Chapter 1

Introduction

1.1 General

Although the words "drink not to drive, drive not to drink," seem plausible, how many individuals will follow through? Drinking and driving not only put others at risk on the road, but it also jeopardizes his safety. Every year, tens of thousands of traffic accidents are caused by drunk driving in China, with drunk driving accounting for more than half of all fatalities. [2] The majority of car accidents nowadays are caused by drunk driving. Drunk drivers are in an unstable state and make impulsive decisions on the highway, endangering the lives of all road users, including drivers. This threat is enormous, regardless of race or nationality. At a time driver tiredness is a significant factor in a wide range of vehicle collisions. According to recent findings, fatigue-related accidents caused 1,200 deaths and 76,000 injuries each year. Every year, road accidents in Sri Lanka result in financial damages of roughly Rs.9.34 billion.[7] The main reason for the accidents is drunken driving and drowsiness of the drivers. As can be seen, there are approximately 2,400 traffic accidents every year, resulting in one death every four hours.

Fig. 1.1: "Illustration of drunk driving"

The problem is being addressed in Nigeria by passing legislation forbidding drivers from being drunk before or while driving, as well as assigning law enforcement officials to apprehend and prosecute offenders.[1] However, police officers and road safety officers face a difficult task in effectively monitoring inebriated drivers. The reason for this is that humans are naturally incapable of being both omnipresent and omniscient in the same location and time.

Because of the increased speeds involved in distraction and the driver's inability to take any avoiding action, let alone brake, drowsiness-related accidents have all the makings of being more serious. In the realm of accident prevention systems, improving technologies for recognizing or avoiding driver fatigue is an important test. Because of the dangers that drowsiness poses on the road, techniques for counteracting its effects must be devised. The loss of awareness caused by fatigue produces several changes in the human body and behaviors. These side effects and criteria enable us to accurately assess drowsiness.

Drunk driving, speeding, and drowsiness of drivers, are the three main causes of an increase in road accidents, with drunken driving and drowsiness causing a disproportionate number of them. The goal of the system's implementation is to reduce the number of accidents caused by drunk driving by leveraging IOT. The MQ-3 alcohol sensor module, IR sensor, and DC motor are all connected to an ESP-8266 controller board. Alcohol sensors detect the presence of alcohol and IR sensors monitor the movement of the eye. The DC motor serves as a model for determining the mechanism's ability to lock the engine once ethanol is detected. [4] to suggest an automatic vehicle engine lockout control system. An alcohol breath analyzer was implemented using LabVIEW in the proposed system. An Arduino was used as the control unit, with an MQ-3 sensor acting as a breathalyzer. Buzzer and DC motor are some of the other Arduino modules which served as output devices. Input devices are MQ-3 sensors, IR sensors, and switches.

1.2 Problem Statement

By focusing on the driver's eye movements, an IoT-based solution is aimed to prevent innumerable accidents caused by fatigued drivers' eye movements and psychological changes. In addition to monitoring the severity of collision impacts during road accidents, records of the location must be kept to take supporting action. Drowsiness

also causes some alterations in driving style. Following these progressions, techniques in the second category evaluate the driver's sleepiness level. The second categorization technique employs steering angle, distance from the following vehicle, lateral location of the vehicle, longitudinal speed, longitudinal speeding up, and lane departure.

1.3 Contribution Of The Project

The influence of driver drowsiness and the impact of collision monitoring or alarm system is built utilizing IoT technologies and ESP-8266. An Infrared Ray sensor can be used while driving to detect driver weariness or sleepiness. MQ-3 sensors measure the breath of the drives. When drowsiness is identified, a buzzer alerts the driver, and a message is sent to the car owner through IoT via a mobile application. Assume a sudden collision occurs as a result of tiredness.

1.4 Aim Of The Project

The main aims of this project are below:

- Driver awareness is increased by using this system.
- The main motive of the project is to reduce accidents.
- Another goal of this project reduce the maintenance cost of the vehicle.
- A safe transportation development in our country.
- Also develop a safe transport system by stopping driving while asleep.

1.5 Objectives

The objective of this project is capable of following these terms:

- To detect drunk drivers and monitor conditions.
- To show alcohol level on display as well as the app.
- To reduce accidents and decreased vehicle maintenance.
- To measure the value of alcohol sensors.
- To monitor all the above information with one app.

Chapter 2

Literature Review

2.1 Introduction

As mentioned in the following sections, the drowsiness of a driver can be identified in a variety of ways using vehicle-based and behavioral metrics performed through various predictive algorithms. According to the study literature, there is limited trustworthy data on the number of research papers collected for this project, as well as the nature and size of the drug testing industry. The purpose of this research paper is to provide an overview of the existing 'Develop an IoT Based System to Detect Drunk Driver and Car Monitoring'. It discusses the different ways in which the condition of drivers can be monitored. It can be distributed or onboard data mining. This paper survey the existing model for computationally efficient onboard alcohol level test and drowsiness check of drivers.

2.2 Back Ground

Thus the proposed system is much more advantageous than the existing systems. For this reason, we studied some research papers.

1. To showcase the concept, researchers used an Arduino Uno microcontroller, an alcohol sensor, an LCD screen, and a DC motor to create a prototype alcohol detection and engine lockout system. The MQ-3 alcohol sensor is used in the system to continually monitor the blood alcohol concentration (BAC) to detect the presence of liquor in a driver's exhale. The proposed system's results adequately matched the requirements for starting a car's engine when the amount of alcohol detected in the driver's breath exceeds the legal limit. The alcohol sensor was able to respond rapidly when alcohol was detected, as well as operate for an extended amount of time, according to the results of the experiments. [11] Our system developed a new one and better service.

2. In this paper drinking and driving not only puts others at risk on the road, but it also jeopardizes his safety. Every year, tens of thousands of traffic accidents are caused by drunk driving in China, with drunk driving accounting for more than half of all fatalities. An MCU electronic circuit board is utilized in the system to address the severe problem of drunk driving in the current culture. The alcohol concentration is detected using the MQ303A alcohol sensor. According to the digital signal, the car is automatically controlled and cannot be driven after the driver has consumed alcohol, so preventing drunk driving. In this system, the concept of device selection is reliable performance and low cost. [2] We develop this project to detect not only drunk drivers but also detect toxic gasses present in the vehicle.

3. The proposed system has been proven in this work in three ways for detecting alcohol levels in a car driver's body and preventing the driver from driving the vehicle by shutting off the ignition system. It also sends messages to those who are concerned. To determine the amount of alcohol in one's breath. This module includes the MQ-3 sensor, as well as a heartbeat sensor that can detect the driver's pulse rate, facial recognition using a webcam and MATLAB, a Wi-Fi module to send a message through an Android App, a Raspberry Pi module to switch off the ignition, and an alert as a preventative module. This system aims to protect both the driver and the environment, which helps to reduce the number of fatalities caused by intoxicated driving while also easing the strain on cops. [3] We use ES-8266 as a microcontroller so the other wifi module was need in our project.

4. In this paper using Internet of Things (IoT) technology, an alcohol detection system was built for road transportation safety in a smart city. A microcontroller is used to set and monitor two Blood Alcohol Content (BAC) thresholds. When the first threshold is exceeded, the designed system sends the driver's BAC level as well as the vehicle's position coordinates to the central monitoring unit. The IoT-enabled alcohol-detecting device shuts down the vehicle's engine when the second BAC

level is reached. This system's effectiveness is checked to ensure optimal operation. The implementation of this method will aid in the reduction of drunk driving-related traffic accidents in smart cities. [4]

5. In this paper author proposed drowsy driver detection is perhaps the most important process for preventing any road accidents anywhere in the world. The goal of this research was to develop a smart alert mechanism for intelligent vehicles that can detect and avoid drowsy driving. However, sleepiness is a common occurrence in the human body caused by a variety of circumstances. As a result, a powerful alarm system must be designed to avoid the source of the incident. In this work, we look at a drowsy driver alert system that was created utilizing a technology that analyzes Video Stream Processing using the eye blink idea.

6. The characteristics that cause exhaustion in drivers are discussed in this work. The majority of street mishaps are caused by tiredness. Every year, a high number of street accidents are caused by driver inexperience. Although determining the exact amount of mistakes caused by sluggishness is beyond the scope of possibility, research suggests that 20 percent of errors are caused only by weakness. This project connects a USB camera to an eye-squint checking framework and generates a signal that warns the driver when they are sleepy. The location of the driver can be tracked via IoT. The administrator of the proposed web application plan will regulate the framework's parameters and deliver messages to the associate.

