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Alcohol Detector Automatic Car Starting with Real Time GSM based Vehicle Accident Alert with GPS Location Tracking System

A Thesis
By

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January, 2023

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Lecturer

SUBMITTED TO THE:

Department of Mechanical Engineering

SONARGAON UNIVERSITY (SU)

In partial fulfillment of the requirement for award of the degree
Of
Bachelor of Science in Mechanical Engineering

January 2023

LETTER OF TRANSMITTAL

January, 2023

To
Niloy Sarkar
Lecturer
Department of Mechanical Engineering.
Sonargaon University

Subject: Submission of Project Report**.**

Dear Sir,

We are pleased to submit the project report on "**Alcohol Detector Automatic Car Starting with Real Time GSM based Vehicle Accident Alert with GPS Location Tracking System".** It was a great pleasure to work on such an important topic. This project has been done as per instruction of your supervision and according to the requirements of the Sonargaon University.

We expect that the project will be accepted by the concerned authority we will remain happy to further explanation that you may feel necessary in this regard.

Thank You
Sincerely yours,

Md. Shofiqul Islam
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DECLARATION

We do hereby solemnly declare that, the work presented here in this project report has been carried out by us and has not been previously submitted to any University/ Organization for award of any degree or certificate

We hereby ensure that the works that has been prevented here does not breach any existing copyright.

We further undertake to indemnify the university against any loss or damage arising from breach of the foregoing obligation.

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First, we started in the name of almighty Allah. This thesis is accomplished under the supervision of **Niloy Sarkar, Lecturer** Department of Mechanical, Sonargaon University. It is a great pleasure to acknowledge our profound gratitude and respect to our supervisor for this consistent guidance, encouragement, helpful suggestion, constructive criticism and endless patience through the progress of this work. The successful completion of this thesis would not have been possible without his persistent motivation and continuous guidance.

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ABSTARCT

Traffic accidents around the world cause many deaths. The global road safety crisis can be seen by observing the high number of fatalities and injuries caused by road accidents. In many cases, family members or emergency services are not notified in a timely manner. This results in a delayed response time of the rescue service, which can result in the death of an individual or cause serious injury. The purpose of this work is to reduce the response time of rescue services in situations such as traffic accidents or other emergencies such as fire, theft / robbery and emergency medical care. Here we use GPS, GSM, Vibration sensor, battery, buck converter, alchohol sensor. The main controller of this system is Arduino Nano. First of all driver check alcohol , if the sensor find alcohol then vehicle engine will be not start. These vibration sensors detect traffic accidents and report to the nearest available emergency service, and provide real-time location tracking for responders and emergency victims, will drastically increase the chances of emergency victims surviving. GSM module send the vehicle location and send helping organisation like - police station (999), fire service or vehicle owner.

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CHAPTER 1

INTRODUCTION

1.1 Background

As far as we know, traffic accidents are on the rise and it has become one of the main problems in cities. This is because of the high use of cars like this, the increase in bicycle accidents, as well as the speeding of drivers. And the reason is that in the absence of advanced technology, the severity of accidents is declining. Appropriate, efficient, and standardized solutions need to be put in place to reduce the incidence of accidents in the country. At present, there is no advanced, efficient technology to reduce and detect accidents.

It also increases the likelihood of the victim's death by delaying the arrival of the ambulance to the scene of the accident, as well as delaying the delivery of information about the health of the victim to the hospital. The existing system can detect accidents and track the car, and it will take more time to reach the hospital, so the system will delay the treatment of the victim. In the proposed system, the time between the accident and the provision of necessary facilities is delayed and the victim is not treated with the necessary medical facilities.

Accidents are common in urban areas, and many of these types of accidents can be easily handled, but some accidents occur when the visibility is low at night, making it difficult for the ambulance driver to locate the scene. Citizen phone calls help. If the driver knows the exact location of the accident, the time between the scene and the hospital will be significantly reduced. The main purpose of this article is to help reduce the time factor in the event of an accident. There are many cases of people who have an accident at night and have lost consciousness, so it takes hours for someone to find out and report it to the government. So saving such precious time really saves lives.

1.2 Objectives

The main objective of this project is to develop a smart accident detection and rescue system, which can sense the alcohol, the vehicle accident detection, GPS tracking and automatic notification to rescue team. Our objectives are pointed out below:

- To study of the **Alcohol Detector Automatic Car Starting with Real Time GSM based Vehicle Accident Alert with GPS Location Tracking System.**
- To design and construct of a **Alcohol Detector Automatic Car Starting with Real Time GSM based Vehicle Accident Alert with GPS Location Tracking System**.
- To implement and study of take proper step to reduce the accident.
- To take necessary notes from the project for future improvements.

1.3 Scopes of use

- In rescue accident car
- Detect car location in emergency situation

1.4 Motivation

In the era of development, advancement and pace we attained efficiency, mobility, flexibility and comfort but we need safe guard as well as. We, as students of electrical side has thus got motivation to design such a system that ensures protection of different vehicle and aware us even if we are distant from this vehicle. Knowing the location of the vehicle after the accident, if rescue workers are sent there soon, people's lives will be saved. This project physically gives us little hope to advance a bit for protection of accident vehicle.

1.5 Structure of the Project

This Project is organized as follows:

Chapter 1 Introduction**:**The first chapter contains the statement of the introduction, our background study for the project, problem statement, objectives of the study and the project outline.

Chapter 2 Literature Review**:** The chapter two contains our introduction, literature review part.

Chapter 3 Hardware and Software Analysis**:**Chapter three describes the theoretical model. Here we mainly discuss about proposed system Hardware and software development of our project etc.

Chapter 3 Methodology**:**Chapter three describes the theoretical model. Here we mainly discuss about proposed system architecture in details with having block diagram, circuit diagram, structural diagram, project working principle, complete project image etc.

Chapter 4 Result and Discussion**:**Chapter four deals with the result and discussion and discuss about our project advantages and application.

Chapter 5 Conclusion**:**Chapter five all about our project conclusion and future scope.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This chapter is arranged on Literature Review. Here's a look at some of last year's literature, like our project. By reading them, we can overcome the mistakes of the previous project and make a more effective project.

2.2 Related Research/ Works

Hari Sankar et al., [1] recommend a full response to each collision with a vehicle identification and rescue vehicle. When a car collides with a car identification device in a car, the entire server sends a nearby ambulance with the car to the collision. An Android device using an ambulance will help drivers quickly and securely collect area details. Automation of collision by recognizing and sending the vehicle, along with training the ambulance driver.

Nicky Kattukkaran and others. The relevant accelerator in the car recognizes the inclination of the car and the heartbeat sensor in the user's physics recognizes the abnormality of the heartbeat and understands the importance of the car. Thus, the devices select the selector via Bluetooth and send the laptop to a smartphone connected to the accelerator and heart rate sensor. The Android device on the mobile phone sends text content material text messages to nearby clinics and friends. In addition, the application shares the actual location of the time-saving hospital.

