GSM BASED AUTOMATIC WINDOW SYSTEM, GAS LEAKAGE AND SMOKE DETECTION AT HOME

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering

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APPROVAL

This Project titled **"GSM based Automatic Window System, Gas leakage & Smoke detection at home"**, submitted by **"Ajoy Sutradhar"** and **"Md. Ajwad Abid"**, ID No: **173-15-10434, 173-15-10456** to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on **04-01-2022**.

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We hereby declare that this project has been done by us under the supervision of **Nazmun Nessa Moon, Associate Professor and co-supervision of Most. Hasna Hena, Assistant Professor,** Department of CSE Daffodil International University. We also declare that neither this project nor any part of this project has been submitted elsewhere for the award of any degree or diploma.

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Finally, we must be acknowledged with due respect the constant support and patients of my parents.

ABSTRACT

This project titled "GSM based Automatic Window System, Gas leakage & Smoke detection at home" which will describe how it is possible to prevent accidents by gas leakage, fire detection, and protection. The study will detect liquid petroleum gas (LPG), natural gas using an MQ- 6 gas sensor & detect flame using an infrared (IR) flame sensor. This project will use a GSM module that sends alerts via phone call. For safety purposes, We will use a servo motor that will automatically open the windows and use a submersible mini water pump that will spray water on the flame. The whole system is controlled by a microcontroller and Arduino has been used to collect and calculate data for the project's desired output. The project will send a message to the customer via phone call detecting gas leakage and fire. Send alerts to attendees via the burger, as well as turning off the green light, turn on the red light will send additional alerts. also, we built a window system that will function while the sensor detects rain is falling it will shut down the window automatically and send a message notification also when the rain will stop it will keep the window normally open. If a gas leak is detected, the protection window will automatically open so that the gas is released and when the flame is detected, the water pump will turn on and spray water on the flame. Above all, the project will be able to prevent fire-related accidents through gas leakage and fire detection, warning, and protection.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

The "GSM base gas leakage, flame detection and protection system" framework is connected with the expressions "Smart and Intelligent Home Security". Gas leakage, flame detection, and protection framework has been utilized to control home apparatuses and gadgets consequently or on the other hand remotely with or without web. GSM base gas leakage, flame detection, and protection system are produced with the gift of present-day science particularly in the field of building and figuring. GSM base Gas leakage, flame detection, Rain detection and protection framework incorporate detected flame and gas leak also save us from the risky situation in our home or kitchen using different frameworks shown in figure 1.1. This framework is intended to make life simple and agreeable, to guarantee effectively utilize vitality and keeping up the security arrangement of home or the remote reconnaissance of kids or on the other hand elderly individual at home. This system has been enhanced hugely and ended up well known for broad highlights.

Figure 1.1: An iconic Smart Home automation

1.2 Motivation

GSM base gas leakage, flame detection, Rain detection, window closing, and protection system Framework are intense, adaptable, and extremely simple to utilize. It is planned and created to make our life security demanding. In the event that we check out, we will find that innovation is making its place all over. From morning tonight, we are utilizing such a significant number of innovations, in short, it is a piece of our life now and it is extremely difficult to live without it too.

Home mechanization is winding up increasingly prevalent step by step because of its various favorable circumstances. We endeavored to control this gas leakage, flame detection, and protection system thought with a GSM base in light of the fact that relatively every individual in our general public utilizing different sorts of advanced cells and GSM base is an essential element of it. As everybody has a GSM base devise, it will be less exorbitant for them to utilize a GSM-based home computerization framework since you don't need to purchase any sort of remote for this venture the extent that you have a PDA

1.3 Objective

Main Objectives of the project:

- To create and plan a controller circuit that can GSM base gas leakage, flame detection, and protection system.
- Safety from Flame which is dangerous for our daily life.
- Protecting against gas leakage which is one of the least common causes of fire and a serious threat to our lives
- Making our daily lives simple, secure, cost-effective, and user-friendly.

1.4 Managing the System

- We build up a GSM base gas leakage, Rain detection with window open and closing, flame detection, and protection system structure with Arduino UNO board.
- GSM base gas leakage, Rain detection, flame detection, and protection system give us a safe environment.
- Automatically window will be open for leakage gas passing and the water pump start for the flame. The phone call has given the notification for alert security.

1.5 Expected Outcome

In recent years, GSM has become a more fundamental component of in-home system administration. In addition, the use of security breakthroughs in in-home and building automated frameworks provides a few advantages that could not be achieved with a wired system.

- **Reduced establishment costs:** GSM base flame, Rain, gas leakage detection and protection system frameworks is substantially more spending neighborly in light of the fact that no link is fundamental in this framework.

- **Easy sending, establishment, and scope:** Remote hubs can be mounted any place. In neighboring or remote spots, where cabling may not be doable by any stretch of the imagination. Subsequently, remote innovation likewise amplifies the secured territory.
- **System adaptability and simple expansion:** Conveying a security system is particularly favorable when, because of new or changed prerequisites, augmentation of the network is necessary

1.6 Project management and finance

While studying this project “gsm based automatic window system, gas leakage & smoke detection at home” we find some resource to do this project and background study materials where things was mentioned the way of arranging component and its experimental data to test aligned. Also, we get some open-source study materials or tutorials which directly indicates the project structure with basic experiment. After that we did local market study where can we will get those parts for the project. Lastly, we go to the market and buy studied parts for the project. The management of finance of this project is self-funded, I and my mates had a discussion while considering the cost estimates of this project and we finance this project at our own way.

1.7 Project Goal

The goal of this undertaking project is to plan and develop a GSM-based gas leakage, flame detection, and protection system framework that will save our home, kitchen, Industries.

1.8 Report Layout

This endeavor report has seven districts by a wide edge. The standard part portrays an idea with yielding as well, our endeavor "Voice Control Home Automation", a brief depiction of the undertaking, expansions, and methodology. The second region is about history, block configuration, circuit diagram, plan of parts. The piece third about portion portrayal, cost evaluation of our system. The part fourth is programming appraisal &program explanation. Part five hardware execution. By then chapter six depicts the result and discussion fittingly. Finally, region seven acquiescence’s the completing remarks, deterrent of our game plan and thought for the future works.

CHAPTER 2

BACKGROUND

2.1 Introduction

The home robotization structure grants individuals comparatively direct home mechanical parties by utilizing a reasonable telephone application. It's colossal besides showing up on stuff and the client's incredible telephone programming for building up a home Automation structure. The thing can support many homes mechanical social affairs like lights, entrance lock, etc. In this part, we will take some sensors which are smoke sensor, gas sensor, fire detect sensor, rain sensor, servo motor, GSM module and some led including Arduino UNO, 'Robotization Smart Home' applications, Arduino compiler, Block chart, and circuit diagram of our System.

2.2 Background

These days, securing one's property and trade against fire is getting to be increasingly imperative. Observing commercial and private ranges all-round is a successful strategy to diminish individual and property misfortunes due to fire disasters. Home gas spillage, fire discovery could be a matter of incredible concern, and hence numerous endeavors are given in most created nations to the plan of programmed discovery frameworks. A fire alert framework ought to dependably and in a convenient way inform building tenants almost the nearness of fire markers, such as smoke or tall temperatures. A fire locator is as a rule actualized as a smoke sensor due to its early fire location capability, quick reaction time and moderately moo taken a toll. Other alternatives for the fire location are based on gas sensors or temperature sensors fire locators that utilize a single sensor, by and large, a smoke sensor, and display tall false-alarm rates due to temperature changes.

2.3 Related works

The term "Internet of things" was begun by Kevin Ashton of Procter & Gamble, afterward MIT's Auto-ID Center, in 1999, in spite of the fact that he inclines toward the express "Internet for things". At that point, he saw Radio-frequency distinguishing proof (RFID) as basic to the Internet of things, which would permit computers to oversee all personal things.

IOT alludes as Internet of things. The things are the physical objects (individuals, gadgets, sensors, or any exercises) that are interconnected and connecting with each other over the Internet. These things collect data from the environment any time and [4] share each other in any put and it gives us consent to get to and control them remotely. These gadgets make a way to communicate with each other through diverse mediums and conventions such as Wi-Fi, cellular organize, Bluetooth, Neighborhood Range Arrange, Partisan Organize, etc.

The collected data by the gadgets have been sent to the cloud server through the web and put away within the server. This server makes the data to the specified arrange of the clients by a few explanatory handles. The users are able to see the comparing result within the WEB server and control the gadgets at them possess willing. So, the web of things makes our life more easy, secure, cheap, and comfortable. For illustration, one can effectively control a switch of a fan or light remotely. People can get information around traffic conditions of the streets so that he or she employments another course to urge the required goal.

2.4 Scope of the problem with limitation

The think about limits itself in identifying the nearness of normal gas and fluid petroleum gas within the discussion at a near remove from the conceivable source of the gas spill. It is accepted that the volume of discussion within the room is more prominent than the volume of the gas show. For fire, the sensor utilized is able of identifying fire in its line of locating. The framework moreover requires to be introduced in a zone with strong organize flag. The GSM, after sending the desired number of call needs resetting through the physical button from the Arduino board. This will initialize the framework and the GSM as well.

2.5 Description of Block Diagram

In our block diagram of this project is firstly we power up the system, the we have microcontroller and sensors to do activity as define in programming section. Likely we have rain sensor when its detect rain or not it will send signal to the microcontroller then microcontroller send signal to the servo motor or actuator to open or off the window. In the very next we have gas sensor and flame sensor. When gas sensor or flame sensor detect gas presents of flame present it will send the microcontroller and microcontroller send the signal to the action formatted for assign task. So, while occurring activity as program we will get SMS alert from our gsm module to our phone that in our device there had happened some activity because of that we will get alert. So, this is how our block diagram shown in figure 2.1 will represent our project.