7. In Nigeria, there are a staggering number of fatal traffic accidents, with 15,090 people dying in 3,075 incidents between June 2006 and May 2014. The number of fatalities peaked in 2013 (2,061), up 2.8% from the previous record of 1,652 deaths set in 2012. On a national scale, Lagos had the most fatalities (1,579 from 620 occurrences), while FCT (Abuja) had the greatest relative mortality rate (0.6 per 100,000 people). At the regional level, the South had a higher rate of fatal traffic accidents (8,288 people, or 55%) than the North (6,792 persons, or 45%). Except for Boko Haram

terrorists targeting commuters in Borno State, political violence is determined to have a minimal relationship to accidents.[1]

8. A model predictive controller (MPC) including a velocity and path planner is designed for real-time calculation of a safe and comfortable velocity and steer angle in a heavy-duty vehicle. By identifying a straightforward roll and motion model based on measurement data, the computation time is decreased. A heavy-duty truck's measurements are used to validate the proposed roll model and build the truck's roll dynamics, and the recommended model exhibits good agreement with the measurement data. Safety concerns including rollover prevention and avoiding moving obstacles are taken into consideration. Acceleration, jerk, steer angle, and steer angle rate are all constrained for comfort. Different situations are used to evaluate the simulation and control algorithm, and the test results reveal the algorithm's characteristics.[6]

2.3 Conclusions

We have read more research to gain knowledge about this project. We learned about online monitoring systems, database management, and different types of alcohol sensors. Also, know which methods are used to detect the drowsiness of the driver. We learned about the power supply of the project after reading this paper.

Chapter 3

Methodology

3.1 Introduction

A set of guiding concepts and practices for planning, managing, and executing projects is known as a project management methodology. How work is prioritized and completed is determined by the project management approach. The underlying plan and logic of our research study are referred to as methodology. It entails researching the methods employed in our project, as well as the theories or principles behind them, to design a strategy that is reached our goals. The primary goal of the project management technique is to standardize, structure, and coordinate work processes. This allows us to keep all initiatives on track and repeat successful parts while learning from mistakes, resulting in a continual improvement process. We follow the five steps of methodology which are problem identification, feasibility study, data analysis, system construction, and testing and debugging.

The scientific method includes problem identification, which is the initial stage in a systematic process to find, assess, and investigate viable solutions to a problem. After several studies, we found that drunken driving and drowsiness are main the reason for road accidents. It is one of the biggest problems in our society. The feasibility study compares the proposed project's value to predicted development costs by analyzing revenues and expenses. The primary components of a feasibility study should be studied as part of establishing the possible success of our project.

We collect some data about alcohol. We check the value of alcohol which is normal and which is medium and which is extremely high. This data is collected from different sources and some reviews and research papers. Normally if the value of alcohol is below 200, then it is called a normal condition. That means drivers don’t take any alcohol. But if the value is around 200-500, it will be considered to present a medium level of alcohol. But if the value is above 500, then drivers take extreme levels of alcohol. We also collected some data about the drowsiness and tiredness of the driver. The respondents became tired and drowsy after twenty to twenty-five minutes of diving, according to the findings. We analyzed this input portion of the

project. At a time we learn about database management systems. After a lot of studies about database systems, we decided to develop a real-time database. For this reason,

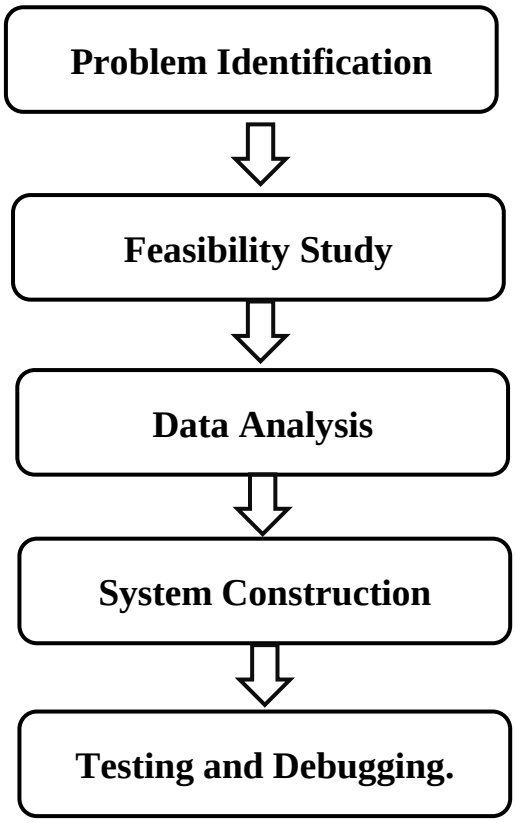


Fig. 3.1: Methodology

Firebase is the most popular and high-security database in this global market. This is a google authorized database. For student purposes, we used the free version of the database. The free memory is 25 MB. In this case, they provide a fixed time to use their service which is one month. At a time we search for a platform where we developed our Android apps. After searching we found a platform. The name of the platform MIT app inventor. This is a block diagramming type app development platform. In this platform, android apps and IOS apps are both created.

The planned technique of construction, taking into account all contractual and legal requirements, construction limits, risks, and possibilities is referred to as construction methodology. The temporary and permanent works, as well as the process required to finish the construction operations, are all part of the methodology. This is the main part of the project. We develop a construction view of the project. In this project, we used an MQ-3 sensor which was placed in the pipe. An Infrared Ray sensor is placed in front of the eye so that sensor can check the movement of the eyelids.

3.2 Hardware Setup

It's difficult to know everything there is to know about the project's equipment and software. We placed electronic components to make idealize. The ESP-8266 is the most significant component of our project. We consider this part to be the heart of our extension because it contains all of the computer program information. We used one alcohol sensor MQ-3 and an IR sensor. The push button is used to start the vehicle. We also used motors and buzzers as an output device. A Wi-Fi router is used to provide internet to the Wi-Fi mod of ESP 8266.

Hardware components

We have used lots of hardware and software components in our project. Now let’s discuss those components below:

- ESP-8266
- MQ-3 Alcohol sensor
- IR sensor
- Power Supply
- Motor
- Buzzer
- PCB Board
- Push Button
- Pocket Router

3.2.1 ESP-8266

NodeMCU is an open-source Lua-based firmware and development board designed specifically for Internet of Things (IoT) applications. It comprises firmware that operates on Espressif Systems' ESP8266 and hardware based on the ESP-12 module. As a Wi-Fi module, the ESP 8266mod is used. It has a microcontroller attached to it. It is primarily used for IoT development (Internet of Things). Like a Pocket router, this WiFi module sends all of our base station's signals. All of the information must be kept in a standard database. As a result, we used Firebase as our database. All input data or signals must first pass via the Wi-Fi module. This information is then saved in Firebase for real-time monitoring. Our mobile phone is immediately connected to this firebase.

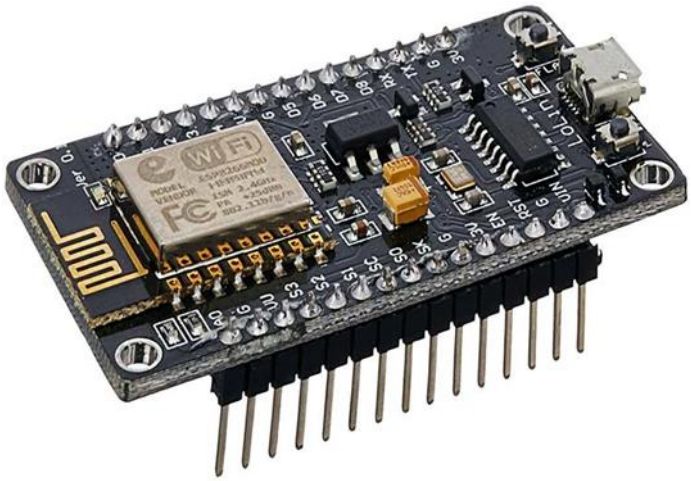


Fig. 3.2: ESP-8266

3.2.1.1 PIN Configuration:

- NodeMCU / ESP8266 has 17 GPIO pins which are used to connect the load or sensors.
- USB Port – Used for powering up our ESP-8266 and uploading sketches
- TX/RX – Transmit and receive data indication LEDs
- Power LED Indicator – This LED lights up anytime the board is plugged into a power source
- 3.3V Pin – This pin supplies 3.3 volts of power to our projects.
- ADC- The two functions can be implemented using ADC.