Adnan bin Fayez et al., [3] have developed a fully-fledged Android system that can detect the situation unexpectedly and send emergency warning messages to nearby police stations and fitness centers. The device is equipped with an external pressure sensor that removes the external pressure of the body. It measures speed and switching points with GPS and accelerator sensors, respectively, on Android phones. By checking the conditions, this software program is helpful in reducing false alarm fees.

D Selvathi et al. The prevention area includes Smart Helmet. If these two preconditions are not met, the rails will no longer be on the engine. The microcontroller controls the transmission capability and fires as a result of the retreat. In addition, the component can

detect the collision with a car in any area and assess the collision of the car with the predefined numbers with the GSM module. The microcontroller continuously archives all the parameters of the car to prevent and acknowledge the collision of the car.

Chunxiao Liao, et. al introduced the "Mobile Shore-Based Smart Traffic Accident Detection System" in 2017. The article presents a framework for smart car crashes based on the nearby mobile Edge computer-based, idle and recyclable and car-certified proof. Our framework uses basic mobile phones to increase speed and speed, and to identify images that display error-prone scenes, to recognize computerized error-detection if false positives occur, and to advise environmental factors and divisions, such as clinics and transportation departments.

Sanjana. K.R, et. In 2015, the Emergency Services Center introduced the "Smart Traffic Lights with Automatic Rescue System." They used a sensor to create a frame that automatically identifies street accidents, advising them to use GSM to manage crises and close them by family members. It is fully computerized, using Google's guides to locate the fault, control traffic lights and reach the emergency center in a timely manner. This framework will be viable in countries with a large population, such as India.

2.3 Summary

The above has been discussed in detail in the past few literature's which has given us a lot of motivation to do this project.

CHAPTER 3

HARDWARE AND SOFTWARE ANALYSIS

3.1 Introduction

In this section, we will discuss elaborately about our hardware design of "**Alcohol Detector Automatic Car Starting with Real Time GSM based Vehicle Accident Alert with GPS Location Tracking System**" and the component description, features, working procedure and discription of our all equipment. The system hardware fabricates composed of micro-controller unit, Vibration Sensor, GPS Module, GSM Module, Gear Motor, Relay, Battery, MQ2 sensor and many more related components.

3.2 Hardware List

- Arduino Nano
- Vibration Sensor
- GPS Module
- GSM Module
- Gear Motor
- MQ2 Sensor
- Battery
- Diode
- Capacitor
- Transistor

3.3 Arduino Nano

Arduino is open-source electronics prototyping platform based on flexible, easy-to-use hardware and software. It's intended for artists, designers, hobbyists, and anyone interested in creating interactive objects or environments. Arduino can sense the environment by receiving input from a variety of sensors and can affect its surroundings by controlling Lights, motors, and other actuators.

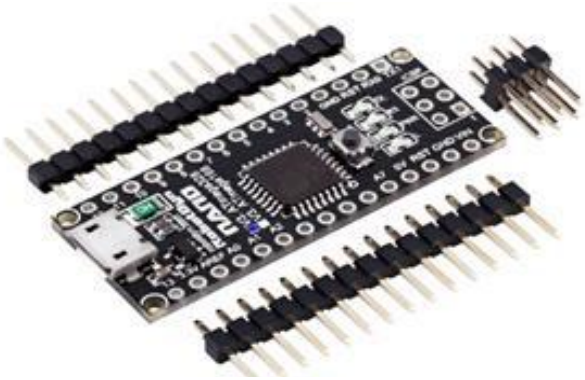

Figure 3.1: Arduino Nano

The microcontroller on the board is programmed using the Arduino programming language (based on Wiring) and the Arduino development environment (based on Processing). Arduino projects can be stand-alone or they can communicate with software on running on a computer (e.g. Flash, Processing, Maxims'). Arduino Nano is a surface mount breadboard embedded version with integrated USB. It is a small, complete, and breadboard friendly component. It has everything that Decimal/ Duemilanove has (electrically) with more analog input pins and onboard +5V AREF jumper. Physically, it is missing power jack. The Nano can automatically sense and switch to the higher potential source of power.

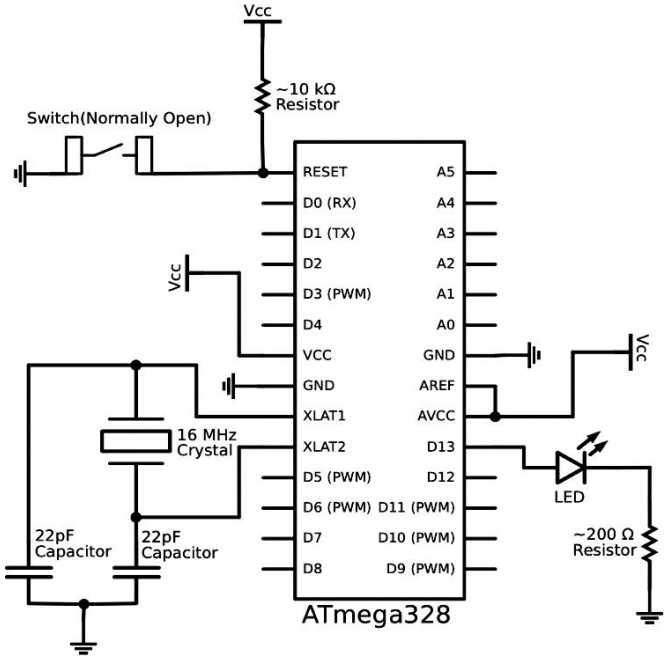

Figure 3.2: Arduino Nano Schematic Diagram

Nano's got the breadboard-ability of the Boarding and the Minibus with smaller footprint than either, so users have more breadboard space. It's got a pin layout that works well with the Mini or the Basic Stamp (TX, RX, ATN, and GND on one top, power and ground on the other). This new version 3.0 comes with ATMEGA328 which offer more programming and data memory space. It has two layers. That make it easier to hack and more affordable. One of the best features of Arduino Nano is, it's easy to use, compact and also small.

