+CIPMUX=0");
checkResponse();
wifi.println("AT+CIPSTART=\"TCP\",\""+HOST+"\",80");
checkResponse();
wifi.println((String)"AT+CIPSEND="+index);
checkResponse();
wifi.println(post);//2
wifi.println("HOST:"+HOST);//8+35
wifi.println("Connection:Close\r\n");//21
 Stringcheck=checkResponse();

if(check.indexOf("server=0")!=-1)serverMode=0;
elseif(check.indexOf("server=1")!=-1)serverMode=1;

if(serverMode==1){
if(check.indexOf("light=0")!=-1)digitalWrite(light,0);
elseif(check.indexOf("light=1")!=-1)digitalWrite(light,1);
if(check.indexOf("fan=0")!=-1)digitalWrite(fan,0);
elseif(check.indexOf("fan=1")!=-1)digitalWrite(fan,1);
if(check.indexOf("pump=0")!=-1)digitalWrite(pump,0);
elseif(check.indexOf("pump=1")!=-1)digitalWrite(pump,1);
 }
}
```

```
StringcheckResponse(){
 Stringr;
while(!wifi.available());
while(wifi.available()){
 r=wifi.readString();
 //Serial.println(r);
 }
delay(50);
returnr;
}

#include<Adafruit_Fingerprint.h>
#include<LiquidCrystal_I2C.h>
LiquidCrystal_I2Clcd(0x3F,16,2);
SoftwareSerialmySerial(D3,D4);
Adafruit_Fingerprintfinger=Adafruit_Fingerprint(&mySerial);

Stringmember="";
intflag=0;
voidsetup()
{
lcd.begin(16,2);
lcd.init();
lcd.backlight();
lcd.setCursor(4,0);
lcd.print("WELCOME");
delay(2000);

lcd.clear();

Serial.begin(115200);
delay(10);
Serial.println();
Serial.println();
lcd.setCursor(0,0);
Serial.print("ConnectingtoWiFi...  ");
Serial.print("Connectingto");
Serial.println(ssid);
WiFi.mode(WIFI_STA);
WiFi.begin(ssid,password);

while(WiFi.status()!=WL_CONNECTED)
{
 delay(500);
 Serial.print(".");
 }

Serial.println("");
Serial.println("WiFiconnected");
Serial.println("IPaddress:");
Serial.println(WiFi.localIP());
lcd.setCursor(0,0);
lcd.print("WiFiconnected  ");
lcd.setCursor(0,1);
lcd.print("IP:");
lcd.setCursor(4,1);
lcd.print(WiFi.localIP());
delay(1500);

while(!Serial);
```

```
delay(100);
Serial.println("\n\nWaitingforFingerprintSensor");
lcd.setCursor(0,0);
lcd.print(" Waitingfor  ");
lcd.setCursor(0,1);
lcd.print(" Sensor  ");
delay(1500);
finger.begin(57600);

if(finger.verifyPassword())
{
 Serial.println("FoundSuccessfully");
 lcd.setCursor(0,0);
 lcd.print("Sensorfound!  ");
 lcd.setCursor(0,1);
 lcd.print("     ");
 delay(1500);
 }else
 {
 Serial.println("Fingerprintsensornotfound!!!");
 lcd.setCursor(0,0);
 lcd.print("SensorNotfound!  ");
 lcd.setCursor(0,1);
 lcd.print("     ");
 while(1)
 {
  delay(1);
 }
 }
}

voidloop()
{
intfingerprintID=getFingerprintID();
delay(50);
if(fingerprintID==1)
 {
 Serial.println("WelcomeDebasis");
 lcd.setCursor(0,0);
 lcd.print("WelcomeDebasis  ");
 lcd.setCursor(0,1);
 lcd.print("     ");
 connecthost("Debasis");
 flag=0;
 }
elseif(fingerprintID==2)
 {
 Serial.println("WelcomeManas");
 lcd.setCursor(0,0);
 lcd.print("WelcomeManas  ");
 lcd.setCursor(0,1);
 lcd.print("     ");
 connecthost("Manas");
 flag=0;
 }
elseif(fingerprintID==3)
 {
 Serial.println("Welcome");
 lcd.setCursor(0,0);
 lcd.print("WelcomeTara  ");
```

```
lcd.setCursor(0,1);
lcd.print("     ");
connecthost("Tara");
flag=0;
}
else
{
Serial.println("Waitingforvalidfinger!!!");
lcd.setCursor(0,0);
lcd.print("PlaceaValid ");
lcd.setCursor(0,1);
lcd.print(" Finger  ");
}
}

intgetFingerprintID()
{
uint8_tp=finger.getImage();
if(p!=FINGERPRINT_OK)return-1;

p=finger.image2Tz();
if(p!=FINGERPRINT_OK)return-1;

p=finger.fingerFastSearch();
if(p!=FINGERPRINT_OK)return-1;

returnfinger.fingerID;
}

voidconnecthost(Stringdata)
{
if(flag==0)
{
member=data;
flag=1;
Serial.print("connectingto");
Serial.println(host);
WiFiClientclient;
constinthttpPort=80;
if(!client.connect(host,httpPort))
{
Serial.println("connectionfailed");
return;
}