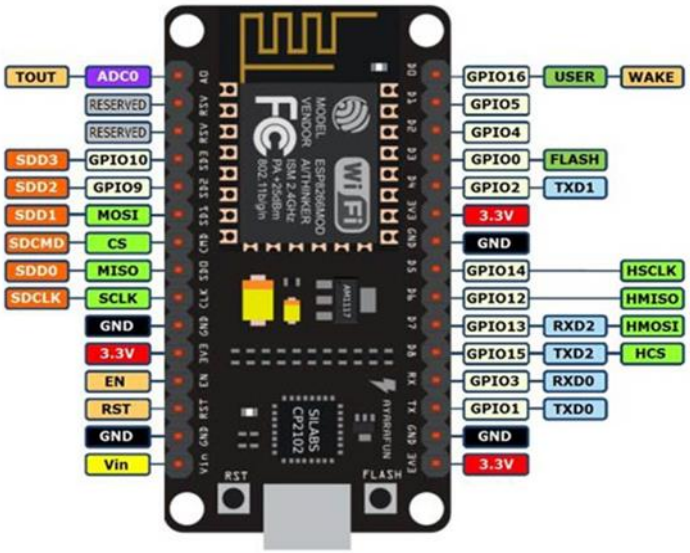


Fig. 3.3: Pin diagram of ESP-8266

3.2.1.2 Working System:

NodeMCU is the microcontroller of this object. It has some digital pins, one Rx (Receiver Pin) one Tx (Transmitter) pin, and one analog pin, etc. This pin is also used to control input and output devices. For the analog input signal, we have only used the A0 pin. For the digital input signal, we have used D0-D8 pins. These pins are also used as a digital output. We have connected an external power supply for activating this controller. Here, the positive point of the power supply connects with the Vin pin and the negative point connects with the GND pin. All the input and output devices connect between D0 to D8. For the input signal, we have declared this pin as input, and for the output signal, we have also declared this as output.

3.2.2 MQ-3 Alcohol Sensor

The MQ3 alcohol sensor operates at 5V DC and consumes about 800mW. It can detect alcohol concentrations of 25 to 500 parts per million. An alcohol sensor detects the attentiveness of alcohol gas in the air and an analog voltage is an output reading. The sensor can activate at temperatures ranging from -10 to 50° C with a power supply is less than 150 Ma to 5V. The sensing range is from 0.04 mg/L to 4 mg/L, which is suitable for breathalyzers.

Fig. 3.4: Alcohol Sensor

3.2.2.1 Specifications Of Mq-3 Sensor

- Operating voltage: 5V
- Resistance: 200 KΩ
- Heating Capacity: <800mw
- Sensing Resistance: 1 MΩ – 8 MΩ
- Preheat Time: Over 24 hour

3.2.2.2 Working System

MQ-3 Alcohol sensor was connected with ESP-8266. Analog pins of the alcohol sensor were connected with A0 pins. So analog value was counted for the percentage of alcohol. The condition of alcohol level depended on this value. If the value was above 500, it would be considered extreme-level drinking. Again if the value was 200 to 500, it would be indicated medium-level drinking. Again if the value was below 100 then that was called a normal condition.

3.2.3 Power Supply

Fig. 3.5: DC Adopter

One of the most useful power sources in use at our project is the 5V power. Using a mixture of transformers, diodes, and transistors, a 5VDC output can be created from a 50VAC or 240VAC input. We used a capacitor for purifying the DC voltage. With current technology, 5 volts provided the best mix of noise immunity, power consumption, and speed. To reduce the requirement for additional power supply, linking circuits such as sensors and other devices try to use the same voltage.

3.2.3.1 Working System:

This is the main power source of this project. Every electronics need a 5v power supply for activating. The positive side of the power supply is connected with VCC or 5v and the other side connects to the GND site. USB port used for portable this power supply. The current amp of the power supply is so low which is suitable for our electric components

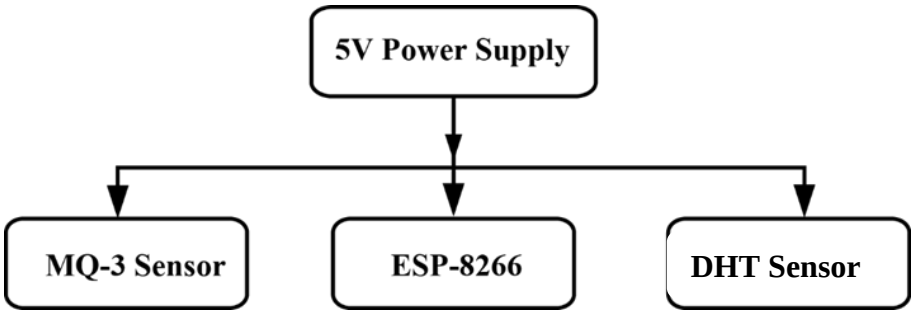


Fig. 3.6: Connection Block Of MQ-3, ESP-8266, DHT

3.2.4 Motor

A Direct Current (DC) motor is a revolving electrical device that transfers electricity

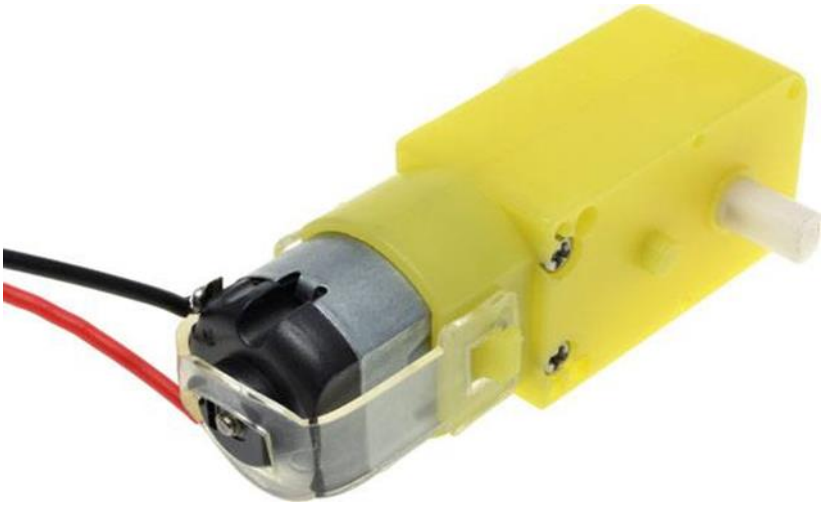


Fig. 3.7: DC Motor

into mechanical using direct current. When DC voltage is given to its terminal, an inductor (coil) inside the DC motor generates a magnetic field that causes rotary motion. In this project, we used the gear motor to show the conceptual engine starting. If we start any motor, we will start any engine following the same coding and hardware connection.

3.2.4.1 Specifications Of Motor

- Motor Type: Gearbox
- Motor Voltage: 3-9 V
- Gear Ratio: 48:1
- No-Load Current: 0.12 A at 3V
- No-Load Speed: 110 RPM at 3V

3.2.4.2 Working System

Motors were used to check the turn on or off. The engine was considered on when the motor was rotated and rotation off was considered to shut down. Motors were connected to relay modules to control the drive of the motor in clockwise and anti-clockwise directions.

3.2.5 DHT Sensor

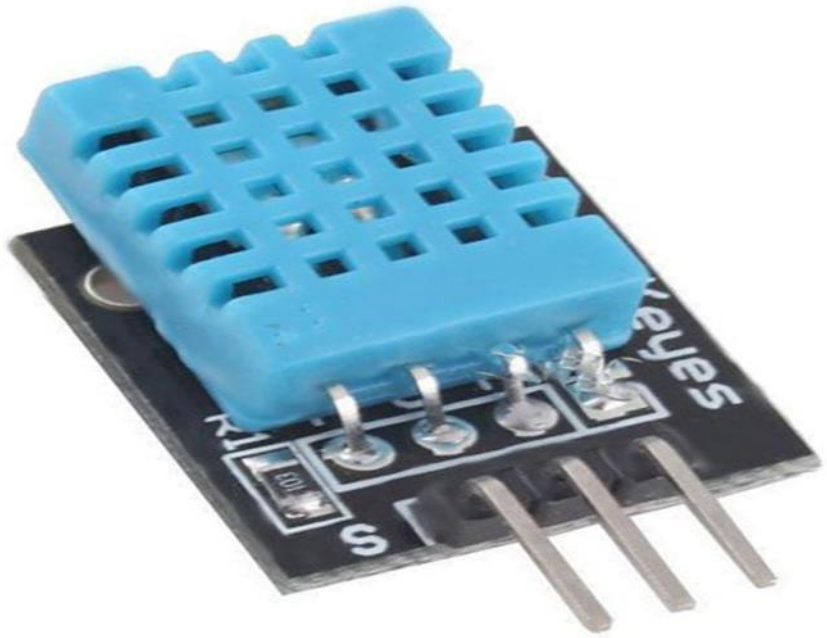


Fig. 3.8: DHT Sensor

A typical temperature and humidity sensor is the DHT11. The sensor has a dedicated NTC for temperature measurement and an 8-bit microprocessor for serial data output of temperature and humidity information. Additionally, factory calibrated, the sensor makes it simple to integrate with other microcontrollers.