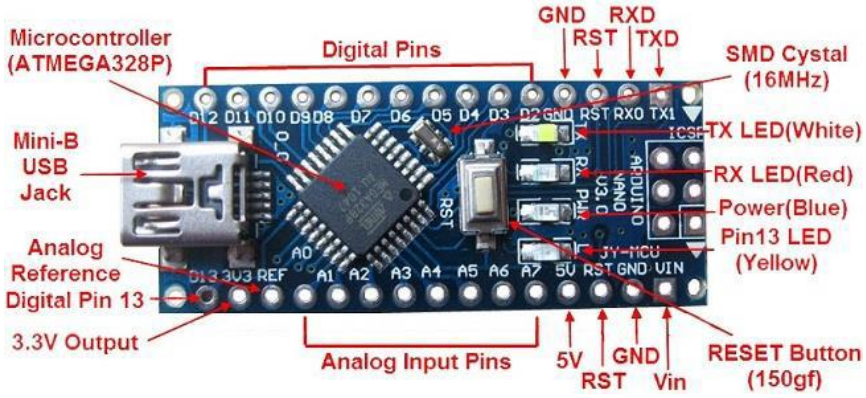

Figure 3.3: How Arduino Nano looks like

Specifications:

- Microcontroller: Atmel ATmega328
- Operating Voltage (logic level): 5 V
- Input Voltage (recommended): 7-12 V
- Input Voltage (limits): 6-20 V
- Digital I/O Pins: 14 (of which 6 provide PWM output)
- Analog Input Pins: 8
- DC Current per I/O Pin: 40 mA
- Flash Memory: 32 KB (of which 2KB used by boot loader)
- SRAM : 2 KB
- EEPROM: 1 KB
- Clock Speed: 16 MHz
- Dimensions: 0.70" x 1.70"

Features:

- Automatic reset during program download
- Power OK blue LED
- Green (TX), red (RX) and orange (L) LED
- Auto sensing/switching power input
- Small mini-B USB for programming and serial monitor
- ICSP header for direct program download
- Manual reset switch

Microcontroller IC ATmega328p

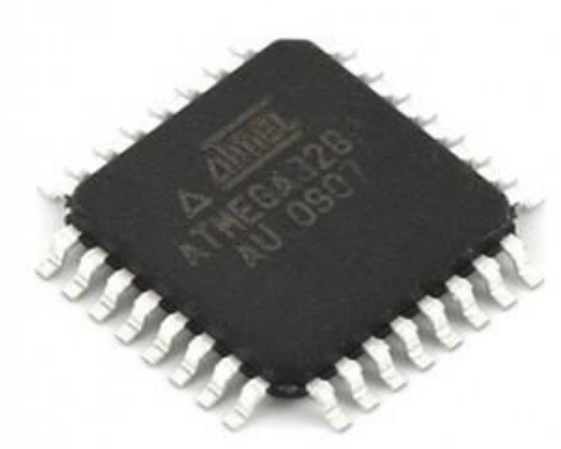

Figure 3.4: Microcontroller IC AT mega 328p

The high-performance Microchip Pico Power 8-bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1024B EEPROM, 2KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, a 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. By executing powerful instructions in a single clock cycle, the device achieves throughputs approaching 1 MIPS per MHz, balancing power consumption and processing speed.

3.4 Vibration Sensor

The vibration sensor is also called a piezoelectric sensor. These sensors are flexible devices which are used for measuring various processes. This sensor uses the piezoelectric effects while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge. This sensor is also used for deciding fragrances within the air by immediately measuring capacitance as well as quality.

Working Principle

The working principle of vibration sensor is a sensor which operates based on different optical otherwise mechanical principles for detecting observed system vibrations.

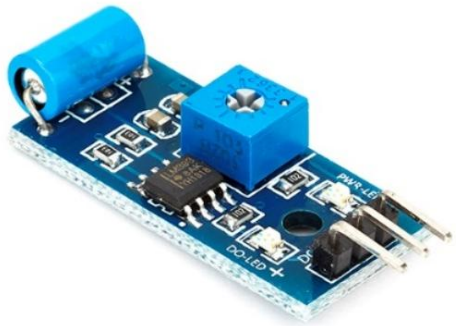

Figure 3.5: Vibration Sensor

The sensitivity of these sensors normally ranges from 10 mV/g to 100 mV/g, and there are lower and higher sensitivities are also accessible. The sensitivity of the sensor can be selected based on the application. So it is essential to know the levels of vibration amplitude range to which the sensor will be exposed throughout measurements.

3.5 5V Regulator IC

Voltage sources in a circuit may have fluctuations resulting in not providing fixed voltage outputs. A voltage regulator IC maintains the output voltage at a constant value. 7805 IC, a member of 78xx series of fixed linear voltage regulators used to maintain such fluctuations, is a popular voltage regulator integrated circuit (IC). The xx in 78xx indicates the output voltage it provides. 7805 IC provides +5 volts regulated power supply with provisions to add a heat sink.

7805 IC Rating:

- Input voltage range 7V- 35V
- Current rating Ic = 1A
- Output voltage range V. Max=5.2V ,V. Min=4.8V

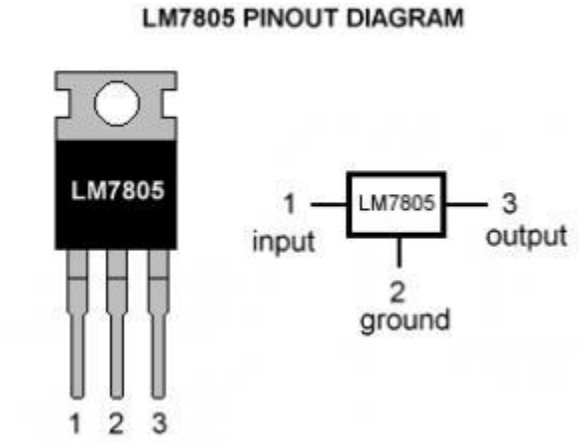

Figure 3.6: 5V Regulator IC

3.6 Buck Converter

A **buck converter** (**step-down converter**) is a DC-to-DC power converter which steps down voltage (while drawing less average current) from its input (supply) to its output (load). It is a class of switched-mode power supply (SMPS) typically containing at least two semiconductors (a diode and a transistor, although modern buck converters frequently replace the diode with a second transistor used for synchronous rectification) and at least one energy storage element, a capacitor, inductor, or the two in combination. To reduce voltage ripple, filters made of capacitors (sometimes in combination with inductors) are normally added to such a converter's output (load-side filter) and input (supply-side filter). It is called a buck converter because the voltage across the inductor “bucks” or opposes the supply voltage.

Figure 3.7: DC -DC Buck Converter

DC-DC Buck Converter Step Down Module LM2596 Power Supply is a step-down(buck) switching regulator, capable of driving a 3-A load with excellent line and load regulation. These devices are available in fixed output voltages of 3.3 V, 5 V, 12 V, and an adjustable output version. The LM2596 series operates at a switching frequency of 150kHz, thus allowing smaller sized filter components than what would be required with lower frequency switching regulators.