General Block Diagram

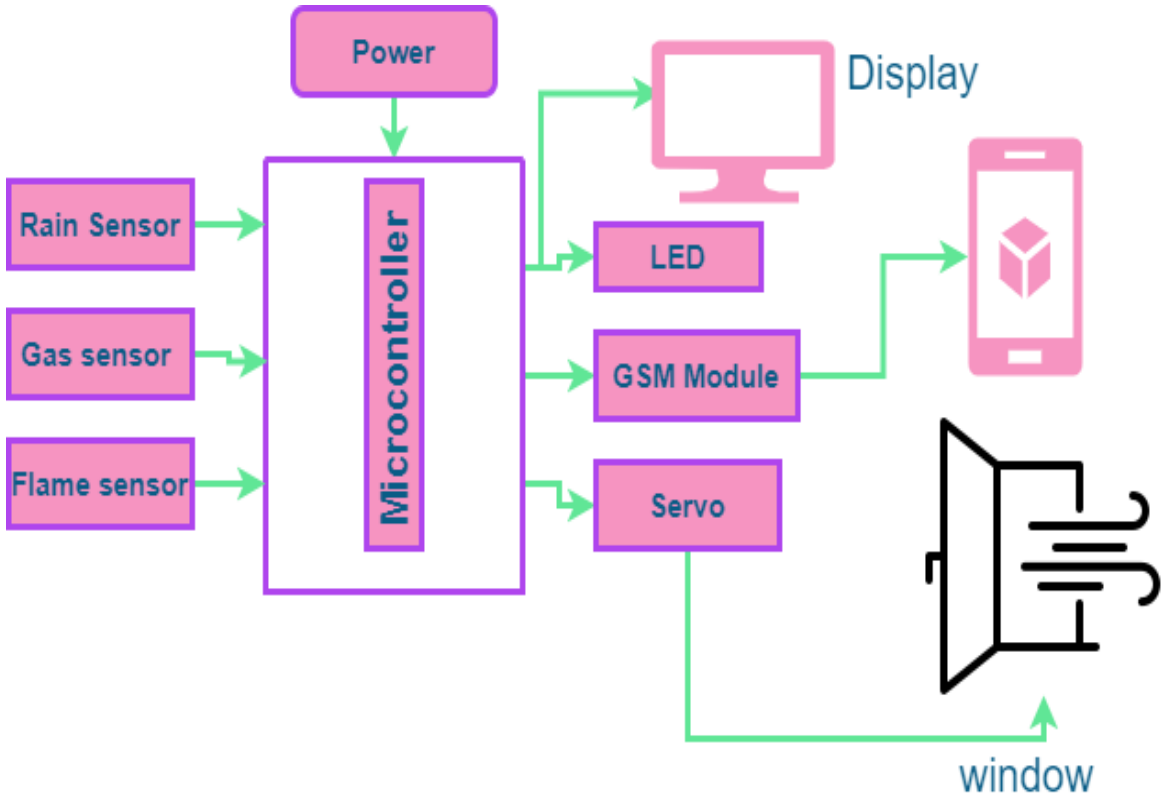


Figure 2.1: Block diagram of our project

2.6 Working Process of Our Circuit Diagram

We'll go through how circuit diagrams function in this article. In our first of we have to give power supply of 12 volt to active the circuit. Then we convert the power to give in the Arduino by using buck converter. When the system will get power all the functionality will start working. As we proposed system when a sensor get its reading the data have been differentiate with previous and calculate its operation then send a signal to the microcontroller then mcu send its data to the gsm for sending sms to the authorized person of specific section. And in the meantime the display will show it text as corresponding work on gsm, sensor and arduino command. Also a led will be indicating that some thing happened on the system. This way our circuit diagram shown in figure 2.2 will be work.

Circuit Diagram

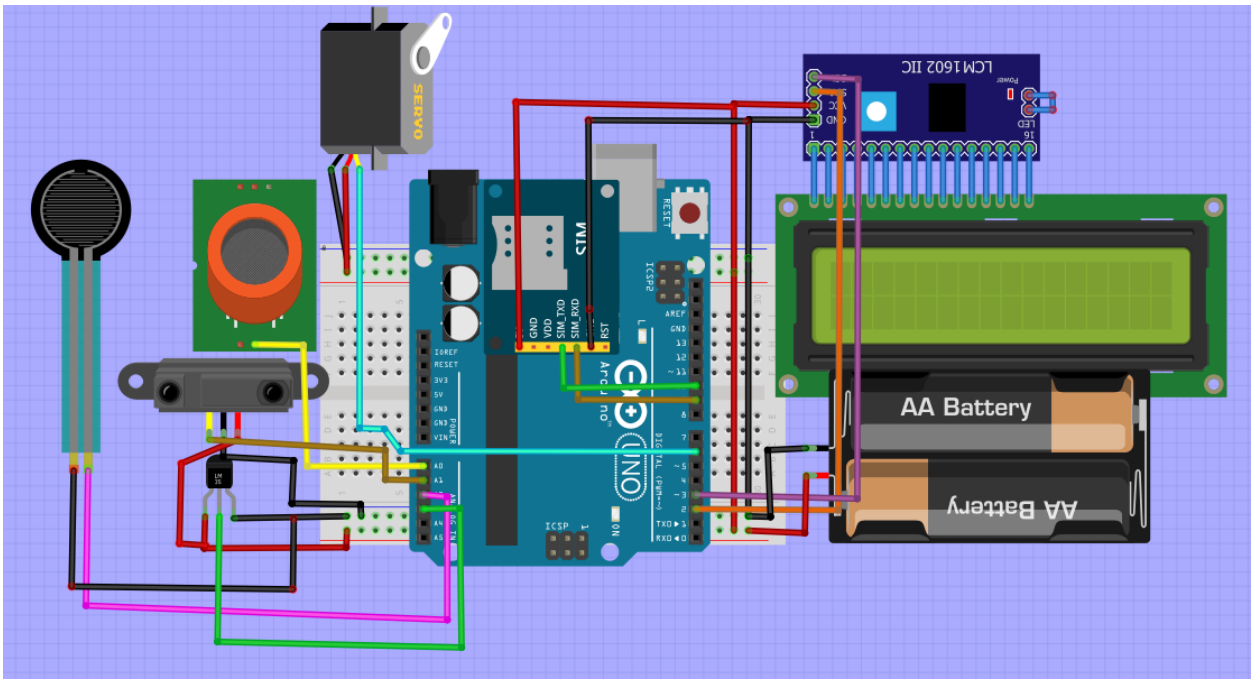


Figure 2.2: Circuit diagram

2.7 Flowchart Diagram of Our System.

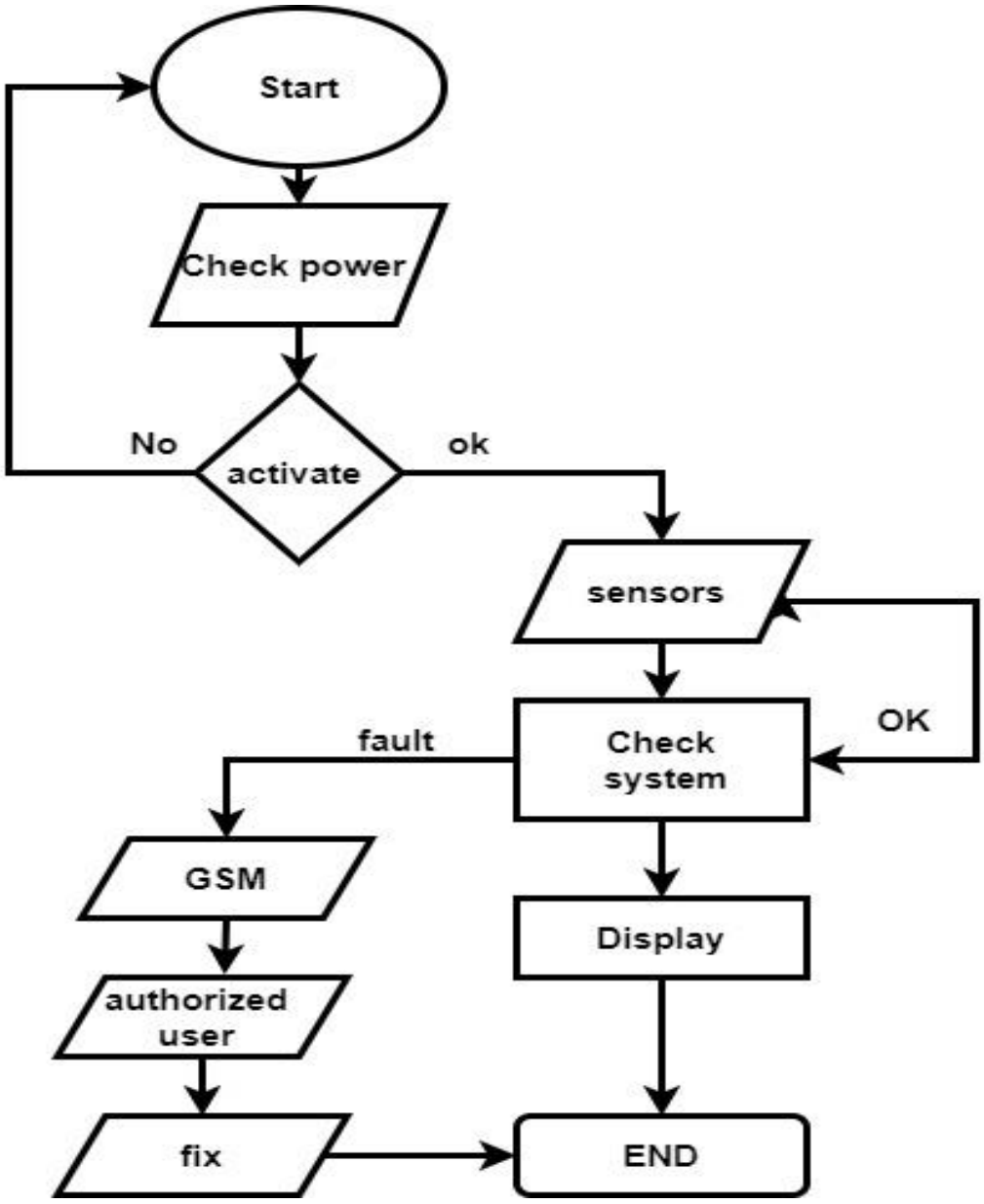


Figure 2.3: Flow chart diagram of our circuit.