The sensor has an accuracy of 1°C and 1% and can detect temperatures from 0°C to 50°C and humidity from 20% to 90%. Therefore, if you want to measure in this range, this sensor could be the best option. The DHT11 Sensor produces serial data and is fully calibrated, making setup incredibly simple.

3.2.5.1 DHT11 Specifications:

- Operating Voltage: 3.5V to 5.5V
- Operating current: 0.3mA (measuring) 60uA (standby)
- Output: Serial data
- Temperature Range: 0°C to 50°C
- Humidity Range: 20% to 90%
- Resolution: Temperature and Humidity both are 16-bit
- Accuracy: ±1°C and ±1%

3.2.5.2 Working Principle:

The DHT11 sensor comprises a thermistor for measuring temperature and a capacitive humidity-detecting device. The humidity-detecting capacitor consists of two electrodes separated by a substrate that may store moisture as a dielectric. The capacitance value changes as the humidity levels fluctuate. These modified resistance values are measured, processed, and converted into digital form by the IC.

This sensor employs a negative temperature coefficient thermistor to measure temperature, which results in a drop in resistance value as the temperature rises. This sensor is often constructed of semiconductor ceramics or polymers, which enable it to obtain a higher resistance value even for the slightest temperature change.

With a 2-degree precision, the DHT11's temperature range is 0 to 50 degrees Celsius. This sensor has a 20 to 80% humidity range with a 5% accuracy. This sensor's sampling rate is 1Hz.In other words, it provides one reading per second. The DHT11 is a tiny device with a 3 to 5-volt operational range. 2.5mA is the maximum current that may be utilized for measuring. Four pins make up the DHT11 sensor: VCC, GND, Data Pin, and a Not Connected Pin. For communication between the sensor and microcontroller, a pull-up resistor of 5k to 10k ohms is offered.

3.2.6 Single-Channel Relay

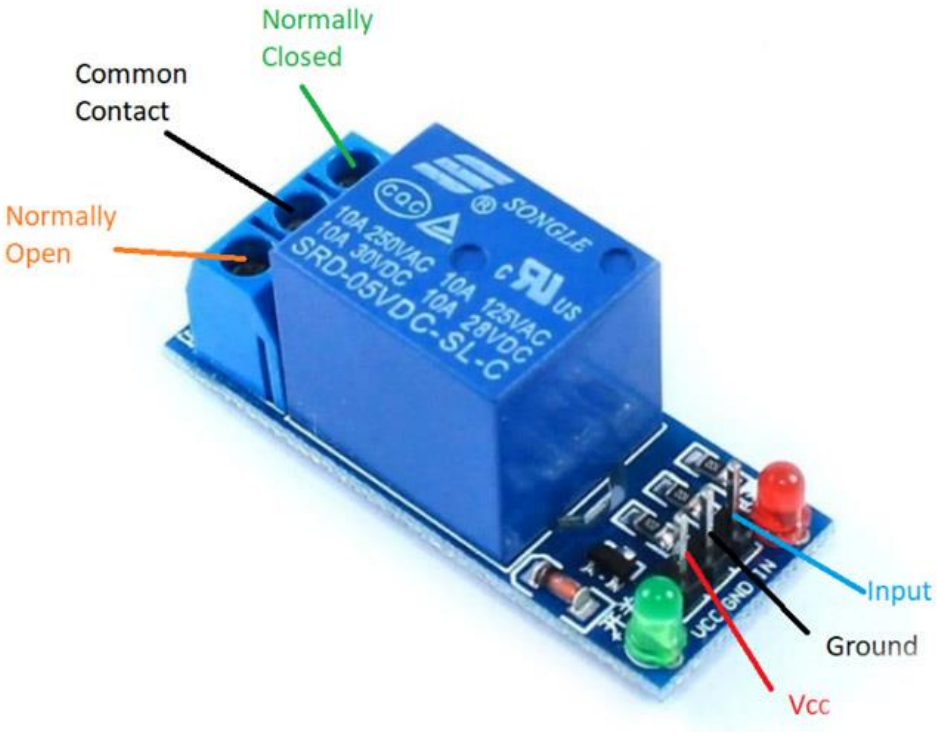


Fig. 3.9: Single-Channel Relay

An electromechanical device called a relay utilizes an electric current to open or shut a switch's contacts. The single-channel relay module has elements that facilitate switching and connecting as well as serve as indicators to signal if the module is powered and whether the relay is active or not. It is much more than simply a simple relay.

3.2.6.1 Module Specifications

Single-Channel Relay Module Specifications in below:

- Supply voltage – 3.75V to 6V
- Quiescent current: 2mA
- Current when the relay is active: ~70mA
- Relay maximum contact voltage – 250VAC or 30VDC
- Relay maximum current – 10A

3.2.6.2 Working Principle

It functions according to the electromagnetic attraction theory. When electricity passes through the first circuit, the electromagnet (brown), which is activated, creates

a magnetic field (blue), which pulls a contact (red) and turns on the second circuit. A spring pushes the contact back up to its initial position when the power is turned off, turning off the second circuit once more. The contacts in the second circuit are not connected by default and turn on only when a current is flowing through the magnet in this example of a "normally open" (NO) relay. Other relays only turn off when the magnet is engaged, pulling or pushing the contacts apart (they are "normally closed" since the contacts are linked and a current runs through them by default). Normally open relays are the most common. A relay connects two circuits by providing current to an electromagnet, which attracts a metal switch and turns on the second output circuit. The output circuit's higher current is activated by the input circuit's modest current.

3.2.7 16X2 LCD Display

The Liquid Crystal Display (LCD) is the most popular and widely used in microcontrollers and embedded-based projects. A (16x2) LCD panel consists of 16 columns and 2 rows. It can show up to 16 characters per line.

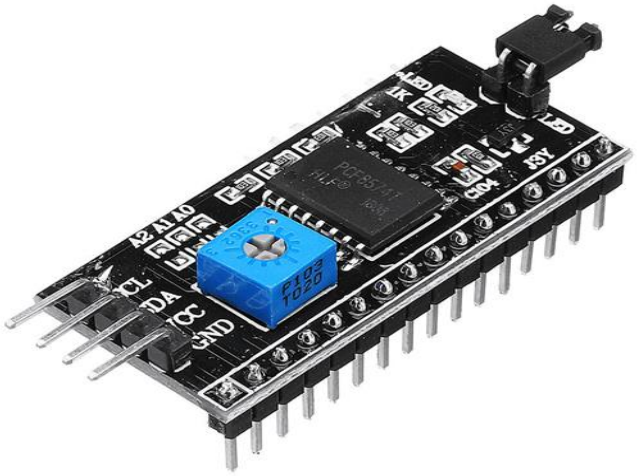
Fig. 3.10: LCD Dsplay

3.2.7.1 LCD Pin Diagram

Fig. 3.11: LCD Display Pin mode

3.2.8 I2C Module

I2C is a single-ended serial bus that is a synchronous, multi-slave, multi-master packet switched. Multiple chips can be connected to the same bus, for example. Serial Data Line (SDA) and Serial Clock Line (SCL), both bidirectional open collector and



open drain lines, are pulled up with resistors in I2C.

Fig. 3.12: I2C Module

3.2.9 MQ135 Air Quality Sensor

Fig. 3.13: Air Quality Sensor

An air quality gas sensor is a device used to detect, measure, or monitor gases like ammonia, benzene, sulfur, carbon dioxide, smoke, and other dangerous gases. The MQ135 air quality sensor is a member of the MQ gas sensor family and is used to identify dangerous gases and smoke in outdoor air. It uses 150mA while running on a 5V supply and must be preheated for 20 seconds to get an accurate outcome. The digital output pin goes high if the air's gas concentration is more than the threshold limit, and the analog pin is used to acquire the analog output voltage, which provides an approximation of the gas level in the air.

3.2.9.1 Specifications:

The MQ135 air quality sensor specifications are listed below:

- Operating Voltage: +5V
- High Sensitivity and faster response.
- Used as an analog or digital sensor.
- Operating temperature: -10°C to -45°C.
- Load resistance is adjustable.
- The potentiometer is used to vary the sensitivity of the digital pin.
- Sensing resistance: 30kiloohms to 200kiloohms.

- Simple drive circuit.

3.2.10 Construction Design

Fig. 3.14: Project Demonstration

Chapter 4

Hardware & Software Simulation

4.1 Introduction

Hardware and software are the technical analysis of a system project that is critical to success or failure. In the project, there are two Requirement analysis processes.