Specifications of DC-DC Buck Converter Step Down Module LM2596 Power Supply :

- Conversion efficiency: 92%(highest)
- Switching frequency: 150KHz
- Output ripple: 30mA9maximum)
- Load Regulation: ± 0.5%
- Voltage Regulation: ± 0.5%
- Dynamic Response speed: 5% 200uS
- Input voltage:4.75-35V
- Output voltage:1.25-26V(Adjustable)
- Output current: Rated current is 2A, maximum 3A (Additional heat sink is required)
- Conversion Efficiency: Up to 92% (output voltage higher, the higher the efficiency)
- Switching Frequency: 150KHz

- Rectifier: Non-Synchronous Rectification
- Module Properties: Non-isolated step-down module (buck)
- Short Circuit Protection: Current limiting, since the recovery
- Operating Temperature: Industrial grade (-40 to +85) (output power 10W or less)

3.7 Gear Motor

Gear motors are mechanisms that adjust the speed of electric motors, leading them to operate at a certain speed. They are composed of a series of gears that make up a kinematic chain, working on a set of rotary parts. Their main purpose is to allow the reduction from an initial high speed to a lower one without negatively affecting the mechanism. In addition to this adjustment, a gear motor is in charge of adjusting the mechanical power of a system.

Figure 3.8: Gear Motor

Mechanical components that complement gear motors

Gear motors are composed of an electric motor and gears, which form the kinematic chain – the fundamental component of the gear ratio.

Kinematic chain

A motor's speed reducer is composed of a speed reducer and its gears. This speed reducer is basically a variable speed drive that allows for the speed to be reduced and increased at the output shaft.

Gears

Gears are toothed wheels made of metal or plastic (and new materials with each passing day) that transmit motion when meshing with each other. They are defined by their number of teeth and their size. In addition, they may have straight-cut or helical teeth.

Motors

The five types of motors that see the most use in gear motors are:

- Brushed motors, with brushes normally made out of carbon. They are bidirectional and may be used with DC or AC. They have a service life of about 3000 hours.
- Asynchronous motors, which are brushless single-direction motors. They are highly limited.
- Synchronous brushless motors, which may be single-direction or bidirectional. They have a constant speed if the frequency of the power source is stable.
- Brushless DC motors that use a driver and can attain high speeds.
- Stepper DC brushless motors. They can be positioned with an average precision of 7.5º.

3.8 Resistor

A resistor is a passive two-terminal electrical component that implements electrical resistance as a circuit element. Resistors act to reduce current flow, and, at the sometime, act to lower voltage levels within circuits. Resistors may have fixed resistances or variable resistances, such as those founding thermostats, visitors, trimmers, photo resistors, hamsters and potentiometers. The current through a resistor is in direct proportion to the voltage across the resistor's terminals. This relationship is represented by Ohm's law.

Figure 3.9: Resistor

Theory of operation

The behavior of an ideal resistor is dictated by the relationship specified by Ohm ‘slaw:

$$V = I.R$$

Ohm's law states that the voltage (V) across a resistor is proportional to the current (I), where the constant of proportionality is the resistance (R).

Equivalently, Ohm's law can be stated:

$$I = V/R$$

This formulation states that the current (I) is proportional to the voltage (V) and inversely proportional to the resistance (R). This is directly used in practical computations. For example, if a 300-ohm resistor is attached across the terminals of a12 volt battery, then a current of12 / 300 = 0.04 amperes flows through that resistor.

3.9 GPS

The NEO-6M GPS module is a well-performing complete GPS receiver with a built-in 25 x 25 x 4mm ceramic antenna, which provides a strong satellite search capability. With the power and signal indicators, you can monitor the status of the module. Thanks to the data backup battery, the module can save the data when the main power is shut down accidentally. Its 3mm mounting holes can ensure easy assembly on your aircraft, which thus can fly steadily at a fixed position, return to Home automatically, and automatic waypoint flying, etc. Or you can apply it on your smart robot car for automatic returning or heading to a certain destination, making it a real "smart" bot! The schematic diagram of the module is shown as below:

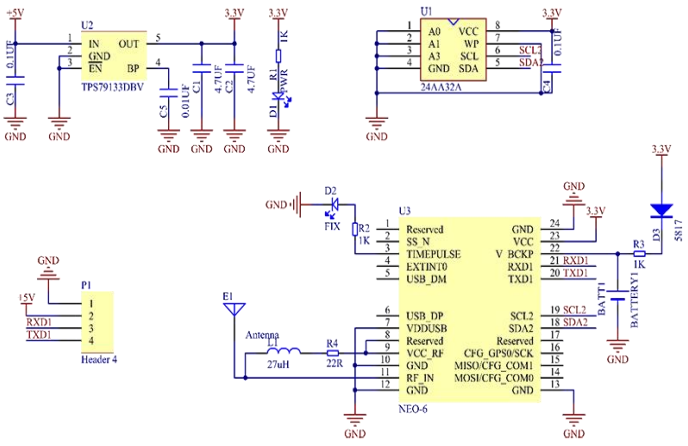

Figure 3.10: Schematic Diagram Of GPS

This is a complete GPS module that is based on the Ublox NEO 6M GPS. This unit uses the latest technology from Ublox to give the best possible positioning information and includes a larger built-in 25 x 25mm active GPS antenna with a UART TTL socket. A battery is also included so that you can obtain a GPS lock faster. This is an updated GPS module that can be used with ardupilot mega v2. This GPS module gives the best possible position information, allowing for better performance with your Ardupilot or other Multirotor control platform.

Features:

1. 5Hz position update rate
2. Operating temperature range: -40 TO 85°CUART TTL socket
3. EEPROM to save configuration settings
4. Rechargeable battery for Backup
5. The cold start time of 38 s and Hot start time of 1 s
6. Supply voltage: 3.3 V
7. Configurable from 4800 Baud to 115200 Baud rates. (default 9600)
8. Super Sense ® Indoor GPS: -162 dBm tracking sensitivity
9. Support SBAS (WAAS, EGNOS, MSAS, GAGAN)
10. Separated 18X18mm GPS antenna

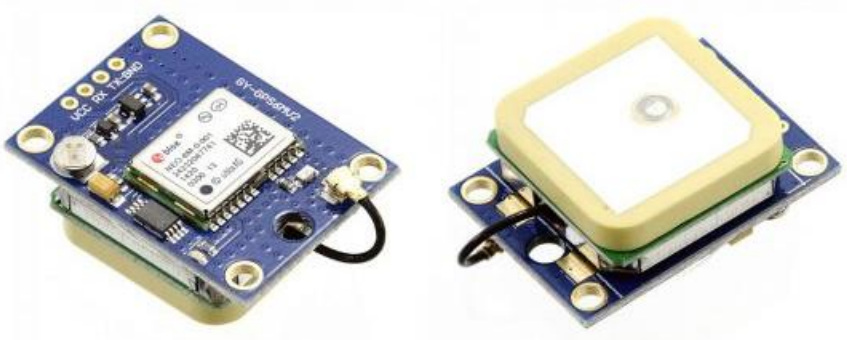

Figure 3.11: NEO-6m GPS

3.10 GSM

At the heart of the module is a SIM800L GSM cellular chip from Sim Com. The operating voltage of the chip is from **3.4V to 4.4V**, which makes it an ideal candidate for direct LiPo battery supply. This makes it a good choice for embedding into projects without a lot of space.