2.8 List of Component Used In Circuit

Table 2.1: component list

SN	Name	Quantity	Used purpose
01	Arduino uno	1	As brain of this project
02	GSM	1	To send sms
03	Temp. sensor	1	Calculating environment
04	LPG sensor	1	Detecting LPG presence
05	Flame sensor	1	Fire detecting
06	MQ5	1	Smoke detecting
07	SMPS power supply	1	Power providing to device
08	Buck converter	2	Provide power to arduino and gsm
09	Breadboard	1	For connecting circuit
09	LCD display	1	Showing text
10	Rain sensor	1	Detect rain
11	Servo motor	1	Open window
12	Some used tool	x	Completing project

2.9 Conclusion

In this chapter of system review we show all of the system circuit diagram, Block diagram component list and flow chart of the included system. How the smart development of a robot will be run successfully.

CHAPTER 3

ANALYSIS AND SIMULATION

3.1 Introduction

In the previous chapter several points where made clear, such as the project design, the material used in the modeling of the project, and the sensor providing the required data to move the different parts of the project. Although these points are sufficient to build a project, they are not enough, because the project needs to run, which is why we are going to analyze the necessary aspects of project. In this chapter, we'll talk about several types of project simulations, how we choose components, and how they help us with our project.

3.2 Temperature Sensor

The LM35DZ is a straight temperature sensor that comes straightforwardly adjusted in Celsius. The simple yield is straightforwardly corresponding to the temperature in Celsius: 10 mV for every degrees Celsius ascend in temperature. This sensor is basically the same with the LM335 (adjusted in Kelvin) and with the LM34 (aligned in Fahrenheit) shown in figure 3.1

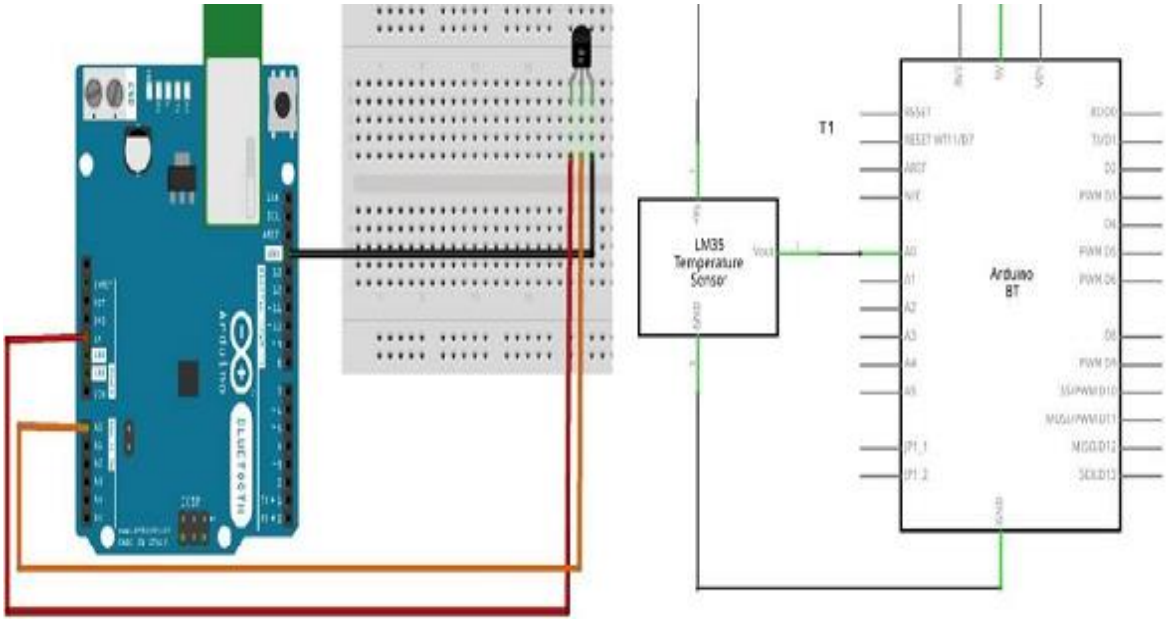


Figure 3.1: temp sensor with arduino

3.3 Gas Sensor

Presently, a large portion of the houses here have a LPG - Gas oven framework for preparing food and different other kitchen exercises. There are LPG chambers that are utilized as a fuel hotspot for the gas oven. Commonly, terrible mishaps happen because of spillage of these chambers, in these circumstances we should regulate legitimate consideration and wellbeing. This figure 3.2 shows connection of a Gas sensors with ardunio.

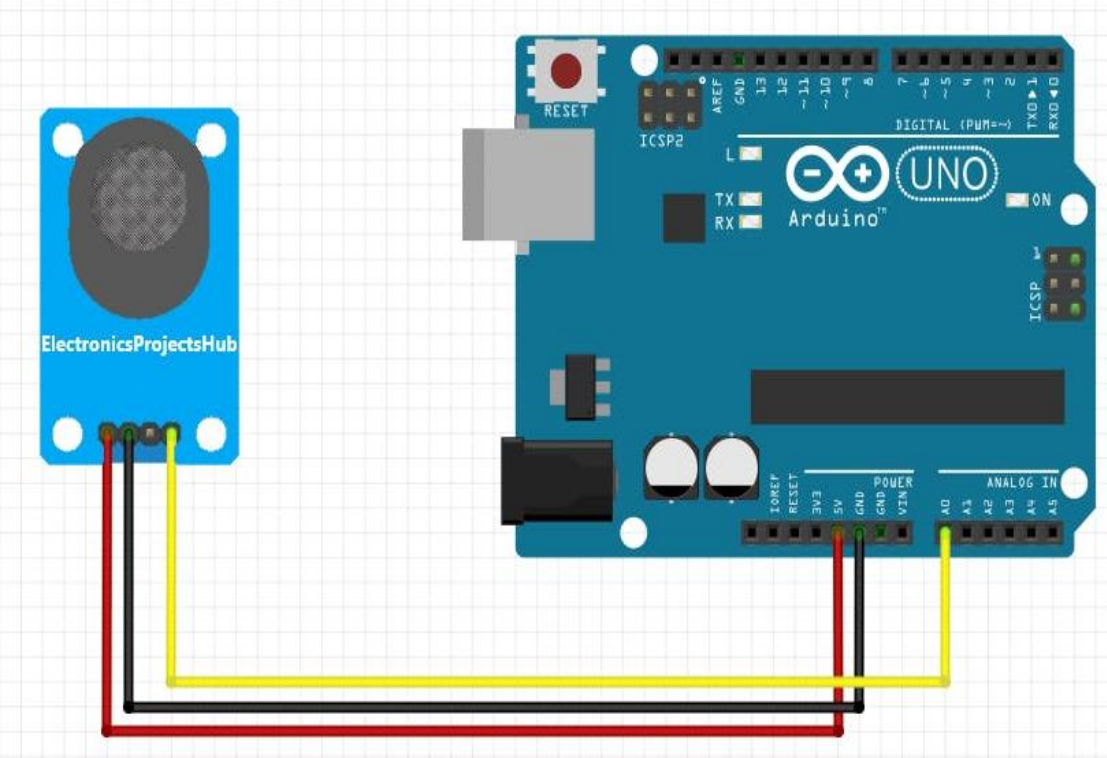


Figure 3.2: gas sensor with arduino connection

3.4 Flame Sensor

Fabricate alarm or fire locator utilizing Flame sensor and Arduino board, the sensor essentially recognizes IR (Infra-Red) light frequency between 760 nm – 1100 nm (nanometer) that is discharged from fire. The vast majority of the fire sensors accompanied the YG1006 sensor which is a fast and high delicate NPN silicon photograph transistor.t is covered with dark epoxy since the sensor is touchy to infrared radiation. By utilizing this idea project, you can see how to screen and

caution about fire, It is generally reasonable for putting out fires robot, alarm, and so forth. This figure 3.3 shows connection of flame sensor with Arduino.

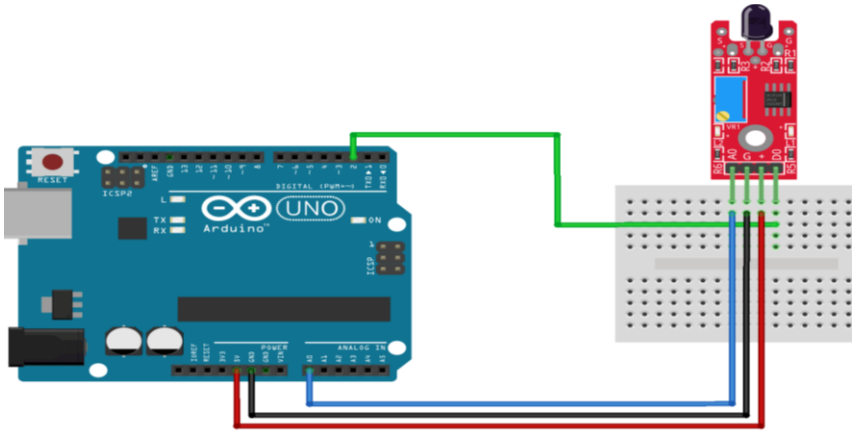


Figure 3.3: flame sensor with arduino connection

3.5 Rain Sensor

The rain sensor operates in a rather easy manner. The sensing pad, which is made up of a sequence of exposed copper traces, works as a variable resistor (similar to a potentiometer) whose resistance fluctuates depending on how much water is on its surface. The amount of water on the surface has an inverse relationship with resistance: the more water on the surface, the greater the conductivity and the lower the resistance. The less water on the surface, the worse the conductivity and the higher the resistance. The sensor generates an output voltage based on the resistance, which may be used to assess whether or not it is raining shown in figure 3.4

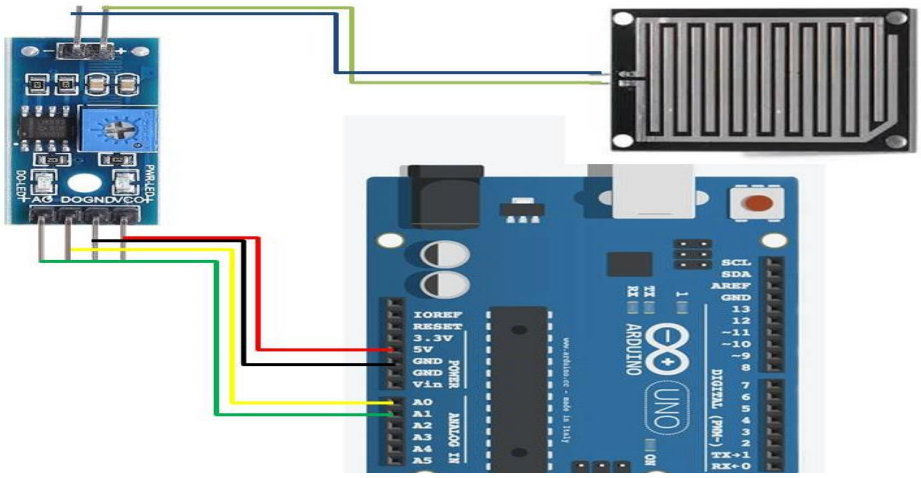


Figure 3.4: Connection of arduino and rain sensor

3.6 GSM 800l Sim Module

SIM800L GSM/GPRS module is a scaled down GSM modem, which can be coordinated into an extraordinary number of IoT projects. You can utilize this module to achieve nearly anything an ordinary wireless can; SMS instant messages, settle on or get telephone decisions, interfacing with the web through GPRS, TCP/IP, and then some! To finish it off, the module upholds quad-band GSM/GPRS organization, which means it works basically anyplace on the planet. This figure 3.5 shows connection of a sim8001 with arduino.