- Hardware
- Software

4.2 Block Diagram

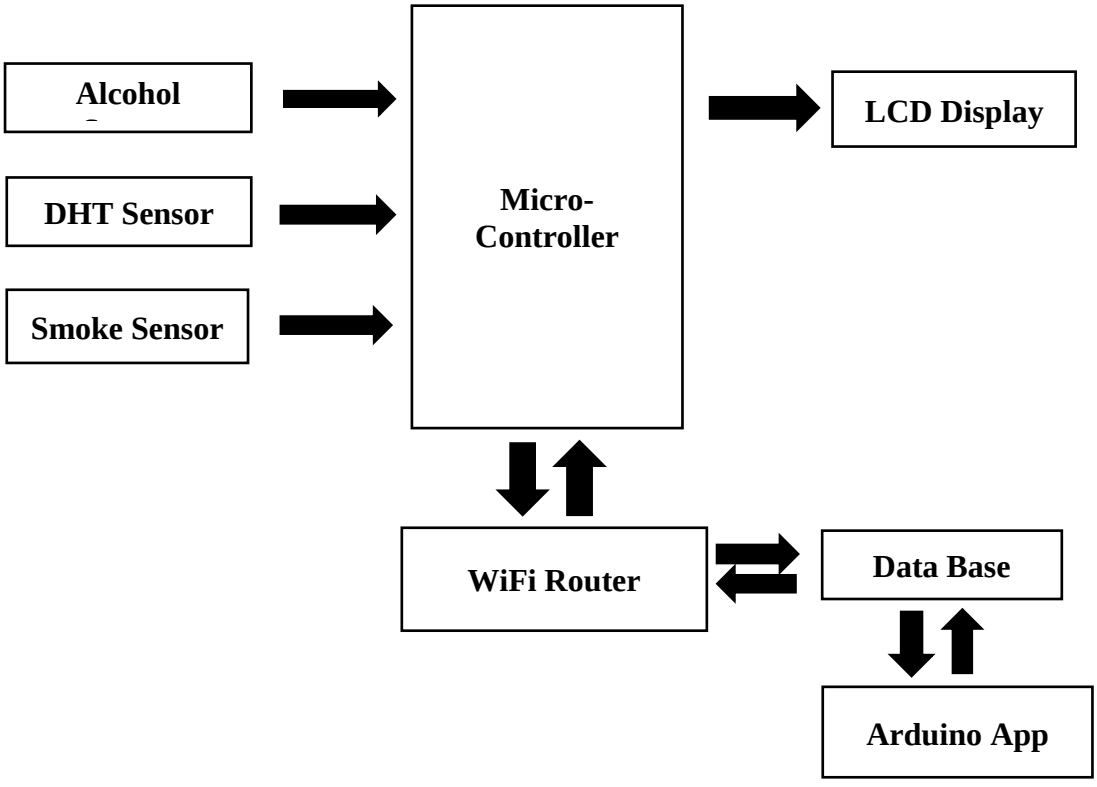


Fig. 4.1: Block Diagram Of The Project

4.3 Hardware Design

4.3.1 Body Preparation

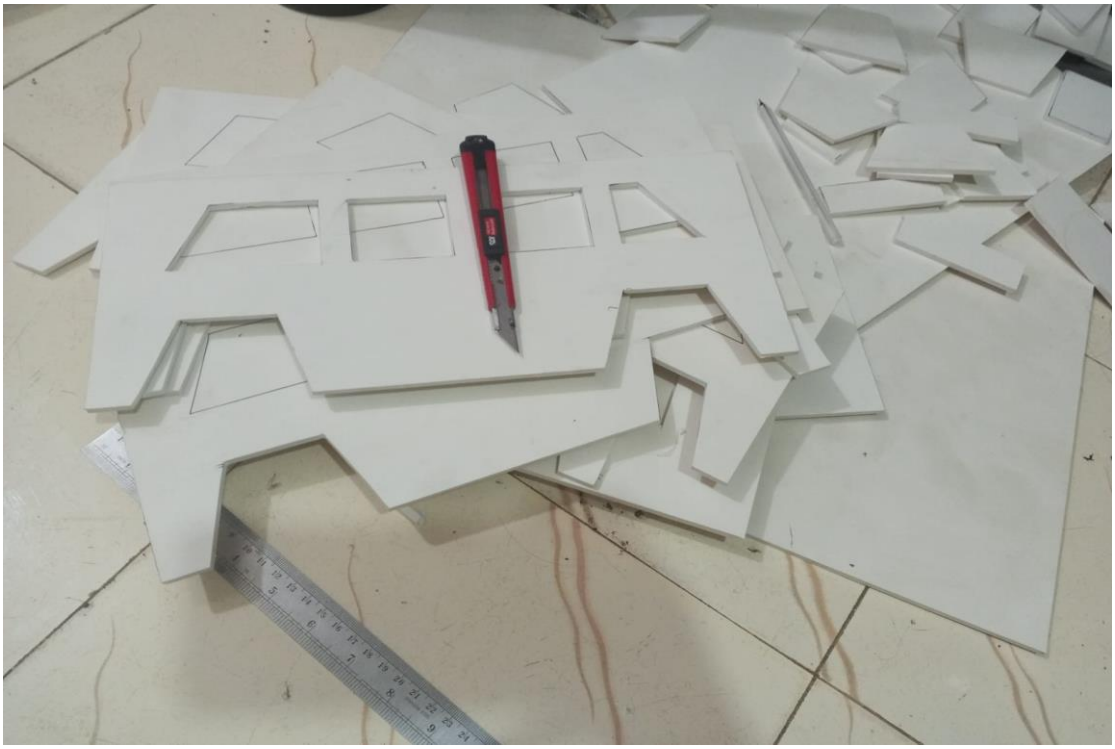


Fig. 4.2: Material Cutting

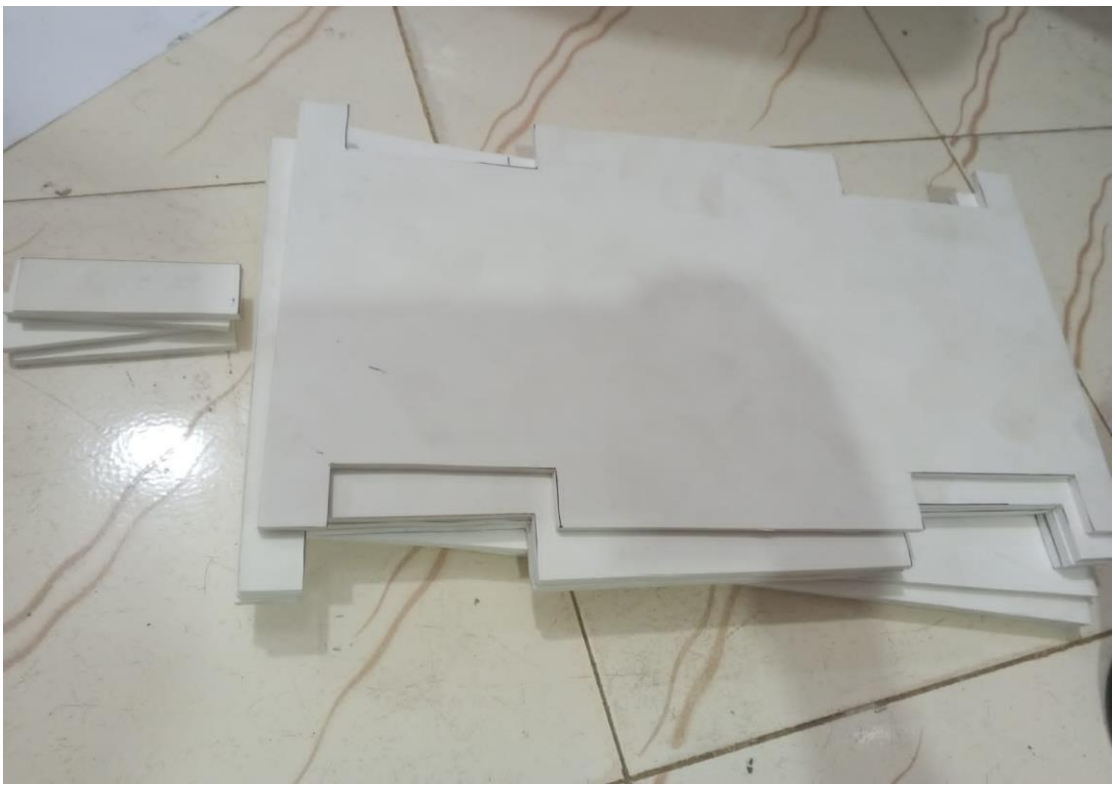


Fig. 4.3: Material Cutting

Fig. 4.4: Material Joining

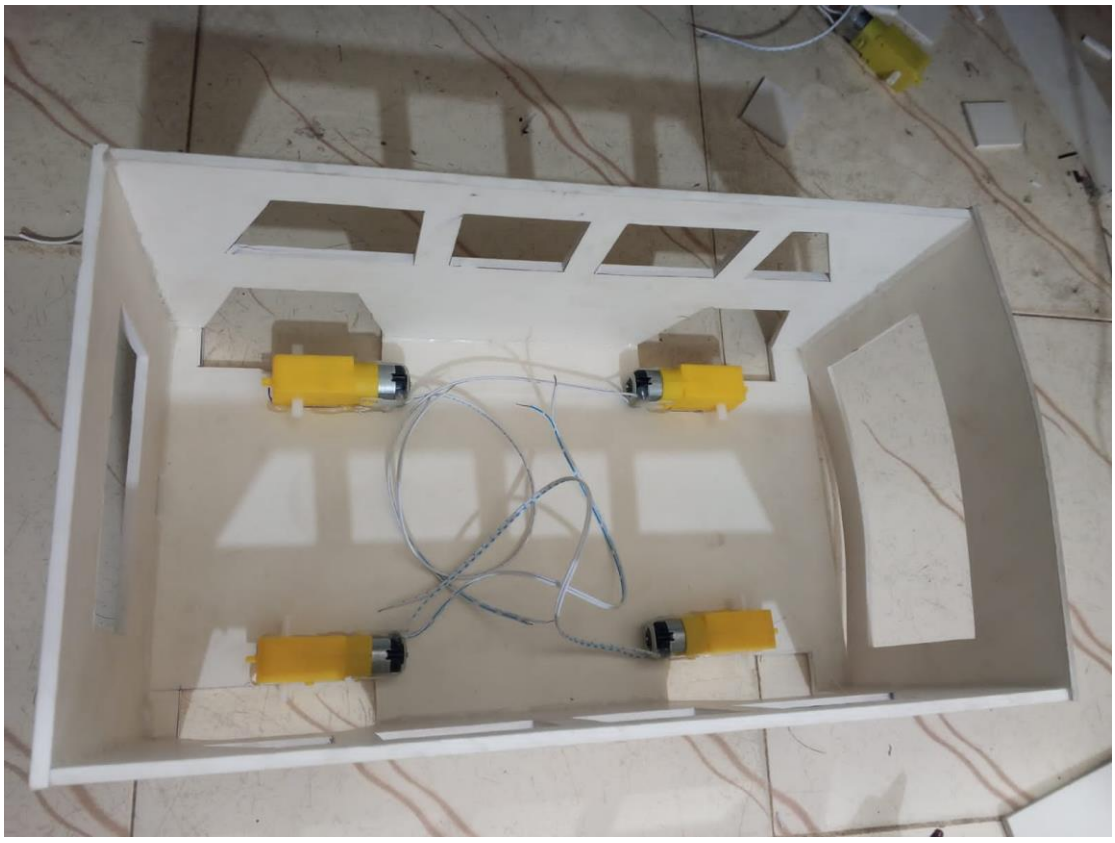


Fig. 4.5: Final Joining

4.3.2 Hardware Setup

Fig. 4.6: Final Circuit And Hardware Setup

4.4 Software Simulation

For this endeavor, software development is yet another crucial subject. This device for monitoring solar plants required some programming or coding to operate the microcontroller. Arduino serves as a microcontroller for the project. The Arduino

controller was then managed using the Arduino IDE. The solar monitoring system performed this step flawlessly.

4.4.1 Arduino IDE:

Now that we've learned about the components of the Arduino IDE, let's take a closer look at them. Some menus let you carry out different actions, including creating new files, saving them, and other things, near the top of the program interface. These button icons provide you quick access to some of the most frequently used tasks. You may check that your code is error-free by selecting the verify button. Your code is sent from your laptop to your Arduino by selecting Upload, enabling it to run on your board. You may input your software in the window, and there are message locations where you can acquire information about it. When we work with the IDE, we'll go through messages in more depth, but for now, just know that they let you know if your code has errors and include details like how much memory it uses on the Arduino. For the time being, don't worry about how much memory your code consumes; we'll discuss this later in the book.