Figure 3.12: GSM Module

All the necessary data pins of SIM800L GSM chip are broken out to a 0.1″ pitch headers. This includes pins required for communication with a microcontroller over **UART**. The module supports baud rate from **1200bps** to **115200bps** with Auto-Baud detection.

The module needs an external antenna to connect to a network. The module usually comes with a **Helical Antenna** and solders directly to NET pin on PCB. The board also has a U.FL connector facility in case you want to keep the antenna away from the board.

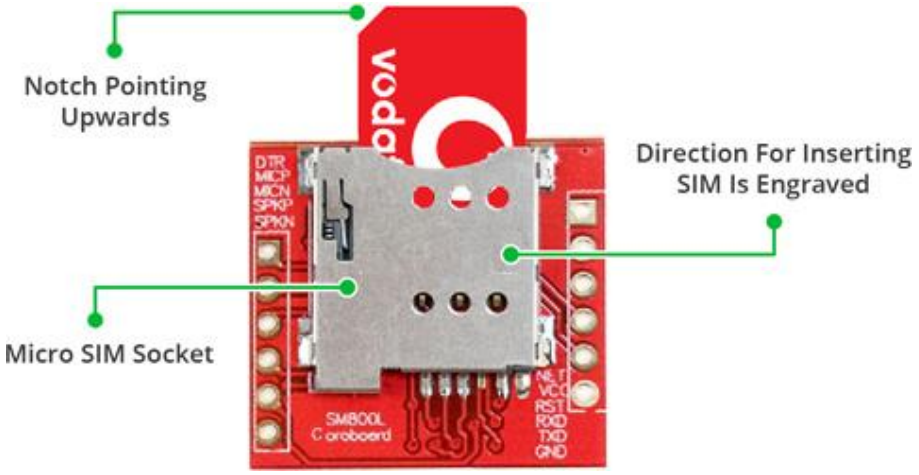

Figure 3.13: GSM Module Introducing

There's a SIM socket on the back! Any activated, **2G micro SIM card** would work perfectly. Correct direction for inserting SIM card is normally engraved on the surface of the SIM socket. This module measures only 1 inch² but packs a surprising amount of features into its little frame. Some of them are listed below:

- Supports Quad-band: GSM850, EGSM900, DCS1800 and PCS1900
- Connect onto any global GSM network with any 2G SIM
- Make and receive voice calls using an external 8Ω speaker & electret microphone
- Send and receive SMS messages
- Send and receive GPRS data (TCP/IP, HTTP, etc.)
- Scan and receive FM radio broadcasts
- Transmit Power:
    - Class 4 (2W) for GSM850
    - Class 1 (1W) for DCS1800
- Serial-based AT Command Set
- FL connectors for cell antennae
- Accepts Micro SIM Card

SIM800L GSM Module Pinout

The SIM800L module has total 12 pins that interface it to the outside world. The connections are as follows:

Figure 3.14: GSM Module Pinout

NET is a pin where you can solder Helical Antenna provided along with the module.

VCC supplies power for the module. This can be anywhere from 3.4V to 4.4 volts. Remember connecting it to 5V pin will likely destroy your module! It doesn't even run on

3.3 V! An external power source like Li-Po battery or DC-DC buck converters rated 3.7V 2A would work.

RST (Reset) is a hard reset pin. If you absolutely got the module in a bad space, pull this pin low for 100ms to perform a hard reset.

RxD (Receiver) pin is used for serial communication.

TxD (Transmitter) pin is used for serial communication.

GND is the Ground Pin and needs to be connected to GND pin on the Arduino.

RING pin acts as a Ring Indicator. It is basically the 'interrupt' out pin from the module. It is by default high and will pulse low for 120ms when a call is received. It can also be configured to pulse when an SMS is received.

DTR pin activates/deactivates sleep mode. Pulling it HIGH will put module in sleep mode, disabling serial communication. Pulling it LOW will wake the module up.

MIC± is a differential microphone input. The two microphone pins can be connected directly to these pins.

SPK± is a differential speaker interface. The two pins of a speaker can be tied directly to these two pins.

3.11 MQ 2 Gas Sensor

The utility model can be used for gas leakage monitoring devices in families and factories, and is suitable for the detection of liquefied petroleum gas, butane, propane, methane, Hydrogen, smoke, etc. This is a very easy to use low cost semiconductor Gas sensor Module with analog and digital output.

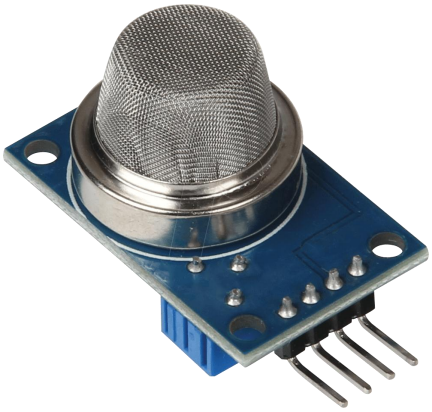

Figure 3.15: MQ 2 Gas Sensor

Features:

- Adopt high quality double panel design, with power indication and TTL signal output indication.
- It has DO switch signal (TTL) output and AO analog signal output.
- TTL output valid signal is low level. When the output is low, the signal light is on, and the micro controller or relay module can be directly connected.
- The analog output voltage increases with the concentration, the higher the voltage.
- It has better sensitivity to liquefied petroleum gas, natural gas, urban gas and smoke.
- MQ-2 MQ2 Smoke Gas LPG Butane Methane Sensor Detector Module
- With four screw holes, easy to locate.
- Product size: 32 (L), *20 (W), *22 (H)
- With long service life and reliable stability.
- Fast response recovery features

Specifications:

- Input voltage: DC5V
- Power dissipation (current): 150mA
- DO output: TTL, numeric quantities 0 and 1 (0.1 and 5V)
- AO output: 0.1-0.3V (relatively pollution-free), the highest concentration of about 4V voltage
- Special reminder: after the sensor is energized, you need to preheat 20S or so, the data to be stable, sensor heating is a normal phenomenon, because the internal heating wire, if hot, it is not normal.