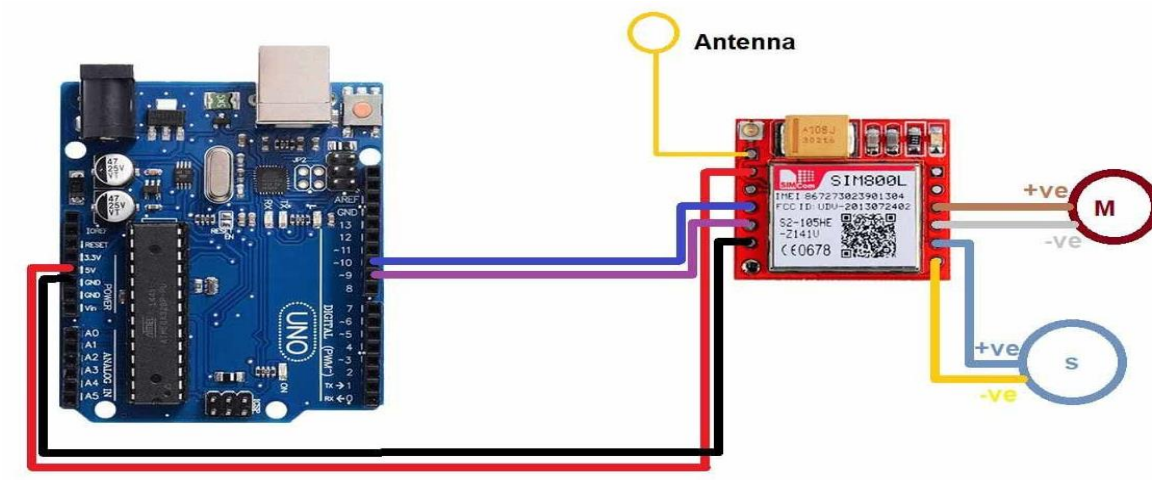


Figure 3.5: sim800l with arduino connection

3.7 Conclusion

In this chapter we show the simulation part of our component which we used in our circuit. The producing motion and get voice from our complete project we complete thus process.

CHAPTER 4

HARDWARE DEVELOPMENT

4.1 Introduction

In this section, we'll discuss elaborately about our hardware design of "Design and implementation of smart window system with home automation and monitoring system" and the component description, features, working procedure and cost analysis of our all equipment. The system hardware fabricate composed of microcontroller unit, temperature sensor, flame sensor, fire sensor, smoke sensor, buck converter, led and many more related component.

4.2 Arduino Controller Unit Description

In light of easy-to-use gear and programming, Arduino is an open-source prototype stage. Arduino sheets can take inputs such as a light on a sensor, a finger on a catch, or a Twitter post and convert them to outputs such as driving a motor, turning on a Drove, or disseminating anything on the internet. I can control your board by sending a set of rules to the board's microcontroller. In order to do everything, we utilize the Arduino programming dialect (for Wiring) and the Arduino Programming (IDE) for Preparing. 16 The Arduino board began altering to adapt to new needs since it was created at the Ivrea Interaction Design Organization as a simple device for speedy prototyping. All Arduino sheets are completely open-source, allowing customers to make them independently and tailor them to their unique needs. The product is also open-source, and it is evolving as a result of client commitments. To finish our project, we used the figure 4.1 Arduino Uno gadget.

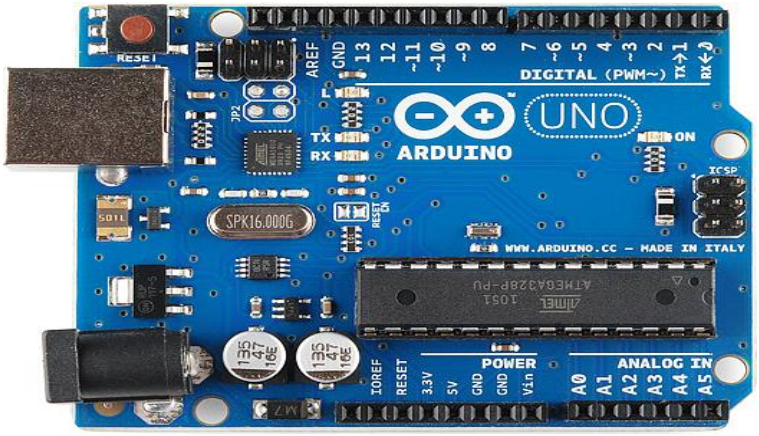


Figure 4.1: Arduino microcontroller

Features of the Arduino UNO

- Microcontroller: ATmega328
- Operating Voltage: 5V
- Input Voltage (recommended): 7-12V
- Input Voltage (limits): 6-20V
- Digital I/O Fork: 14 (of which 6 provide PWM output)
- Analog Input Fork: 6
- 32 KB flash memory, of which 0.5 KB is used by the boot loader
- SRAM: 2 KB (ATmega328)

4.3 IR Infrared Flame Sensor

A flame detector is a sensor shown in figure 4.2 that detects and responds to the presence of a flame or fire, allowing it to be detected. A detected flame may result in an alert, the deactivation of a gas line (including propane or a herbal gas line), or the activation of a hearth suppression machine, depending on the installation. When used in conjunction with commercial furnaces, their job is to provide confirmation that the furnace is operating properly; in these cases, they take no direct action beyond notifying the operator or controlling the device. Because of the mechanics it uses to find the flame, a flame detector can frequently respond faster and more accurately than a smoke or heat detector.

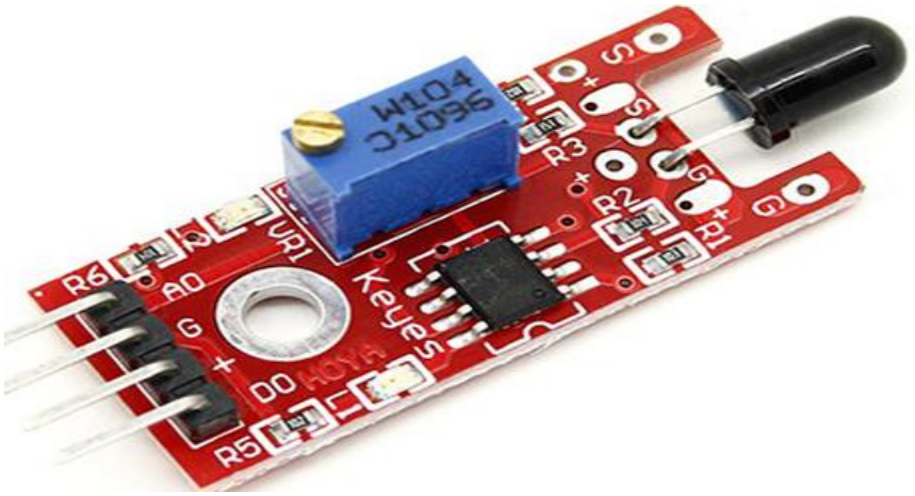


Figure 4.2: Flame Sensor

A flame sensor module contains a flame sensor (IR receiver), a resistor, capacitor, potentiometer, and comparator lm393 in an integrated circuit. Infrared light with wavelengths ranging from 0cm

to 300cm could be detected. The far-infrared flame probe transforms infrared light detected inside the body into current adjustments. With a detection attitude of 60 levels, the integrated variable resistor can be used to alter sensitivity. The working voltage is between 3.33 and 5.2 volts dc, with a virtual output to show whether or not a sign is present. An lm393 comparator is used to condition the sensing.

Features:

- Infrared light wavelength rang 0cm to 300cm
- 3.3 to 5. V I/O.
- Sensing conditioned lm 393 comparator.

4.4 MQ-6 Gas Sensor

This is a simple-to-use liquefied petroleum gas (LPG) sensor that can detect LPG concentrations in the air (mainly propane and butane). The MQ-6 Figure 4.3 can detect gas concentrations ranging from 200 to ten thousand parts per million. The sensitivities of this sensor is excellent, and the average response is quick. The sensor output is an analog resistance. The driving circuit is straightforward: simply supply 5V to the heating coil, add a load resistance, and connect the output to an ADC. Figure 4.3 is a sensor which appears in a package identical to our MQ-6 gas sensor and may be utilized with the breadboard listed below

Figure 4.3: Gas sensor MQ-6

The MQ-6 LPG gas sensor detects the presence of gas in the surroundings. It has pins that connect to the Arduino's microcontroller. Note: After a while, the sensor becomes extremely hot; do not touch it.

4.5 Rain Sensor

By connecting an Arduino to a Rain Sensor, a basic Rain Detection System may be readily developed. The sensor shown in figure 4.4 will detect any rain that falls on it, and the Arduino board will recognize it and take appropriate action. A system like this might be employed in a variety of areas, including agriculture and automobiles. Rainfall detection may be utilized to control the irrigation operation autonomously. Continuous rainfall data can also assist farmers in using this smart technology to irrigate the crop only when absolutely necessary.

The Rain board module is made up of two copper tracks that are meant to give strong resistance to the supply voltage under dry conditions, and the module's output voltage is 5V. As the dampness on the board increases, the resistance of this module steadily diminishes. With regard to the wetness on the module, the output voltage lowers as the resistance decreases.

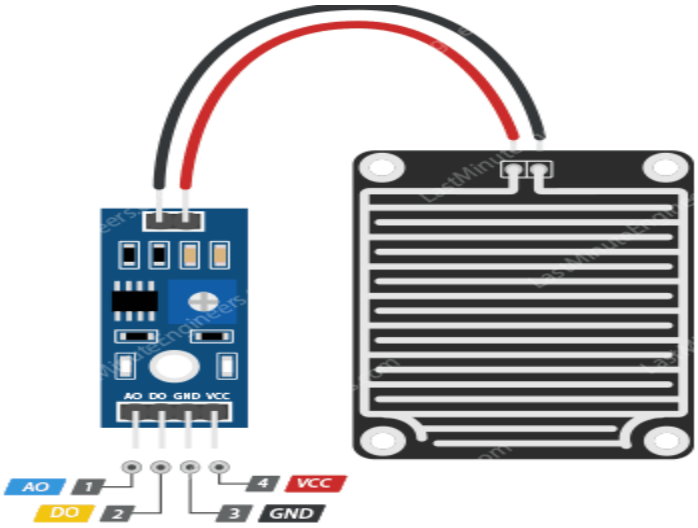


Figure 4.4: Rain sensor

The rain sensor module's operation is straightforward. Due to the dryness of the rain board module on a sunny day, it gives considerable resistance to the supply voltage. This value is shown as 5V on the rain board module's output pin. If an analog pin on the Arduino is read, this 5V is read as

1023. Rainwater causes the rain board to become wetter, lowering the supply resistance. The output voltage begins to fall as the resistance lowers.

4.6 GSM Module SIM800L

A GSM module is a chip or device that is used to allow connection between a phone or a calculating machine and a GSM framework. The modem (modulator-demodulator) is a critical component in providing circuitry and communication interfaces for PCs (such as RS-232, USB 2.0, and others). A GSM module can be a dedicated modem device with a serial, USB, or Bluetooth connection, or a22 phone with GSM modem capabilities. module shown in figure 4.5 is used to call the user when critical situation arises

Figure 4.5: GSM SIM800L

This module is used to warn the user by calling him/her within 30 seconds from sensing the gas. The green led will turn on when it called the user.

4.7 Servo motor

A servo motor is a small motor with a shaft for output. This shaft can be moved to certain angular positions by sending a coded signal to the servo. As long as the coded signal is present on the input line, the servo will maintain the shaft's angular position. The shaft's angular location changes as the coded signal changes. Servos are used to position control surfaces like elevators and rudders in radio-controlled airplanes. They're used by radio-controlled cars, puppets, and, of course, robots.

In this part, we'll talk about our motor, which is responsible for moving our robot head and two hands. The servo motor rotation angle and simulated results are shown below in figure 4.6

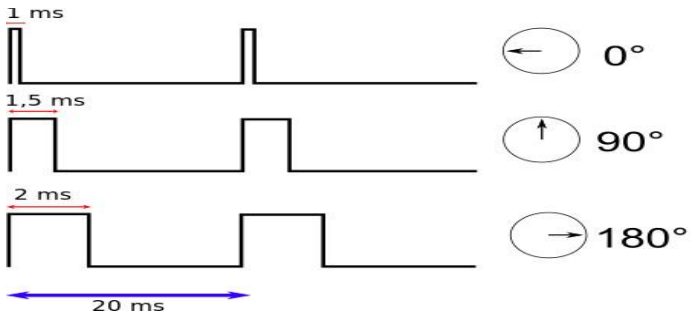


Figure 4.6: Motor Position Angle with Time

The set point is set in the manner depicted in the diagram above. The value is conveyed via a 50Hz signal, as you can see. The time of the logic HIGH impulse is the real value for the angle. The timing protocol used by most servos is just that. This 4.7 figure shows servo motor connection with arduino.

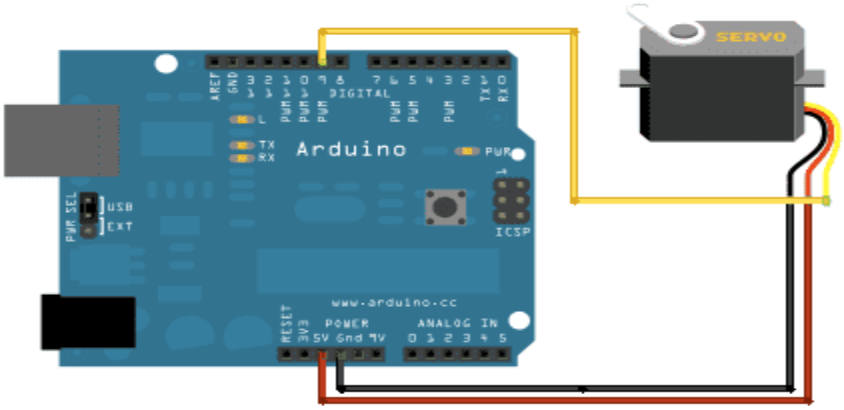
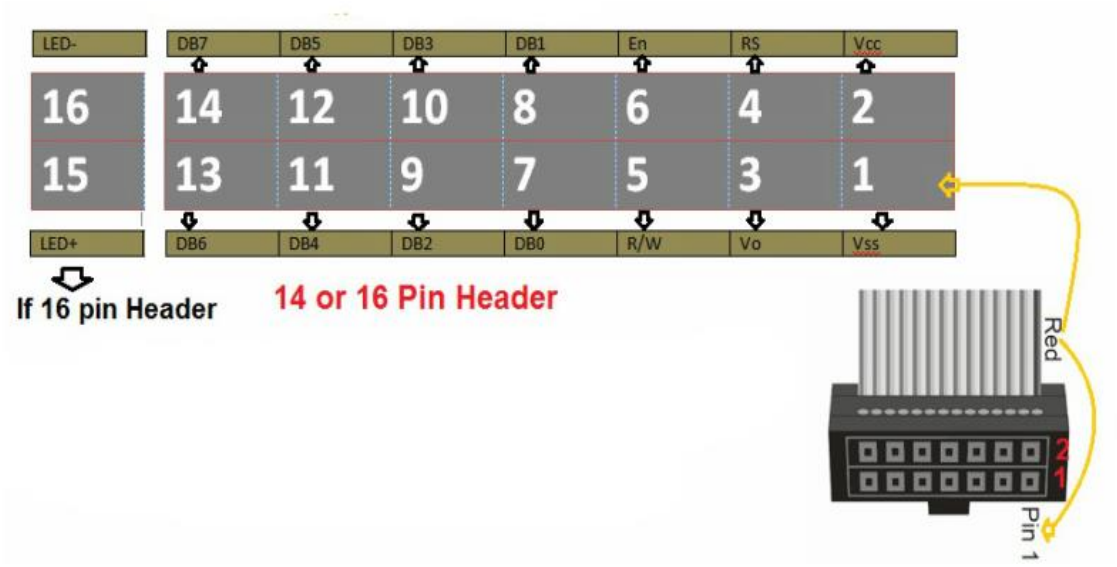


Figure 4.7: Servo motor with arduino connection

4.8 Description of LCD Display

A fluid basic stone presentation (LCD) are a level board show, electronic visual part, or video show that utilizes the light changing properties of fluid pearls. Fluid tremendous stones don't send light straightforwardly. Here, in this table shown in table 4.1 we're going, also, utilize a monochromatic 20x4 alphanumeric LCD. 20x4 comprehends those 20 characters can be showed up overall of the 4 lines of the 20x4 LCD, as a particularly all out of 80 characters can be showed up at any outline of time.

Table 4.1 Address locations for a 1x16 line LCD



4.8.1 Shape and Sizes

Certainly, even with character-based modules, there is a vast range of shapes and sizes available. In one, two, and four-line arrangements, line lengths of 8, 16,20,24,32, and 40 characters are the usual.

There are a handful of accumulated LC degrees of progress. In comparison to the more established "turned nematic" sorts, "supertwist" types, for example, offer better section and study point. A few modules are unprotected by foundation light, allowing them to be visible in dimly lit environments. The scene light could be "electro-splendid," necessitating the use of a high-voltage inverter circuit, or essential LED illumination. This 4.8 figure shows different models of LCD.

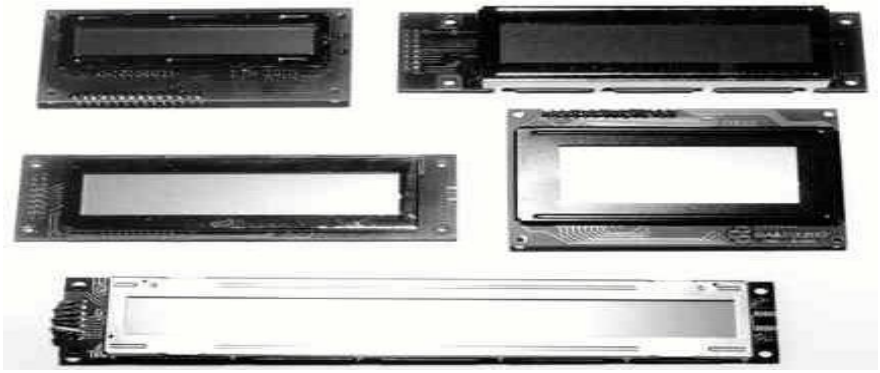


Figure 4.8: LCD Different Models.

4.8.2 Pin Description

The majority of LCDs with one regulator have 14 pins shown in figure 4.9, while LCDs with two regulators have 16 pins (two pins are extra in both for backdrop illumination LED associations). All function and symbol of pin shown in table 4.2

Table 4.2 Pin Description of LCD

PIN	SYMBOL	FUNCTION
1	Vss	Power Supply(GND)
2	Vdd	Power Supply(+5V)
3	Vo	Contrast Adjust
4	RS	Instruction/Data Register Select
5	R/W	Data Bus Line
6	E	Enable Signal
7-14	DB0-DB7	Data Bus Line
15	A	Power Supply for LED B/L(+)
16	K	Power Supply for LED B/L(-)

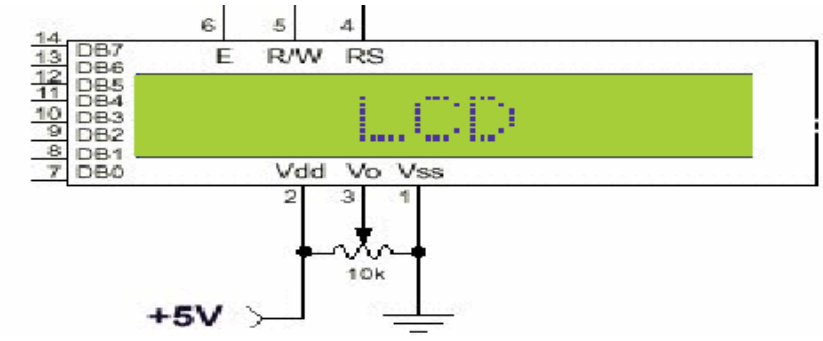


Figure 4.9: Pin Diagram of 16x2 line LCD.

4.9 Wires

In this endeavor we need couples of Females shown in figure 4.10(a) too, Male and Male too, Male jumper wire shown in figure 4.10(b). Those are for interfacing Bluetooth module and move module too, the Arduino UNO board.

Figure 4.10(a) Female to Male Jumper Wire. Figure 4.10(b) Male to Male jumper wire.

And we need some 220v carried wire shown in figure 4.11 to connect load in the relay module.

Figure 4.11: 220v carried wire.

4.10 Power supply

An AC connector, AC/DC connector, or AC/DC converter are an especially outside power supply, as ceaselessly as conceivable encased for a condition like an AC plug. In the force supply pack, we utilize one stage down transformer in like way information down the voltage from 220-volt ac shown in figure 4.12 also, 9-volt dc. The yield of the transformer is equivalently associated with the two diode circuit. As a full-wave rectifier circuit, two diodes are used. The capacitor is currently separating the full-wave rectifier's yield. With the help of charging and passing on influence, the capacitor converts the beating dc into smooth dc. The capacitor yield is coordinated by the IC 7805 controller in a short time. The IC 7805 generates a 5-volt rule, and the circuit generates a synchronized 5-volt power supply. The controller's yield is now channeled by the capacitor once more. In order to provide a visual piece of data as well as the circuit, we use one resistor and one driven in the capacitor yield.

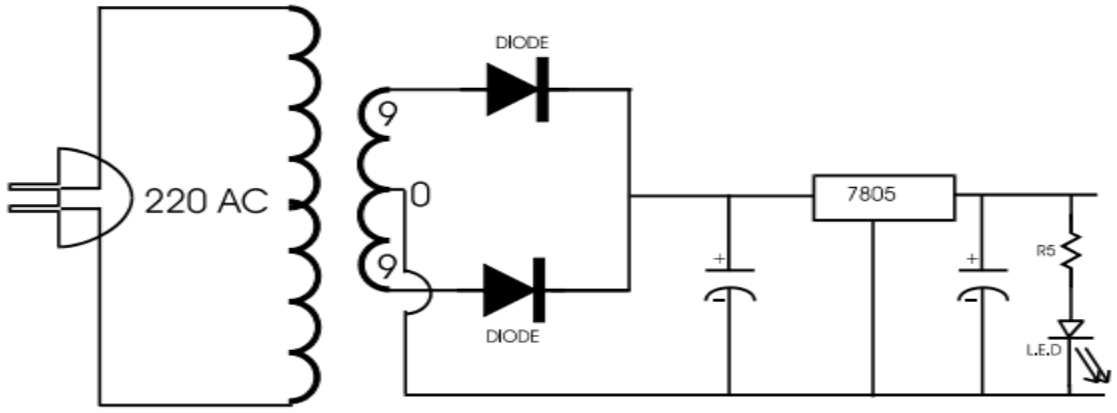


Figure 4.12: 12v Power supply.

4.11 Cost Analysis

In this section, we will show the cost of our project that means cost sheet representation of our project.

Cost Sheet

This table 4.3 shows the cost of all component we used in our project.

Table 4.3: Cost sheet

No	Component Name	Quantity	Purchase Price (TK)
01	Arduino microcontroller	1	750.00
02	Gas sensor	1	120
03	Flame sensor	1	150
04	Temp sensor	1	150
05	SIM800L	1	750
06	Rain sensor	1	230
07	Power supply	1	450
08	Buck converter	1	150
09	Servo motor	1	200
10	Others tools	xxx	2000
	Total		=4950

Comparison:

Our all segments are accessible on the lookout. We get all parts at are truly sensible cost. So we make this task more expense effective.

4.12 Conclusion

Five primary Component and a few devices are utilized in this framework to make it. This Project is utilized to control the house machines. Our segment is basic &available in our national market.

CHAPTER 5

SOFTWARE ANALYSIS

5.1 Introduction

The software utilized and the language in which the program code is defined, as well as the program code dumping tools, are discussed in this chapter. The development of the program for the application is also documented in this chapter. This figure 5.1 shows a software logo

Figure:5.1 Software Logo

5.2 Description of our Software

The Arduino ecosystem is the world's most popular open-source hardware and software platform. The firm provides a variety of software tools, hardware platforms, and documentation creation services. Arduino is a popular IoT development tool as well as one of the most effective STEM / STEAM education tools. Large number of designers, engineers, academics, programmers, and makers use Arduino to create innovations in music, games, toys, home automation, farming, autonomous vehicles, robots, and other fields all around world. Writing code and uploading it to the I/O board shown in figure 5.2 is simple with the open-source Arduino environment. It's available in Windows, Mac OS X, and Ubuntu. The environment is written in Java and is based

on open source tools like as Processing, avr-gcc, and others. The Arduino screenshot is given here...

Figure: 5.2 Arduino Software

It can also compile and upload programs to the board with a single button press. Editing make files or running programs from a command-line interface is rarely necessary. Although some third-party programs, like as Ino, make it feasible to build from the command line if necessary.

The Arduino IDE contains a C/C++ library names "Wiring" (from the same-named project), which simplifies many popular input/output operations. Arduino programs are written in C/C++, however to create a runnable program, users simply need to declare two functions:

Setup () is a function that is called only once at the start of a program and can be used to initialize settings.

Loop () — a function that is called over and over until the board shuts down.

Program Explanation:

1. Important Initialization & Setup:-

- Software Serial Communication is used with PWM pin of Arduino.

<SoftwareSerial.h> - Header library is made us of!

- Sensor speaker pin is assigned to pin 46 using Variable “sensor”
- “Sensor “ – Configured as Input
- “speaker” – Configured as Output
- “SD card” –Configured as input

“Motor” –Configured as output

5.3 Fritzing Software:

Fritzing is an open-source shown in figure 5.3 that aims to create amateur or hobby Design (cad) software for the design of digital hardware, in order to assist designers and artists who are ready to move beyond prototyping to creating a more permanent circuit. Potsdam University of Applied Sciences developed it. The software shown in figure 5.3 was designed in the spirit of the Process programming language and the Arduino microcontroller, and it allows a designer, artist, researcher, or enthusiast to research and produce a PCB layout for producing an Arduino-based prototype. Users can share and discuss drafts and experiences on the connected website, as well as cut production costs. We create circuit diagrams with visual interfaces using this software.

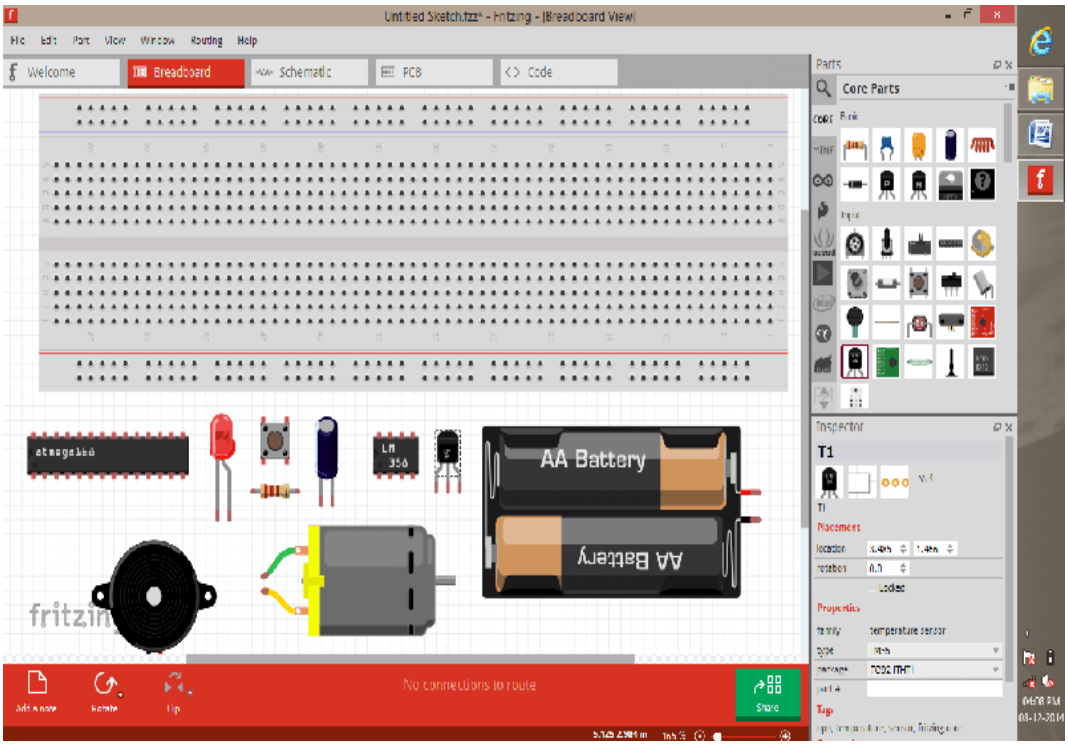


Figure: 5.3 Fritzing software

5.4 Conclusion

In this chapter we discussed about the software we use for our smart development of a robot. Here we use couple of software for programming, compiling, executing command for robot response and drawing circuit diagram for our robot and setup wireless communication between robot hardware .thus software are free and open source that's why it's reliable to us for making project or prototypes project. Reliability it is used in other fields. Software analysis is a very important part of our system. A Software analysis makes sure good design. A proper Software analysis and its burn into arduino Uno the project to a smooth end.

CHAPTER 6

RESULTS AND DISCUSSIONS

6.1 Introduction

The framework extended comprises 5 significant modules especially, the arduino uno, sensor with the microcontroller, GSM technology. It utilizes ATmage328 that is an 8-digit microcontroller. It finds wide application due too its highlights and low force. During this part, we are going also to examine the trial of our undertaking.

6.2 Experimental Setup

ATmega328 are the base of the framework. The sources of info given to the microprocessor are the yields of module HC-05. The yield of the regulator is given to the hand-off module. The Output of the Bluetooth module is given to the D0, D1 pin of ATmega328. The weight sensor is intensified and digitized by a simple computerized converter and is given to the port pins of the regulator. Here are some images of our project in figure 6.1 and figure 6.1.1 shows setup of our system.

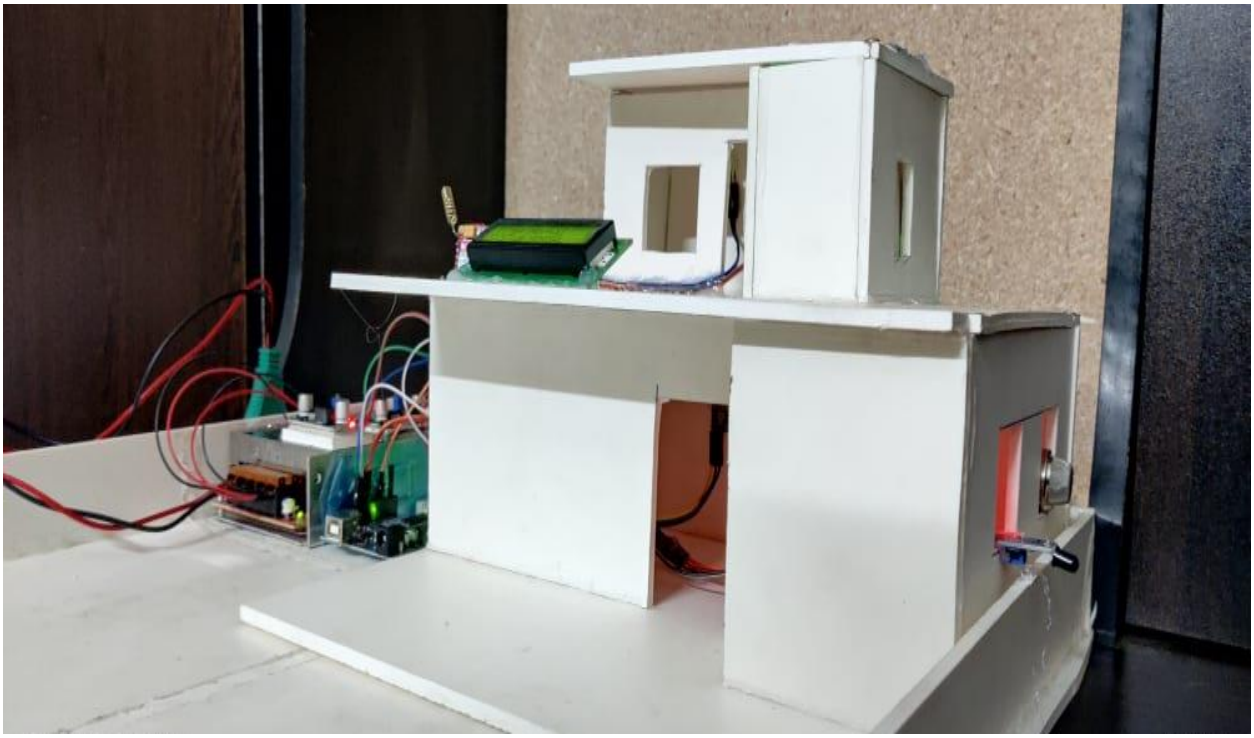


Figure 6.1: Our Project

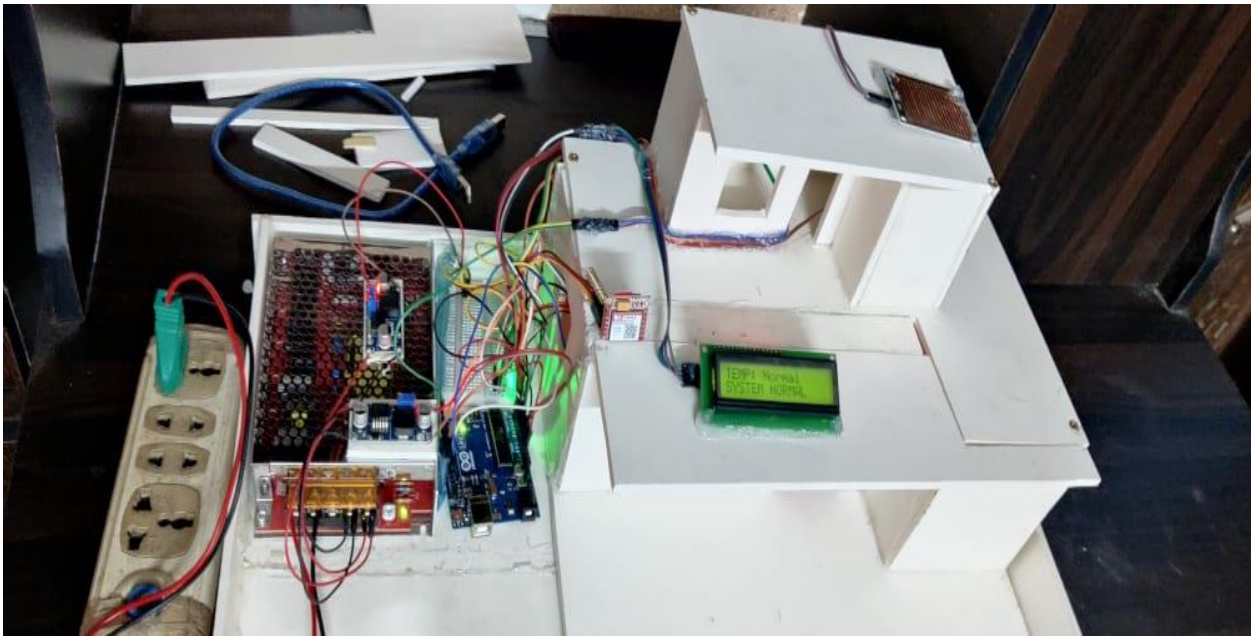


Figure 6.1.1: Setup of our system

The beneficiary and transmitter pins of the GSM module are associated with the TX and Rx pins of ATmega328p individually. For the assurance hardware, an exhaust is furnished with the regulator.

6.3 Advantages

- It is strong and simple too utilize the framework.
- No additional preparation is needed for utilizing it.
- All the control would be in your grasp by utilizing this home mechanization framework.
- This undertaking can give the office of observing every one of the machines with in the correspondence range through Bluetooth.
- By utilizing this framework the clients can check the situation with the machines at whatever time.

6.4 Disadvantages

- GSM technology utilized in this home robotization framework, which has new problem for govt registration can't be accomplished from outside this reach.
- Application is associated after detaching the GSM and sensor technology.
- When the new clients need to interface the first download application programming then the code and arrangement should be finished.

6.5 Limitations

The think about limits itself in recognizing the nearness of characteristic gas, butane, and fluid petroleum gas within the discus at a near remove from the conceivable source of gas spill. It is accepted that the volume of discuss within the room is more noteworthy than the volume of gas show. For fire, the sensor utilized is competent of identifying fire in its line of locate and 180-degree see of the infrared Driven. The framework moreover requires to be introduced in a region with strong organize flag. The GSM, after sending the desired number of call needs resetting through the physical button from the Arduino board. This will initialize the framework and the GSM as well.

6.6 Future work

We want to connect all appliances of home, office, industry, university, etc. where is an important place in our daily life? That makes our life easier and reduces our wasted time and cost. Figure 6.2 is a demo future vision of our project.

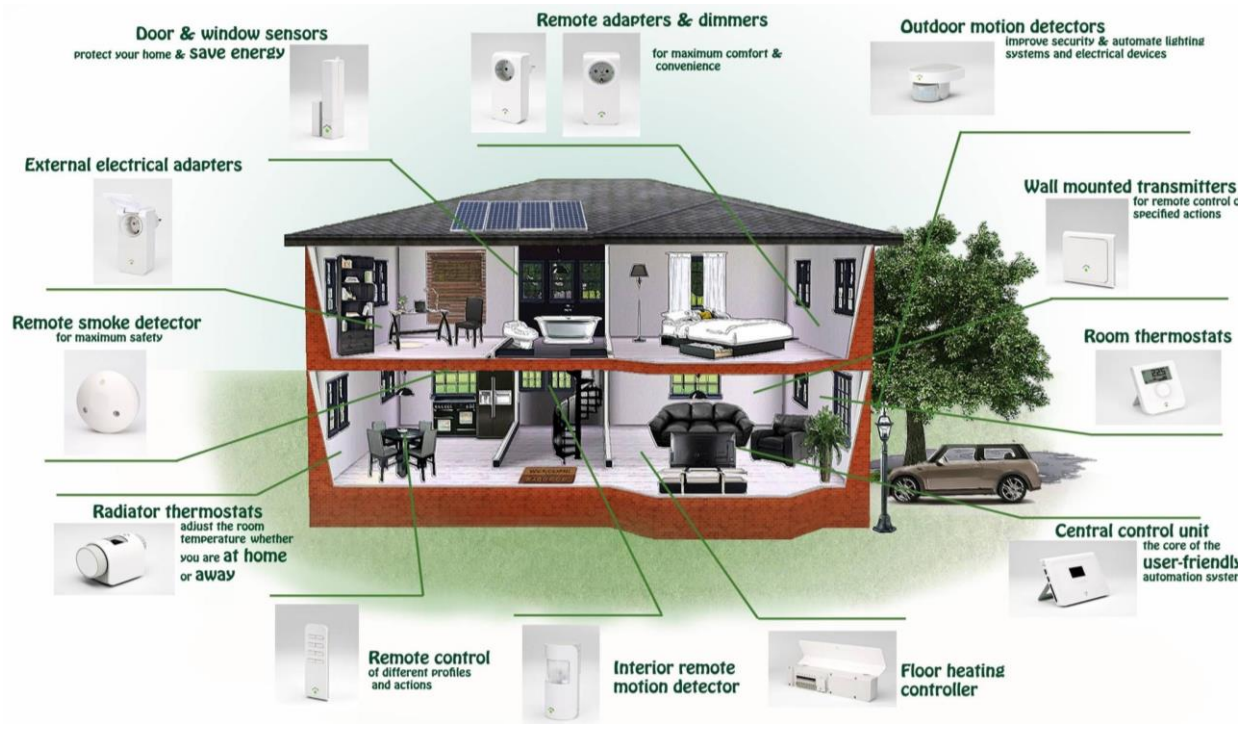


Figure 6.2: Future development module of our project.