Examine the buttons in the code editor's top row in more detail. You may quickly access the actions in the code window with the help of these buttons. These activities include creating a new file, opening an existing file, and saving it, as well as validating your code for errors and uploading it to the Arduino board. In a minute, we'll use each of these buttons, but first, let's discuss what it means to draw a sketch.

Fig. 4.7: Arduino IDE

A text editor for writing code, a message box, a text terminal, a toolbar with buttons for common activities, and several menus are all included in the Arduino Software (IDE). It connects to the Arduino hardware, enabling program upload and communication.

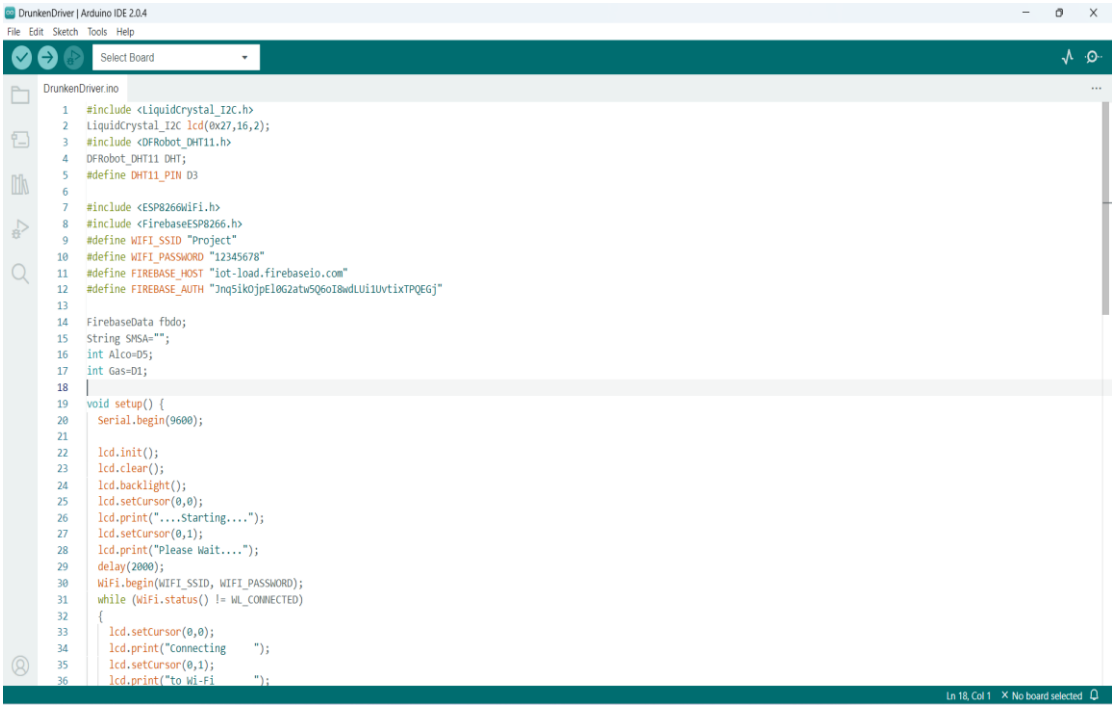
Programs created using the Arduino Software are called sketches (IDE). These images were produced using a text editor, and they were saved without a file extension. With the editor, you have the option to search for and replace text as well as cut and paste. While storing and exporting, the message section gives feedback and flags errors.

The text that the Arduino Software (IDE) delivers to the terminal contains information such as thorough error messages. The bottom right corner of the window shows the configured board and serial port. With the toolbar buttons, you may verify and upload programs, create, save, and save drawings, and activate the serial monitor.

The five menus File, Edit, Sketch, Tools, and Help provide more commands. The menus are context-sensitive, which means they only show things that are relevant to the job being done at the time.