Connection mode:

- VCC: power supply positive (5V)
- GND: power supply negative pole
- DO:TTL switch signal output
- AO: analog signal output
- Functions: This version supporting test procedures

- Using chips: AT89S52
- Crystal oscillator: 11.0592MHZ
- Since this Gas Sensor module is sensitive to smoke it can be used in for fire detection. MQ2 Gas Sensor is also sensitive to flammable/combustible gasses like LPG, Propane & Hydrogen.
- Baud rate: 9600

3.12 Buzzer

Piezo elements are actually one of the coolest crystals you'll play with. Flex them, they generate a voltage (pretty high, actually). Pass power through them, and they'll flex. Do it fast enough, and they'll start to make a sound! So besides making annoying little beepy noises, you could use it as a sensor to detect a knock or other similar vibration.

Specifications

- Operating Voltage: 1.0 ~ 20.0V
- Rated Voltage: 3.0V
- Diameter: Ø12.5mm
- Total Height: 6.3mm
- Capacitance: 15,000pF
- Current Consumption: ≤2mA
- Resonance Frequency : 4,000Hz
- Sound Pressure Level at 10cm: ≥75db
- Self Drive: No

Figure 3.16 : Buzzer

3.13 Arduino Software

An intelligent micro-controller unit called the Arduino Uno can be programmed with the Arduino software. There is no need to install any software other than the Arduino first. From the Tools Board menu (according to your on-board micro-controller) select "Arduino Unio A" using the hardware programmer.

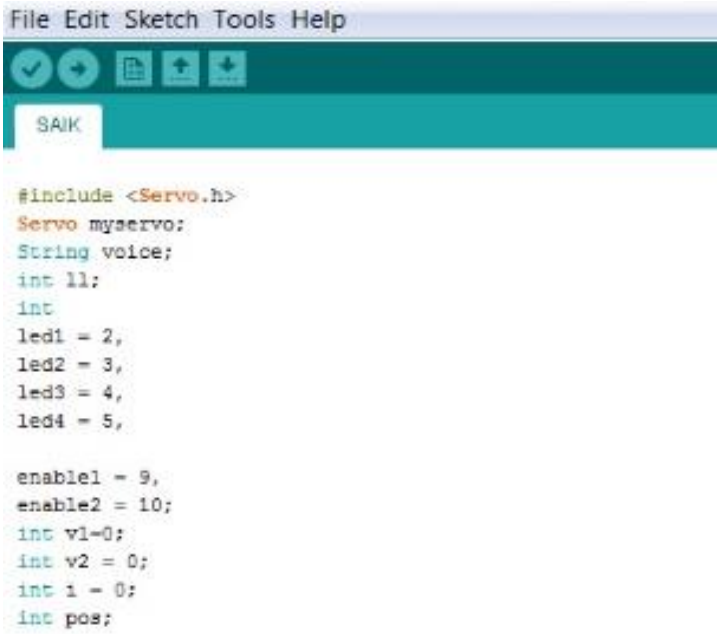

Figure 3.17: Arduino Software Interface IDE

The communication uses the native STK 500 protocol (reference C header file). We can bypass the boot loader and program the micro-controller under the ICSP (In Circuit Serial Programming) heading. Atmeg16U2 firmware source code (or 8U2 on The Rev1 and Rev2) Atmega 16U2/8U2 boards are loaded with a DFU boot loader, which can be enabled at: On the Rev 1: board, attach a solder jumper to the back of the board. Rev 2 or later: There is a resistor that pulls the 8U2/16U2 HWB wires to ground, making it easy to put in DFU mode. The Arduino Uno is the latest smart micro-controller unit and has Several advantages for communicating with other Arduino computers or other micro-controllers.

The ATMA 328 provides URT TTL with Communication Protocol (5V), available in digital PIN 0 - (RX) for data retrieved with PIN No. 1 (TX) for data transmission. The system port communicates via USB Atimega 16U2 in the port and comes out as a low-end

port with computer software. '16U2 firmware uses standard USB CMM driver and no external drivers required. Anyway, Windows needs an .inf file.The Arduino file system contains a serial viewer that allows sending easy text data to and from Arduino boards. The RX and TX connectors will flash on the board when transferring data via USB-to-serial connector and USB connection to the computer (but not for serial communication on pins 0 and 1).

The software system library allows seamless communication within any digital PIN. The Atmeg 328 supports I2C information communication (TWI) and SPI. The Arduino software includes a wire library to support the use of the I2C car. Arduino programs are written in C or C ++ and the program code written for Arduino is called Sketch. Arduino IDE uses GNU and AVR LBC toolkit to compile programs, as well as upload programs using Android. For example, software for Arduino can be developed using the Arduino platform using Atmel micro-controllers, around the development of Atmel, AVR Studio or even the new Atmel Studio.

3.14 Proteus Software

The Proteus Design Suite is a software component used for automated electronic design. Engineers and electronics engineers use schematic-based applications and electronic devices to create printed circuit boards. The first version of the Proteus design suite was called PC-B, and was written in 1986 by John Jameson, president of the DOS company. Windows eventually followed the schematic retention support in 1990 with the help of local ports. The mixing pepper pepper simulation mode was first integrated into Proteus in 1996 and the Micro-controller simulation came to Proteus in 1998. 2002 Shape-based auto routing was added in 2002 and 2006. Another major product update is 3D plant visualization. Recently, IDE dedicated to simulation was added in 2011 and MCAD import / export included in 2015. Support for faster design was added in 2017. The LED products featured are usually biennial, but the working package is left to function as necessary.