//WenowcreateaURLfortherequest
Stringurl="/pushingbox?";
url+="devid=";
url+="v810401C3XXXXX";
url+="&Name="+String(member);

Serial.print("RequestingURL:");
Serial.println(url);
client.print(String("GET")+url+"HTTP/1.1\r\n"+
  "Host:"+host+"\r\n"+
  "Connection:close\r\n\r\n");
unsignedlongtimeout=millis();
while(client.available()==0){
if(millis()-timeout>5000){
Serial.println(">>>ClientTimeout!");
client.stop();
```

```
 return;
 }
 }
 while(client.available()){
 Stringline=client.readStringUntil('\r');
 Serial.print(line);
 Serial.print("DataSent!");
 }

 Serial.println();
 Serial.println("closingconnection");
 }
}
```

**CodeforEnrollment:**

```
#include<Adafruit_Fingerprint.h>
SoftwareSerialmySerial(D3,D4);

Adafruit_Fingerprintfinger=Adafruit_Fingerprint(&mySerial);

uint8_tid;

voidsetup()
{
 Serial.begin(9600);
 while(!Serial);//ForYun/Leo/Micro/Zero/...
 delay(100);
 Serial.println("\n\nAdafruitFingerprintsensorenrollment");

 //setthedataratefortheSensorserialport
 finger.begin(57600);
 if(finger.verifyPassword()){
 Serial.println("Foundfingerprintsensor!");
 }else{
 Serial.println("Didnotfindfingerprintsensor:(");
 while(1){delay(1);}
 }
}

uint8_treadnumber(void){
 uint8_tnum=0;
 while(num==0){
 while(!Serial.available());
 num=Serial.parseInt();
 }
 returnnum;
}

voidloop()    //runoverandoveragain
{
 Serial.println("Readytoenrollafingerprint!");
 Serial.println("PleasetypeintheID#(from1to127)youwanttosavethisfingeras...");
 id=readnumber();
 if(id==0){//ID#0notallowed,tryagain!
 return;
 }
 Serial.print("EnrollingID#");
 Serial.println(id);
 while(!getFingerprintEnroll());
}
```

```
uint8_tgetFingerprintEnroll(){

intp=-1;
Serial.print("Waitingforvalidfingertoenrollas#");Serial.println(id);
while(p!=FINGERPRINT_OK){
p=finger.getImage();
switch(p){
caseFINGERPRINT_OK:
Serial.println("Imagetaken");
break;
caseFINGERPRINT_NOFINGER:
Serial.println(".");
break;
caseFINGERPRINT_PACKETRECIEVEERR:
Serial.println("Communicationerror");
break;
caseFINGERPRINT_IMAGEFAIL:
Serial.println("Imagingerror");
break;
default:
Serial.println("Unknownerror");
break;
}
}

//OKsuccess!

p=finger.image2Tz(1);
switch(p){
caseFINGERPRINT_OK:
Serial.println("Imageconverted");
break;
caseFINGERPRINT_IMAGEMESS:
Serial.println("Imagetoomessy");
returnp;
caseFINGERPRINT_PACKETRECIEVEERR:
Serial.println("Communicationerror");
returnp;
caseFINGERPRINT_FEATUREFAIL:
Serial.println("Couldnotfindfingerprintfeatures");
returnp;
caseFINGERPRINT_INVALIDIMAGE:
Serial.println("Couldnotfindfingerprintfeatures");
returnp;
default:
Serial.println("Unknownerror");
returnp;
}
Serial.println("Removefinger");
delay(2000);
p=0;
while(p!=FINGERPRINT_NOFINGER){
p=finger.getImage();
}
Serial.print("ID");Serial.println(id);
p=-1;
Serial.println("Placesamefingeragain");
while(p!=FINGERPRINT_OK){
p=finger.getImage();
switch(p){
```

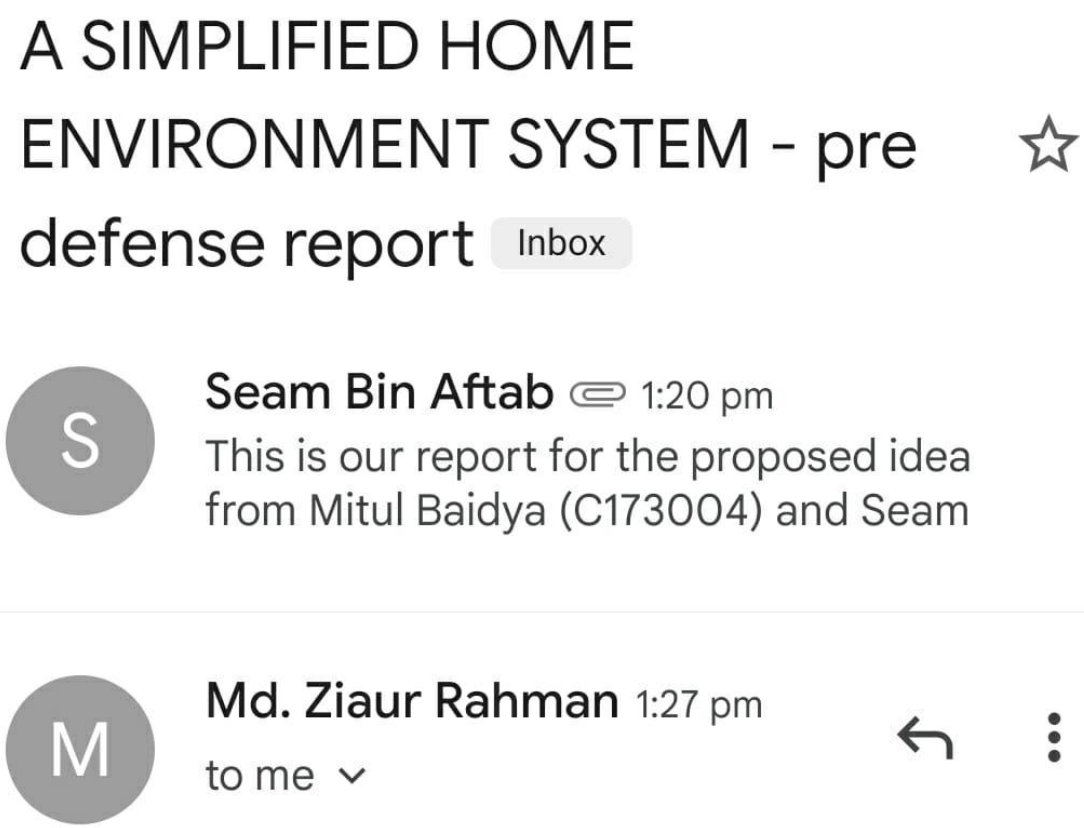
```
caseFINGERPRINT_OK:
 Serial.println("Imagetaken");
 break;
caseFINGERPRINT_NOFINGER:
 Serial.print(".");
 break;
caseFINGERPRINT_PACKETRECIEVEERR:
 Serial.println("Communicationerror");
 break;
caseFINGERPRINT_IMAGEFAIL:
 Serial.println("Imagingerror");
 break;
default:
 Serial.println("Unknownerror");
 break;
 }
}

//OKsuccess!

p=finger.image2Tz(2);
switch(p){
 caseFINGERPRINT_OK:
 Serial.println("Imageconverted");
 break;
caseFINGERPRINT_IMAGEMESS:
 Serial.println("Imagetoomessy");
 returnp;
caseFINGERPRINT_PACKETRECIEVEERR:
 Serial.println("Communicationerror");
 returnp;
caseFINGERPRINT_FEATUREFAIL:
 Serial.println("Couldnotfindfingerprintfeatures");
 returnp;
caseFINGERPRINT_INVALIDIMAGE:
 Serial.println("Couldnotfindfingerprintfeatures");
 returnp;
default:
 Serial.println("Unknownerror");
 returnp;
}
//OKconverted!
Serial.print("Creatingmodelfor#");Serial.println(id);
p=finger.createModel();
if(p==FINGERPRINT_OK){
 Serial.println("Printsmatched!");
}elseif(p==FINGERPRINT_PACKETRECIEVEERR){
 Serial.println("Communicationerror");
 returnp;
}elseif(p==FINGERPRINT_ENROLLMISMATCH){
 Serial.println("Fingerprintsdidnotmatch");
 returnp;
}else{
 Serial.println("Unknownerror");
 returnp;
 }
Serial.print("ID");Serial.println(id);
p=finger.storeModel(id);
if(p==FINGERPRINT_OK){
```

```
Serial.println("Stored!");
}elseif(p==FINGERPRINT_PACKETRECIEVEERR){
Serial.println("Communicationerror");
returnp;
}elseif(p==FINGERPRINT_BADLOCATION){
Serial.println("Couldnotstoreinthatlocation");
returnp;
}elseif(p==FINGERPRINT_FLASHERR){
Serial.println("Errorwritingtoflash");
returnp;
}else{
Serial.println("Unknownerror");
returnp;
}
}
```

**APPROVAL OF SUPERVISOR**



A SIMPLIFIED HOME ENVIRONMENT SYSTEM - pre defense report Inbox

Seam Bin Aftab 1:20 pm
This is our report for the proposed idea from Mitul Baidya (C173004) and Seam

Md. Ziaur Rahman 1:27 pm
to me

Yes, I approve.

Hide quoted text

On Sun, May 8, 2022, 1:21 PM Seam Bin Aftab <c173005@ugrad.iiuc.ac.bd> wrote:

> This is our report for the proposed idea from Mitul Baidya (C173004) and Seam Bin Aftab (C173005).
>
> If you would be kind enough to approve it, it will be much appreciated.