- Controlling other home appliances by this system.
- Better user-friendly user interface.

- Removing disadvantages stage by stage
- In the future we can add a method where this system can automatically take steps against this gas leakage problem and save a lot of lives.
- We want to reduce the accident of our country that was caused by gas leakage by improving our system

APPENDIX

GSMBASEDAUTOMATICWINDOW

```
#include <SoftwareSerial.h>
#include <Wire.h>
#include <LiquidCrystal_I2C.h>
#include<Servo.h>
SoftwareSerial gsm (10,11);//rx,tx
LiquidCrystal_I2C lcd(0x27,16,2);
Servo myservo;
bool linear;
int
temp = A0,
gas = A2;
int led=13;

const int flamepin=A1;
const int threshold=200;// sets threshold value for flame sensor
int flamesensvalue=0; // initialize flamesensor reading

int gas_data,temp_data;
void setup() {
Serial.begin(9600);
 gsm.begin(9600);
 lcd.init();
 lcd.backlight();

 lcd.setCursor(0,0);
lcd.print("   Automatic " );
lcd.setCursor(0,1);
lcd.print(" Window System");
delay(5000);
```

Figure A1: GSM based Automatic Window System, Gas leakage & Smoke detection at home Coding Part 1

GSMBASEDAUTOMATICWINDOW

```
pinMode(led,OUTPUT);
pinMode(2,OUTPUT);
pinMode(temp,INPUT);
pinMode(gas,INPUT);
pinMode(flamepin,INPUT);
myservo.attach(6);
myservo.write(90);
}

void loop() {
  // put your main code here, to run repeatedly:
  //// gsm /////////

temp_data = analogRead(A0);
  int t = temp_data * 0.201;
Serial.print(" TEMP:      ");
lcd.clear();
lcd.print("TEMP: Normal");
lcd.setCursor(0,1);
lcd.print("SYSTEM NORMAL");

  Serial.println(t);
 if (Serial.available()>0)
   {
  nsms();
    //break;
    Serial.println("system message");
  }

  if (gsm.available()>0)
  Serial.write(gsm.read());
  /////
    temperature();
  gase();
```

Figure A2: GSM based Automatic Window System, Gas leakage & Smoke detection at home Coding Part 2

GSMBASEDAUTOMATICWINDOW

```
lcd.setCursor(0,0);
lcd.print("  Fire Detect");
lcd.setCursor(0,1);
lcd.print(" Check System");
delay(2000); //stops program for 1 second
nsms();
delay(8000);
delay(5000);
}
else{
digitalWrite(led,LOW); //turns led off led and buzzer

}
}

 void nsms()
{
  Serial.println("SMS loop entering");
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("sms loop entering   ");
 gsm.println("AT+CMGF=1");    //Sets the GSM Module in Text Mode
  delay(1000);  // Delay of 1000 milli seconds or 1 second
  gsm.println("AT+CMGS=\"+01626531530\"\r"); // Replace x with mobile number
  delay(1000);
  gsm.println("please check your device immediately sir fault was detected ");// The SMS text you want to send
  delay(100);
  lcd.setCursor(0,1);
  lcd.print("SMS Sending");
   gsm.println((char)26);// ASCII code of CTRL+Z
  delay(1000);


}
```

Figure A3: GSM based Automatic Window System, Gas leakage & Smoke detection at home Coding Part 3

GSMBASEDAUTOMATICWINDOW

```
    temperature();
  gase();
  Rain();
    flame();

delay(100);
//lcd.clear();
//  lcd.setCursor(0,0);
//lcd.print("   Automatic " );
//lcd.setCursor(0,1);
//lcd.print(" Window System");
  digitalWrite(2,1);
  delay(500);
  digitalWrite(2,0);
  delay(50);

}

void Rain(){
   int Value = analogRead(A3);
  Serial.print(" Rain_Value: ");
  Serial.print( Value);
  if (Value<350){
    myservo.write(180);
    Serial.print("Heavy rain led on");
    lcd.clear();
    lcd.setCursor(0,0);
    lcd.print("  Rain Detect");
    lcd.setCursor(0,1);
    lcd.print(" Closing Window ");
   // delay(5000);

  }
else {
```

Figure A4: GSM based Automatic Window System, Gas leakage & Smoke detection at home Coding Part 4

Figure A5: GSM based Automatic Window System, Gas leakage & Smoke detection at home Coding Part 5

Figure A6: GSM based Automatic Window System, Gas leakage & Smoke detection at home Coding Part 6

GSMBASEDAUTOMATICWINDOW

```
lcd.setCursor(0,0);
lcd.print("  Fire Detect");
lcd.setCursor(0,1);
lcd.print(" Check System");
delay(2000); //stops program for 1 second
nsms();
delay(8000);
delay(5000);
}
else{
digitalWrite(led,LOW); //turns led off led and buzzer

}
}

 void nsms()
{
  Serial.println("SMS loop entering");
  lcd.clear();
  lcd.setCursor(0,0);
  lcd.print("sms loop entering   ");
 gsm.println("AT+CMGF=1");    //Sets the GSM Module in Text Mode
  delay(1000);  // Delay of 1000 milli seconds or 1 second
  gsm.println("AT+CMGS=\"+01626531530\"\r"); // Replace x with mobile number
  delay(1000);
  gsm.println("please check your device immediately sir fault was detected ");// The SMS text you want to send
  delay(100);
  lcd.setCursor(0,1);
  lcd.print("SMS Sending");
   gsm.println((char)26);// ASCII code of CTRL+Z
  delay(1000);


}
```

Figure A7: GSM based Automatic Window System, Gas leakage & Smoke detection at home Coding Part 7

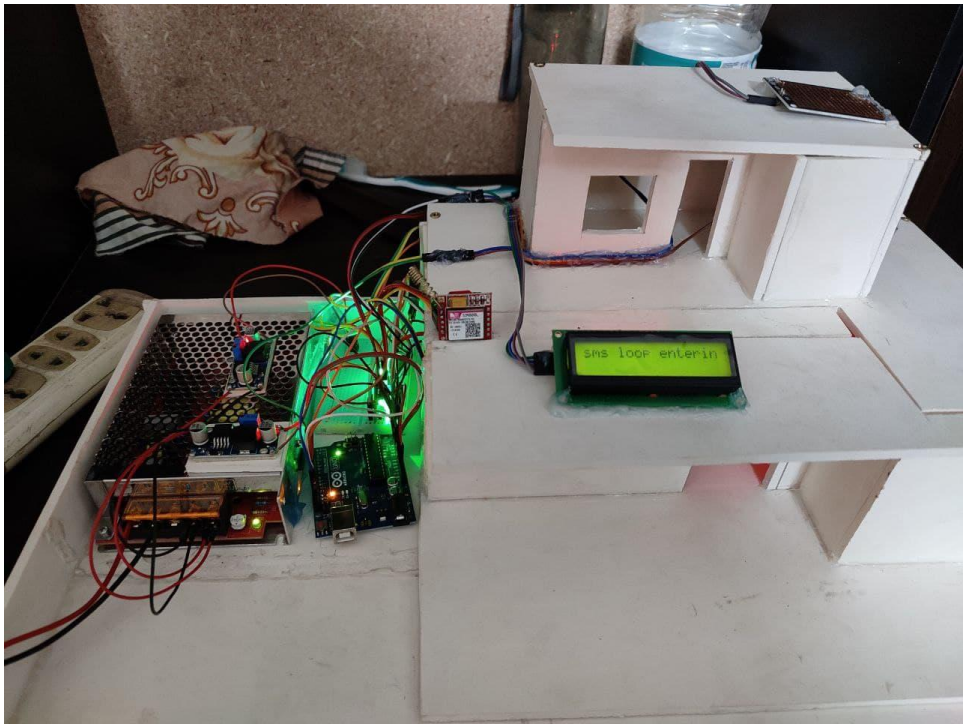


Figure A8: GSM based Automatic Window System, Gas leakage & Smoke detection at home project outlook interface

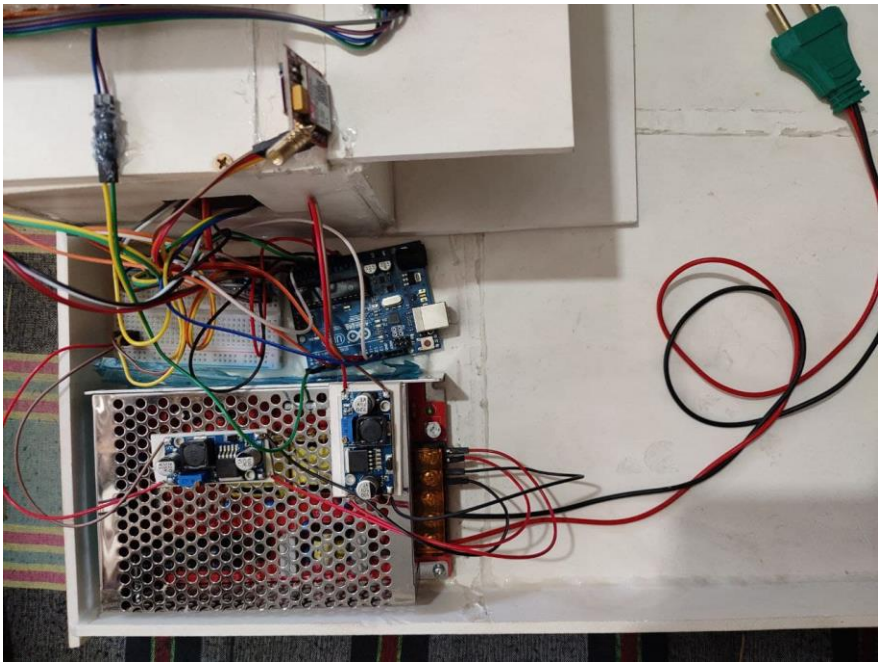


Figure A9: GSM based Automatic Window System, Gas leakage & Smoke detection at home project circuit connection

Reference

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PLAGIARISM

Plagiarism report