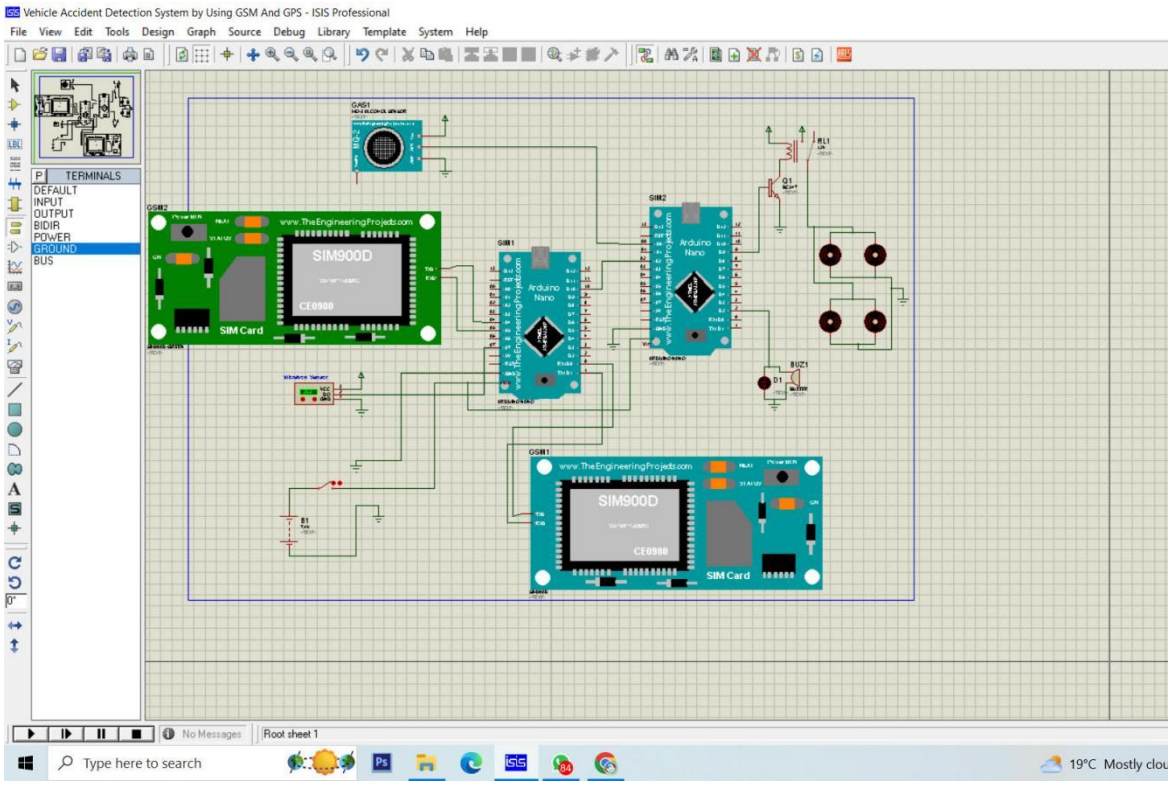

Figure 3.18: Proteus Software Interface

CHAPTER 4

METHODOLOGY

4.1 Our methodologies for the project

Our used methodology for the project:

- Creating an idea for the design and construction of "**Alcohol Detector Automatic Car Starting with Real Time GSM based Vehicle Accident Alert with GPS Location Tracking System".** And designing a block diagram & circuit diagram to know which components we need to construct it.

- Collecting all the components and programming the micro-controller to control our desired system.

- Setting up all the components in a PCB board & soldering. Then assembling all the blocks in a board and finally running the system to check if it actually works or not.

4.2 System Design and Components

The main processing brain of the system is the Arduino Nano. Firstly, to run the micro-controller battery supply the main voltage. Then the system will be on and ready for operation. Here this system will able to measure the system condition and able to take command. Here we use Battery, Arduino Nano, MQ2 Sensor, Buzzer, vibration sensor, relay, gear motor, GPS etc. All of this equipments are combined work together and full fill our required as we desire.

4.3 Block Design Specifications

In this diagram we will show by block the individual parts.

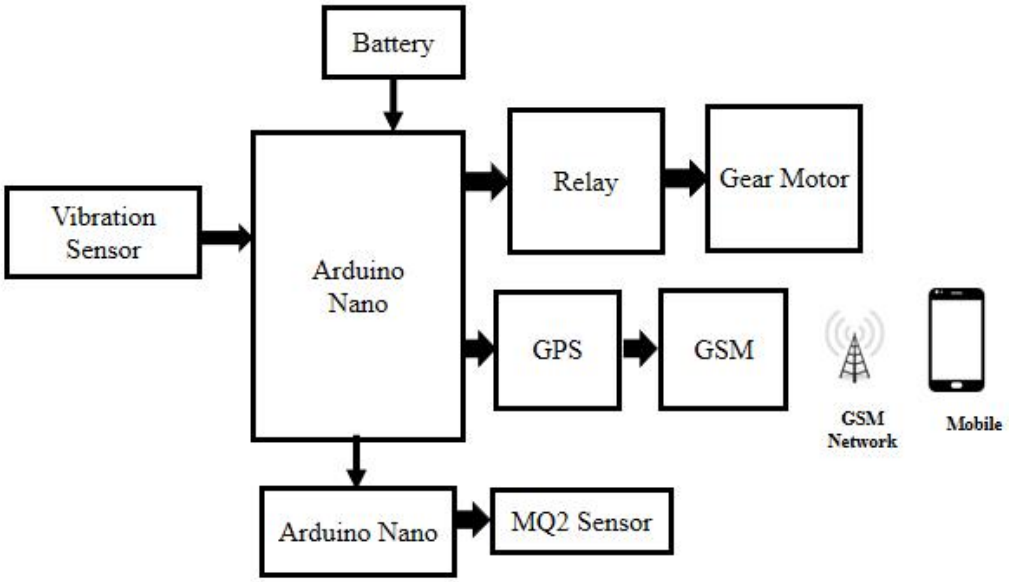

Figure 4.1: Block Diagram diagram

4.4 Circuit Design Analysis

The schematic diagram here is representing the electrical circuit and the components of our System. Here we connect equipment with he smart wire connection.

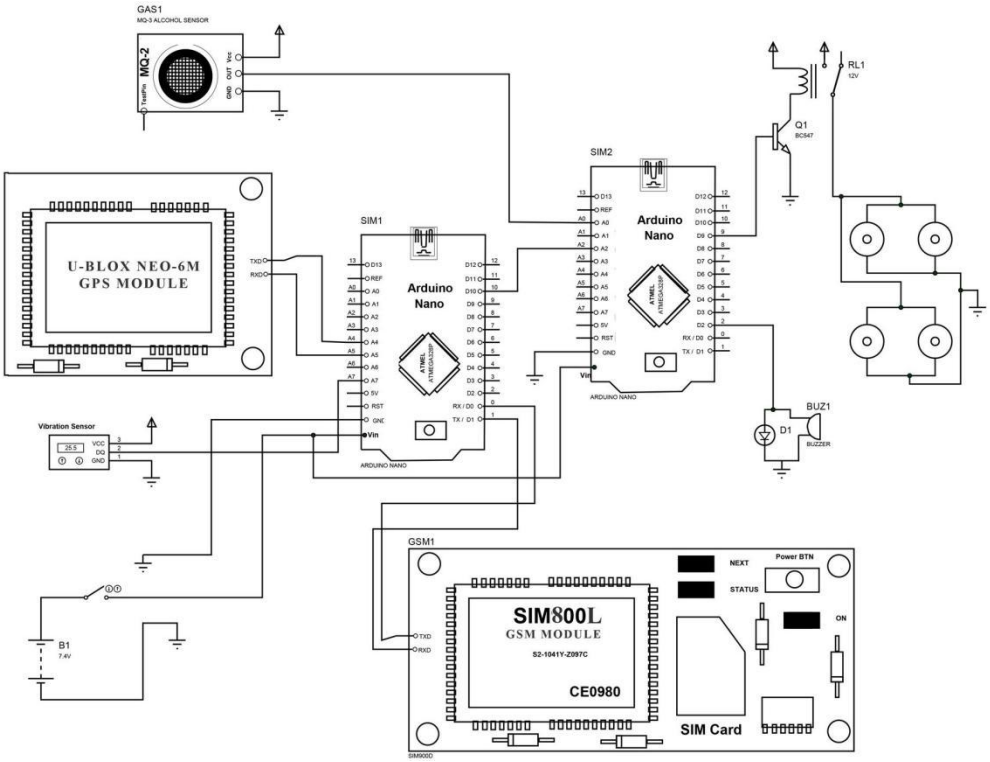

Figure 4.2: Circuit Diagram of our system

4.5 Working Principle

In our project we have a power source that is battery. In this project we have used an Arduino Nano for operate this system. First of all driver check the alcohol level. If alcohol sensor detect alcohol then engine will not on that situation. Here we use GPS sensor who sense the vehicle location, GSM module will help the send a text in rescue team. Once the system is activated then if the car has an accident somewhere, it will immediately track the location of the place via GPS and send a text (Location Link) to the phone via GSM. This will save the lives of the passengers in the car by rescuing them very quickly.