4.4.2 Arduino Variable Declaration and Library Include

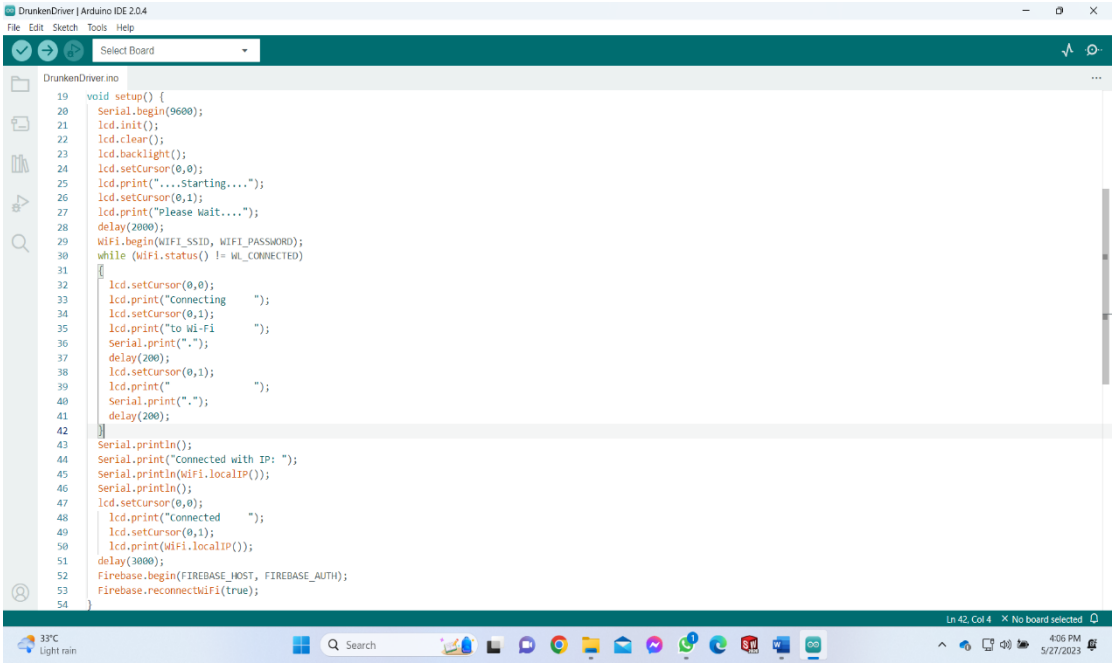
At first in the coding, all the libraries are included in Arduino ide mane space. The different project has different component that is used so different component need a



different library. After all, the needed library is included then we choose some variable

Fig.4.8: Arduino IDE screen Void Setup and Library Include

to our choice anything we declare as a variable. Here we put some int type variables, some character type variables, and some string type variable



4.4.3 Void Setup Funcion

Fig. 4.9: Void Setup Function

4.4.4 Void Loop Function

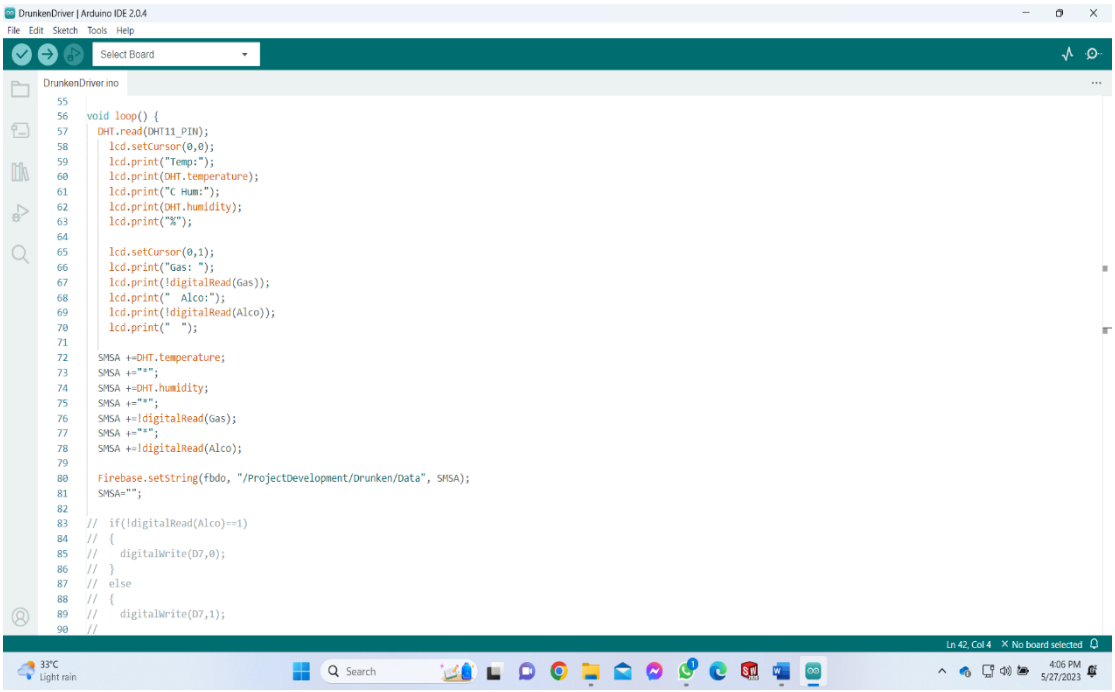


Fig. 4.10: Void Loop Function

4.5 Internet of Things

The Internet of Things (IoT) is a brand-new paradigm that has modified the conventional manner of dwelling right into an excessive-tech existence fashion. Smart cities, clever houses, pollutants control, strength saving, clever transportation, clever industries, and clever libraries are such changes because of IoT. A lot of vital studies research and investigations had been executed so that it will decorate the era via IoT. However, there are nonetheless numerous demanding situations and troubles that want to be addressed to reap the overall capacity of IoT. These demanding situations and troubles ought to be taken into consideration from diverse factors of IoT including applications, demanding situations, allowing technologies, social and environmental effects, etc. The most important aim of this overview article is to offer an in-depth dialogue from each technological and social perspective. The article discusses exclusive demanding situations and key troubles of IoT, structure, and essential software domains. Also, the object brings into mild the present literature and illustrated their contribution to exclusive factors of IoT. Moreover, the significance of massive information and its evaluation with appreciation to IoT has been discussed. This article might assist readers and researchers to recognize the IoT and its

applicability to the actual world [14]. IoT is regularly turning into an essential thing of our existence that may be sensed anywhere around us. On the whole, IoT is an innovation that places collectively good-sized sort of clever systems, frameworks, and wise gadgets and sensors. Moreover, it takes gain of quantum and nanotechnology in phrases of storage, sensing, and processing pace which had been now no longer achievable beforehand [15]. A splendid transformation may be located in each day's ordinary existence at the side of the growing involvement of IoT gadgets and the era. One such improvement of IoT is the idea of Smart Home Systems (SHS) and home equipment that include internet-primarily based totally gadgets, automation gadgets for houses, and dependable strength control gadgets. Besides, every other essential fulfillment of IoT is a Smart Health Sensing gadget (SHSS). SHSS consists of a small wise system and gadgets to aid the fitness of the human being. These gadgets may be used in each interior and exterior to test and screen the exclusive fitness troubles and health degree or the quantity of energy burned withinside the health club etc. Also, it's far getting used to screening the important fitness situations withinside the hospitals and trauma facilities as well. Hence, it has modified the complete situation of the scientific area with the aid of using facilitating it with the excessive era and clever gadgets. Moreover, IoT builders and researchers are actively concerned to uplift the existing fashion of the disabled and senior age organization human beings. IoT has proven a drastic overall performance in this place and has supplied a brand-new path for the everyday existence of such human beings. As those gadgets and systems are very fees powerful in phrases of improvement fees and without problems to be had inside an everyday fee range, for this reason, a maximum of human beings are availing them [16].

4.6 Firebase

4.6.1 Using Firebase Features In Android Application

Using all features of Firebase in the Android application is very easy and is just a few lines of code. The features like authentication, database, and storage have been discussed in the section. The other more detail about the features is available on the Google Firebase guide link listed in the reference section. The methodology to use some features is as follows

4.6.2 Authentication

After adding Firebase and authentication dependency to the Android application, the user can create a login id by the following code

```
FirebaseAuthauth=FirebaseAuth.getInstance();
auth.signInWithEmailAndPassword(email, password)
.addOnCompleteListener(new OnCompleteListener())
{
@Override
 public void onComplete (Task task)
        { if(task.isSuccessful()) { FirebaseUser user=task.getResult().getUser();
        String email=user.getEmail();
         //…
         } }
         });
```

4.6.3 Storage of Firebase, Insertion, Read/Write

The files like images, audio, video etc can be stored in the app. The data stored is highly secured and robust in nature means it resumes from the last point if any network error occurs. The steps below are to be followed to use the storage feature in the Android application:

Once the Firebase and storage dependency are added to the application, create an instance of

```
FirebaseStorage storageobject =FirebaseStorage.getInstance();
```

Second, create the reference to the location by:

```
StorageReference FileRef = storageRef.child("filePath");
```

The file can be uploaded by using one of

putBytes(), putFile(), putData() or putStream()

method which returns to UploadTask.

Once the object is created, navigate the Firebase reference to the position where a child can be added. If a list is created and does not have a specific name for each child, the push() method can be used before the setValue() is called.

Call: ref.push().setValue(object) or ref.setValue(object).

Navigate the Firebase reference to the parent of the item that one wants to update

Then a map containing the update values can be created.

Call ref.updateChildren(map).

Navigate the Firebase reference to the item that one wants to remove

Call ref.removeValue(object).

4.6.4 MIT App Inventor

MIT App Inventor is a drag-and-drop visible programming device for designing and constructing completely useful cell apps for Android. App Inventor promotes a brand-new technology of private cell computing wherein human beings are empowered to design, create, and use in my view significant cell generation answers for his or her each day lives, in ad infinitum precise situations. App Inventor's intuitive programming metaphor and incremental improvement skills permit the developer to be cognizant of he good judgment for programming an app instead of the syntax of the coding language, fostering virtual literacy for all. Since it became moved from Google to MIT, some upgrades were added, and studies tasks are underway.

4.6.5 Basic App Development Performed In App Inventor Compass

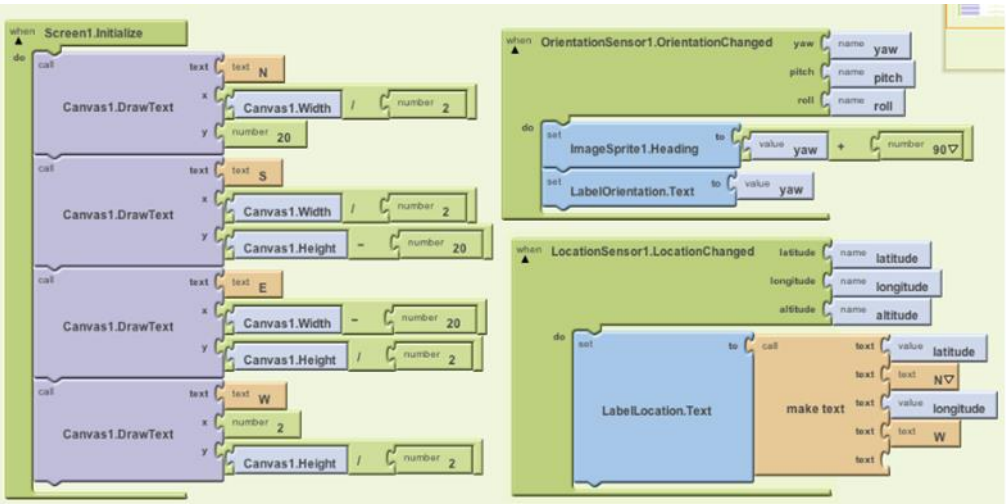


Fig. 4.11: Drag and drop code window

We first performed some basic apps in app inventor before entering our main project one of them is the compass which code and output section is shown above.

Chapter 5

Conclusion

5.1 Conclusion

Automobile crashes are becoming a major safety concern; incidents of injury and death brought on by automobile collisions are often recorded. In cities and on highways, the number of pedestrians who are run over and killed by automobiles is also on the rise. Further inside the sporting reserves, wild creatures are frequently put to death by automobiles as well. The worth of a lifestyle cannot be calculated, and the cost of automobile repairs has a negative influence on investments as well. Most of the time, drivers don't notice the presence of borders until it's too late. Since brakes need a driver's reaction, this increases reaction time and decreases dependability. There have been many methods for making automobile collision avoidance structures, but these methods place a specific emphasis on steering movement control. Additionally, many of these systems just provide the driver a warning indication before triggering the autonomous brakes, which means they no longer take into account the protection distance needed for the car to stop. This constantly leaves the possibility for human error. This study describes the development of a computerized accident prevention system that uses obstruction detection and distance measurement through ultrasonic sensors to identify limits and their lengths. The vehicle plays protection distance-induced braking at that distance once the barrier has been identified and a safe separation distance has been achieved to bring the vehicle to a halt. According to test results, the device has an average reaction time of 0.86 seconds to the use of the brakes and a 12.8 percent error rate when considering the real distance of an obstruction. Many procedures and methods are employed to prevent accidents brought on by drivers who have consumed too much alcohol. There are often several distinct approaches, some of which include steering lock, ignition interlock, vehicle interlock system, and many others. The technique includes many considerations; some of these considerations include cost, appearance, application of

technique, and many more.

5.2 Societal and Environmental Impact

- It saves our lives from accidents.
- It creates awareness in the community of drivers.
- Road will be safer for our society.
- It also decreases the amount of collision on roads and the remanence of vehicle collisions will be reduced.
- Indirectly the use of alcohol for negative purposes will be reduced.

5.3 Future Scopes

For the future of this research, we propose the analysis of different concentrations of alcohol to assess the sensitivity of the proposed methodology. The influence of factors such as the influence of the type of vehicle, and the ventilation systems will be the subjects of further study. External factors such as the impact of people that have consumed alcohol will be explored to assess the detection rate in such scenarios. To further improve the methodology, the incorporation of image-based recognition modules to monitor the driver and passengers, merging both modules, and developing a meta-heuristic system will be explored. Then, the systems will be capable of reacting based on the alcohol in the vehicle and also the behavior of the driver and passengers. We have researched a system that can detect all the conditions when the driver has drunk already no matter how much they did. Secondly, connecting to the car ignition is a proper way to force drivers to do so every time they want to drive. We believe that an alcohol-detecting system can use in all cars to serve the people who need it and for safety. This could even be extended by incorporating an extra alcohol odor sensor at the traveler seats to discover the presence of alcohol in the air within the vehicle cabin. Once alcohol is detected, the system problems each a voice alert and a message alert on the navigation system monitor.

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Appendix

```
#include <LiquidCrystal_I2C.h>
LiquidCrystal_I2C lcd(0x27,16,2);
#include <DFRobot_DHT11.h>
DFRobot_DHT11 DHT;
#define DHT11_PIN D3

#include <ESP8266WiFi.h>
#include <FirebaseESP8266.h>
#define WIFI_SSID "Project"
#define WIFI_PASSWORD "12345678"
#define FIREBASE_HOST "iot-load.firebaseio.com"
#define FIREBASE_AUTH "Jnq5ikOjpEl0G2atw5Q6oI8wdLUi1UvtixTPQEGj"

FirebaseData fbdo;
String SMSA="";
int Alco=D5;
int Gas=D1;

void setup() {

  Serial.begin(9600);

  lcd.init();
  lcd.clear();
  lcd.backlight();
  lcd.setCursor(0,0);
  lcd.print("....Starting....");
  lcd.setCursor(0,1);
  lcd.print("Please Wait....");
  delay(2000);
  WiFi.begin(WIFI_SSID, WIFI_PASSWORD);
  while (WiFi.status() != WL_CONNECTED)

  {

    lcd.setCursor(0,0);
    lcd.print("Connecting     ");
    lcd.setCursor(0,1);
    lcd.print("to Wi-Fi       ");
    Serial.print(".");
    delay(200);
    lcd.setCursor(0,1);
    lcd.print("               ");
    Serial.print(".");
```

```
    delay(200);

  }

  Serial.println();
  Serial.print("Connected with IP: ");
  Serial.println(WiFi.localIP());
  Serial.println();
  lcd.setCursor(0,0);
    lcd.print("Connected     ");
    lcd.setCursor(0,1);
    lcd.print(WiFi.localIP());
  delay(3000);
  Firebase.begin(FIREBASE_HOST, FIREBASE_AUTH);
  Firebase.reconnectWiFi(true);

}

void loop() {

  DHT.read(DHT11_PIN);
    lcd.setCursor(0,0);
    lcd.print("Temp:");
    lcd.print(DHT.temperature);
    lcd.print("C Hum:");
    lcd.print(DHT.humidity);
    lcd.print("%");

    lcd.setCursor(0,1);
    lcd.print("Gas: ");
    lcd.print(!digitalRead(Gas));
    lcd.print("  Alco:");
    lcd.print(!digitalRead(Alco));
    lcd.print("  ");

  SMSA +=DHT.temperature;
  SMSA +="*";
  SMSA +=DHT.humidity;
  SMSA +="*";
  SMSA +=!digitalRead(Gas);
  SMSA +="*";
  SMSA +=!digitalRead(Alco);

  Firebase.setString(fbdo, "/ProjectDevelopment/Drunken/Data", SMSA);
  SMSA="";

//  if(!digitalRead(Alco)==1)
//  {
```

```
//    digitalWrite(D7,0);
//  }
//  else
//  {
//    digitalWrite(D7,1);
//
//  }


}
```