4.6 Experimental Setup of Our System

After completing our block diagram and circuit diagram we connect the all equipments together then we make a PCB Board and fitted the sensor and camera where we need. Here is our structural setup of our design is given below -

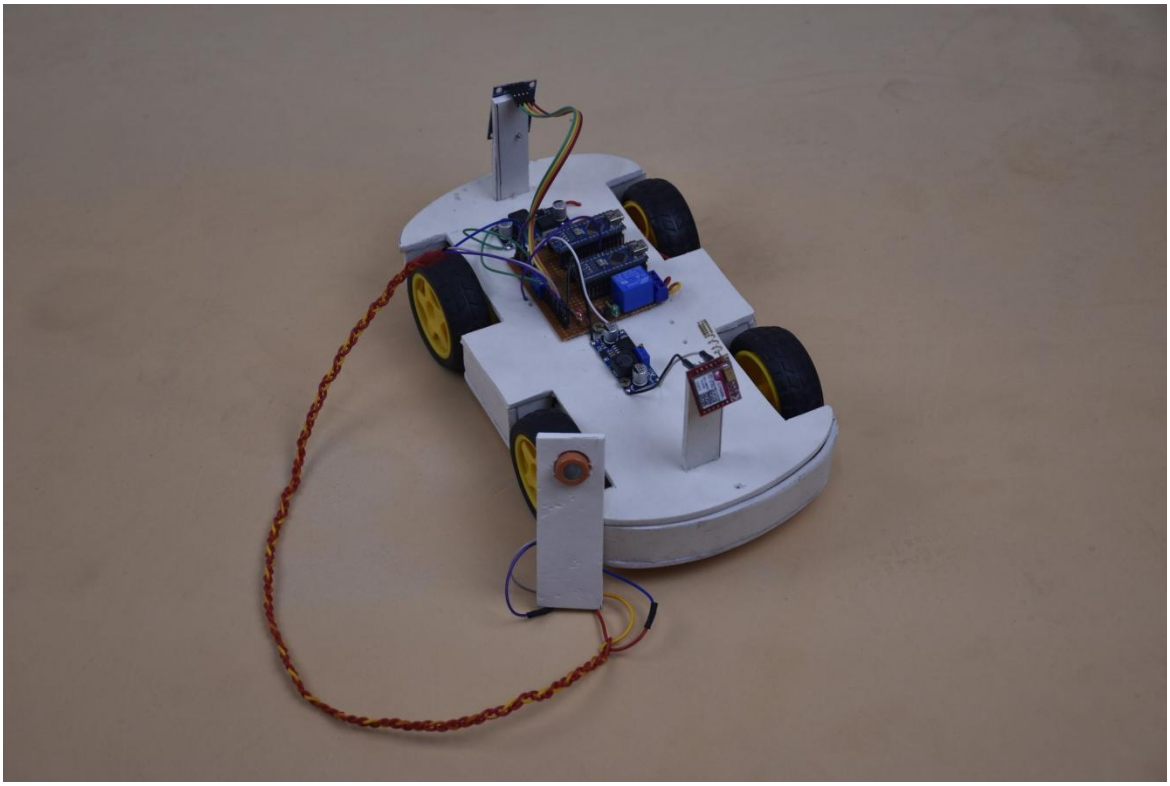

Figure 4.3: Our System Structural set up.

CHAPTER 5
RESULT AND DISCUSSION

5.1 Discussion

While working on our project, we did face some difficulties as it is a very complex system but the end results, we came up with were quite satisfactory. We have put the whole system through several tasks to validate our work and also have taken necessary notes for future improvements. Some future recommendations that we have involves improvement in system design and wiring, adding features for more efficient.

5.2 Result

This chapter contains the results obtained and discussion about the full project. Our project is smoke and gas detection system. In our project making we used PVC boards for total hardware making. After finally completing this project, we ran it & we observed the output of this project. We can see that it is working well as expected. After making our project we observe it very careful. It works as we desire. Our project give output perfectly and all equipment are work perfectly. We check how much it works and we get perfect output from this project.

- Finally, we have completed our project successfully & check our project its run accurately according to our objective.
- At first, we start our system.
- First of all driver check the alcohol level. If alcohol sensor detect alcohol then engine will not on that situation
- If the car has an accident, it will track the location of the car via GPS and send a text to the rescue team's phone.
- The GSM module will help send this text.
- This will make it easier to get an accident vehicle out, and rescue teams will be able to get there quickly.

5.3 Advantages

There are certainly many advantages of our project and some of the major ones have been given below:

- Accident location detected automatically.
- Automatic text sends to rescue team.
- Able to check driver alcohol level with alcohol sensor.
- Reduce the searching time to find accident car.
- This project is easy to use.
- Cost effective.
- User-friendly.
- Automatic and requires less human interaction.
- Can be operated virtually from anywhere in the world.
- The whole system consumes very little energy.

5.4 Application

This project has applications in many fields due its necessity. We have selected a few of them and they are given below:

- It can be used in any kind of vehicle.

CHAPTER 6
CONCLUSION

6.1 Conclusion

The completed module is successfully detecting accidents using vibrator sensor, this module is connected to GSM and GPS to send the data via message or notification. This module is successfully transmitting the location coordinates of accident spots to mobile via the GSM Module. This system will assure the accident spot. The ambulance will get the direction through map. So that, the ambulance reaches the accident place without facing any trouble and the victim will reach the hospital on timely. This system will show an alternative road without that accident road. So, other user can reach their destination easily and save their time. Hence, it will reduce life risk of the victim. After all, we may hope for a better solution of smart accident detection and rescue system.

6.2 Future Scope

Some of our project future scopes of works are listed below:

- In future development this project can be develop by more sensor & alarm system.
- In future we will add a huge battery source.

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APPENDIX

Program Code: