CONTENT

ABSTRACT

An accident prevention system is a critical tool for ensuring the safety of workers in various industrial and commercial settings. This system is designed to detect potential hazards and prevent accidents before they occur, thereby reducing the risk of injury and damage to property. The objective of this paper is to provide an abstract on the concept of accident prevention systems and their effectiveness in preventing accidents.

The proposed accident prevention system comprises various technologies, including IoT, deep learning, wireless sensor networks, and big data analytics. These technologies are used to collect and analyse data from different sources to identify potential hazards, predict future accidents, and provide real-time warnings to workers. The system is designed to detect unsafe conditions such as high temperature, high pressure, toxic gas leaks, improper use of equipment, and unsafe work practices.

The effectiveness of accident prevention systems has been studied extensively in various industries. Studies have shown that these systems are effective in identifying potential hazards, predicting future accidents, and providing real-time warnings to workers.

The implementation of accident prevention systems has significantly improved workplace safety, reduced the risk of injury and damage to property, and improved productivity and efficiency.

In conclusion, the implementation of an accident prevention system is critical for ensuring the safety of workers in various industrial and commercial settings. The use of various technologies such as IoT, deep learning, wireless sensor networks, and big data analytics has significantly improved the effectiveness of these systems in preventing accidents. The implementation of these systems can improve workplace safety, reduce the risk of injury and damage to property, and improve productivity and efficiency.

INTRODUCTION

In today's world there is a severe increase in the use of vehicles. Such heavy automobile usage has increased traffic and thus resulting in a rise in road accidents. This takes a toll on the property as well as causes human life loss because of unavailability of immediate preventive and safety facilities.

Complete accident prevention is unavoidable but at least repercussions can be reduced. This embedded system can prevent the accident to occur and proper preventive measures are taken in this system. The ambulance service and the police station can easily find the location as the location along with the google map link was sent to their smart devices with mobile network accessibility.

The system consists of eye blink sensor, temperature sensor, alcohol sensor, accelerometer, GPS module, GSM module, motor, buzzer, led etc. and all these devices are interfaced with the central micro controller unit.

We are going to use eye blink sensor for detecting sleep by setting the certain time limit, if the driver gets sleepy, we can warn him. Temperature sensor helps us in detecting the heat of the engine and if the engine is overheated then that of a normal condition, we can warn the driver. Alcohol sensor helps us in detecting if the driver is drunk or not.

If he/she is over drunk the vehicle provides warning and the engine stops functioning. Accelerometer detects the occurrence of accident and sends signal to the micro controller for further functioning.

GPS module provides us the location, speed, time, and date of the certain place where the vehicle is in the real time. If accident occurs, the location of accident that we get from the GPS is send to the ambulance service and police by the help of GSM module. Everything might be all right after a simple accident so the driver can re-inform the ambulance service and police station in this case.

Accidents in the workplace can have severe consequences, including injury, property damage, and loss of productivity. To prevent such incidents, accident prevention systems have been developed and implemented in various industries. These systems use various technologies such as sensors, real-time monitoring, and predictive analytics to identify potential hazards and prevent accidents before they occur.

Accident Prevention System

The primary goal of an accident prevention system is to improve workplace safety by identifying and mitigating potential hazards. The system's design and implementation depend on the industry and the specific hazards involved. For example, in a chemical plant, the system may use sensors to detect toxic gas leaks and alert workers of potential danger. In a construction site, the system may use cameras and deep learning algorithms to detect unsafe work practices.

Accident prevention systems are not only critical for maintaining the safety of workers but also have economic benefits. Accidents can result in lost productivity, increased insurance premiums, and legal liabilities. Implementing an accident prevention system can reduce the risk of such incidents and associated costs.

LITERATURE REVIEW

The products available in the market are not reliable when it comes to synchronizing more than one parameter. The literature survey revealed that systems available in market has a major disadvantage, it is specifically designed for one sole purpose like Accident detection, Accident prevention or accident reporting. These systems on their own have many advantages but these systems, but from cost point we must reconsider our decision to buy these products due to their lack of multitasking ability.
These systems are useful as it improves their functionalities by adding a feature to the existing system will increase the redundancies.

To overcome this disadvantage, we are proposing a system which could increase the functionality and reliability such that it can prevent the vehicle accident along with accident detection system and accident reporting to the ambulance service and police station.

Thus, our proposed system is much more advantageous over the existing system. Sensors are used in everyday objects such as touch-sensitive elevator buttons (tactile sensor) and lamps which dim or brighten by touching the base, besides innumerable applications of which most people are never aware.

With advances in micromachinery and easy-to-use microcontroller platforms, the uses of sensors have expanded beyond the traditional fields of temperature, pressure, or flow measurement, for example into MARG sensors. George Atwood invented the very first accelerometer in the 1700s.

The Atwood machine, as it was called, consists of masses on springs where the velocity is calculated based on displacements experienced. The Global Positioning System (GPS), originally Navistar GPS, is a satellite-based radionavigation system owned by the United States government and operated by the United States Space Force.

The GPS project was started by the U.S. Department of Defence in 1973, with the first prototype spacecraft launched in 1978 and the full constellation of 24 satellites operational in 1993.

The Global System for Mobile Communications (GSM) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile devices such as mobile phones and tablets. It was first deployed in Finland in December 1991.

By the mid-2010s, it became a global standard for mobile communications achieving over 90% market share, and operating in over 193 countries and territories.
2G networks developed as a replacement for first generation (1G) Analog cellular networks. Subsequently, the 3GPP developed third-generation (3G) UMTS standards, followed by the fourth-generation (4G) LTE Advanced and the fifth-generation 5G standards, which do not form part of the ETSI GSM standard.

Accident prevention systems are crucial in maintaining the safety of workers in various industrial and commercial settings. These systems help to identify and mitigate potential hazards before accidents occur, thereby reducing the risk of injury and damage to property. The following literature review discusses various studies and researches on accident prevention systems.

In a study conducted by Bao et al. (2020), an accident prevention system was developed using the internet of things (IoT) technology. The system used sensors and a real-time monitoring system to identify and prevent potential accidents in a chemical plant. The study concluded that the IoT-based system was effective in detecting potential hazards, and the timely warnings provided by the system significantly reduced the risk of accidents.

Another study by Kim et al. (2020) proposed an accident prevention system using a deep learning algorithm to detect unsafe conditions in a construction site. The system used camera images to identify potential hazards such as workers not wearing safety gear, improper use of equipment, and unsafe work practices. The study concluded that the deep learning algorithm was effective in detecting unsafe conditions, and the implementation of the system could significantly reduce the risk of accidents in construction sites.

In conclusion, the literature suggests that accident prevention systems using various technologies such as IoT, deep learning, wireless sensor networks, and big data analytics are effective in identifying potential hazards and preventing accidents in

various industries. The implementation of such systems could significantly improve workplace safety and reduce the risk of injury and damage to property.

This literature review of road safety in Africa has been organized by the main road safety sectors. South Africa's references were provided by TRL's local counterpart, the Centre for Scientific and Industrial Research (CSIR) in South Africa and they are included at the end of each section. This avoided the risk of the road safety work in South Africa overwhelming the rest of the region's efforts. The first source for the literature review was the IRRD database which contains references from over 30 institutes and organizations from 25 countries and includes references in English, German, Spanish and French.

IRRD is reported to receive approximately 10,000 references each year and is updated on a monthly basis. The literature review was limited to those references published in the past decade and it was decided not to include the 1989 Second African Road Safety Conference. A few key older reports were included, such as UNECA's 1989 Road Safety manual on Low-Cost Engineering Countermeasures which remains a practical reference. Articles were also identified from Conference Proceedings, including that of the 1997 Third African Road Safety Congress, TRL project files and from the personal libraries of colleagues.

HARDWARE REQUIREMENTS

The hardware devices to be used for accident prevention, detection and reporting system are eye blink sensor, temperature sensor, alcohol sensor, accelerometer, GPS module, GSM module, buzzers, led, microcontroller (Arduino Uno), power supply, connecting wires etc.

EYE BLINK SENSOR

The eye blink sensor senses the eye blink using infrared signal. The variation across the eye will vary as per the eye blink. If the eye is closed the output is high otherwise the output is low. The main component of the Eye Blink Sensor is the infrared sensor. The infrared sensor contains two parts. An IR transmitter and an IR receiver. The IR transmitter emits infrared waves onto the eye.

While the receiver continuously searches for variations in the reflected waves which indicates that the eye has blinked or not. If the eye is closed then reflected waves will be received by the IR Receiver and the output of the sensor would be low.
If the eye is open then all the IR rays will be absorbed by the eye and the output of the eye blink sensor would be high. Eyeblink Sensor can be used in a variety of applications including robotics and mechatronics projects as it provides excellent results and is very economic to buy.

Eye Blink Sensor is compatible with Arduino, Raspberry Pi, AVR, PIC and almost all other microcontrollers. The IR Variation Across the eye will vary as per eye blink. If the eye is closed output is low otherwise the output is high.
An infrared sensor includes two parts, the emitter (transmitter) & the receiver (receiver), so this is jointly called an optocoupler or a photo-coupler. Here, IR LED is used as a transmitter whereas the IR photodiode is used as a receiver for reflected IR radiations.

BUZZER

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke. An audio signalling device like a beeper or buzzer may be electromechanical or piezoelectric or mechanical type.

The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.

The pin configuration of the buzzer is shown below. It includes two pins namely positive and negative. The positive terminal of this is represented with the '+' symbol or a longer terminal. This terminal is powered through 6Volts whereas the negative terminal is represented with the '- 'symbol or short terminal and it is connected to the GND terminal.

This buzzer was launched in the year 1831 by an American Scientist namely Joseph Henry but, this was used in doorbells until they were eliminated in 1930 in support of musical bells, which had a smooth tone.
The specifications of the buzzer include the following.

- Colour is black
- The frequency range is 3,300Hz
- Operating Temperature ranges from – 20° C to +60°C
- Operating voltage ranges from 3V to 24V DC
- The sound pressure level is 85dBA or 10cm

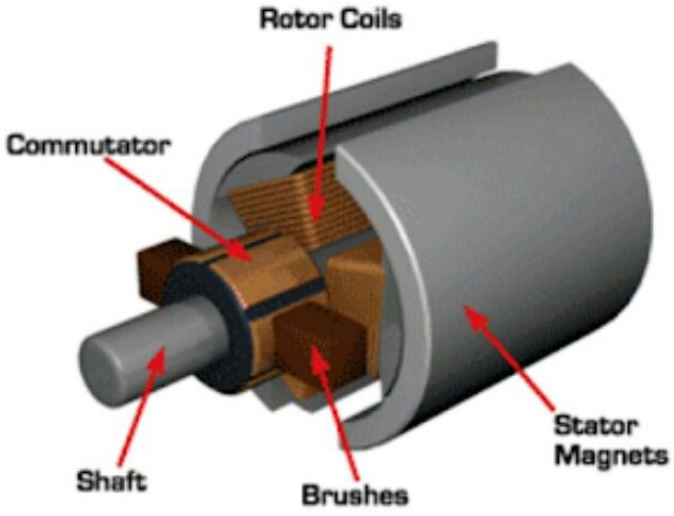
D.C MOTOR (CONTROL SWITCH)

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current flow in part of the motor.

A DC motor is any of a class of rotary electrical motors that converts direct current (DC) electrical energy into mechanical energy. The most common types rely on the forces produced by induced magnetic fields due to flowing current in the coil. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change the direction of current in part of the motor.

DC motors were the first form of motors widely used, as they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings.

Small DC motors are used in tools, toys, and appliances. The universal motor, a lightweight brushed motor used for portable power tools and appliances can operate on direct current and alternating current. Larger DC motors are currently used in propulsion of electric vehicles, elevator, and hoists, and in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.



MICROCONTROLLER (ARDUINO UNO R3)

The Arduino Uno R3 is a microcontroller board based on a removable, dual inline-package. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards(shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. it has one 5v output pin and one 3.3v output pin. it also contains three ground pins.

Arduino UNO is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst-case scenario you can replace the chip for a few dollars and start over again.

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc and initially released in 2010. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.

LED (LIGHT EMITTING DIODE)

LED (Light Emitting Diode) is a semiconductor device that emits light when a current is passed through it. LEDs are widely used in various applications, including lighting, displays, and indicators, due to their low power consumption, long life, and high efficiency.

LEDs are made up of layers of semiconductor material, such as gallium arsenide, and are doped with impurities to create a p-n junction. When a voltage is applied across the p-n junction, electrons and holes recombine, releasing energy in the form of photons, which produces light.

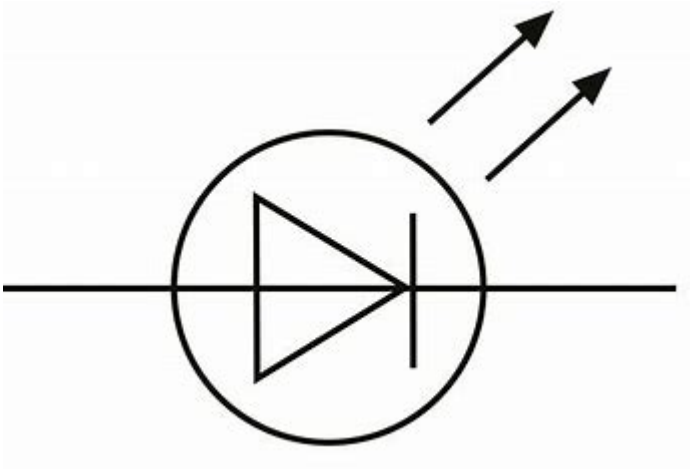
The colour of the light emitted by an LED depends on the semiconductor material and the dopants used. For example, gallium nitride doped with indium produces blue light, while gallium phosphide doped with nitrogen produces green light. By varying the semiconductor material and dopants, LEDs can be made to emit a wide range of colours.

One of the significant advantages of LEDs is their energy efficiency. LEDs consume much less power than traditional incandescent bulbs, making them ideal for applications where power consumption is critical, such as battery-powered devices. They also have a longer life, typically lasting 50,000 to 100,000 hours, which reduces maintenance costs and replacement frequency.

Another advantage of LEDs is their flexibility in design and use. LEDs can be made in various shapes and sizes, including small surface-mounted devices (SMDs) used in electronics, and high-power LEDs used for lighting applications. LEDs can also be dimmed and controlled using pulse-width modulation (PWM), allowing for precise control over brightness and colour.

In conclusion, LEDs are a semiconductor device that emits light when a current is passed through it. They have significant advantages over traditional incandescent bulbs, including energy efficiency, long life, and design flexibility. LEDs are widely used in various applications, including lighting, displays, and indicators, and their versatility and efficiency make them an ideal choice for many electronic and lighting projects.

LED CIRCUIT:



RELAY MODULE ONE CHANNEL

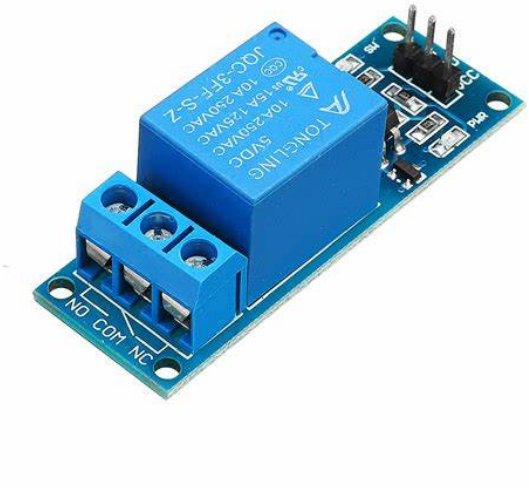
A relay module is an electronic device that allows low-voltage signals to control high-voltage devices. It consists of a relay switch, an optocoupler, and other components that help protect the control circuit from damage. A one-channel relay module can control one high-voltage device, such as a motor or a light bulb. It typically includes a small LED indicator to show the relay's status. Here are the main components of a one-channel relay module:

Relay switch: The relay switch is an electromechanical switch that can control high-voltage devices. When a low-voltage signal is applied to the relay's control coil, the switch contacts close or open, allowing or blocking the flow of current to the device.

Optocoupler: The optocoupler is an optical device that isolates the control circuit from the high-voltage device, protecting it from voltage spikes and other electrical disturbances. It consists of a light-emitting diode (LED) and a photoresistor or phototransistor. When a low-voltage signal is applied to the LED, it emits light that activates the photoresistor or phototransistor, which in turn triggers the relay switch.

Power supply: The relay module requires a separate power supply to operate the high-voltage device. The power supply can be AC or DC, depending on the device's requirements.

LED indicator: The LED indicator shows the status of the relay switch, indicating whether the switch contacts are open or closed.



SOFTWARE REQUIREMENTS

The software applications to be used for accident prevention, detection, and reporting system is Arduino IDE, google map and messaging app.

ARDUINO IDE

The Arduino Integrated Development Environment (IDE) is a cross- platform application (for Windows, macOS, Linux) that is written in functions from C and C++. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. A program written with the IDE for Arduino is called "sketch". Sketches are saved on the development computer as files with the file extension.io. Arduino Software (IDE) prior to 1.0 saved sketches with the extension. DE. Arduino IDE was created for people with no profound knowledge of electronics. Arduino IDE also contains a message area, a text console, a toolbar with buttons for common functions and a series of menus.

The Arduino Integrated Development Environment (IDE) is a software platform used for developing, programming, and uploading code to Arduino microcontrollers. It is a cross-platform application that runs on Windows, Mac, and Linux operating systems and supports various Arduino boards, including the popular Arduino Uno and Mega.

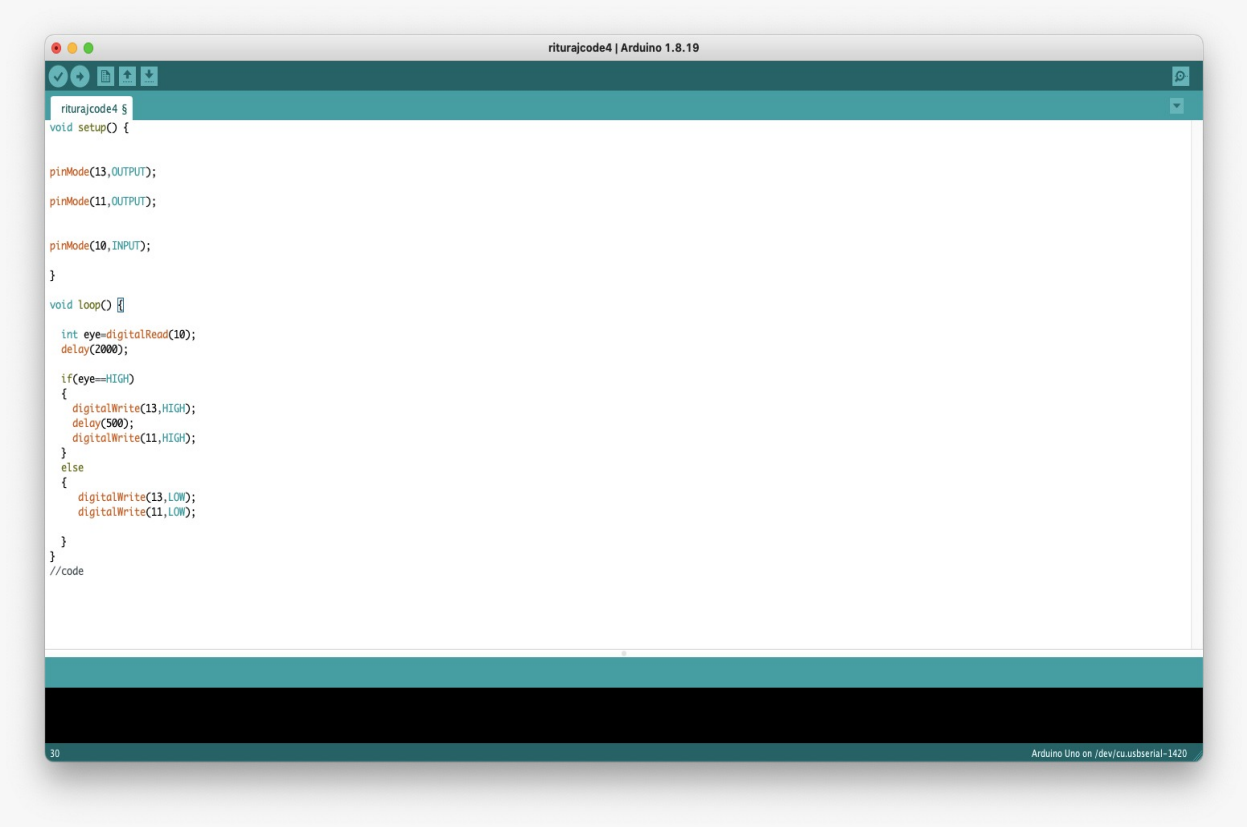
The Arduino IDE provides a simple interface that allows users to write and edit code, compile, and upload code to the Arduino board, and monitor serial communication with the board. It includes a text editor with features such as syntax highlighting, auto-completion, and error highlighting, making it easy for beginners to write code.

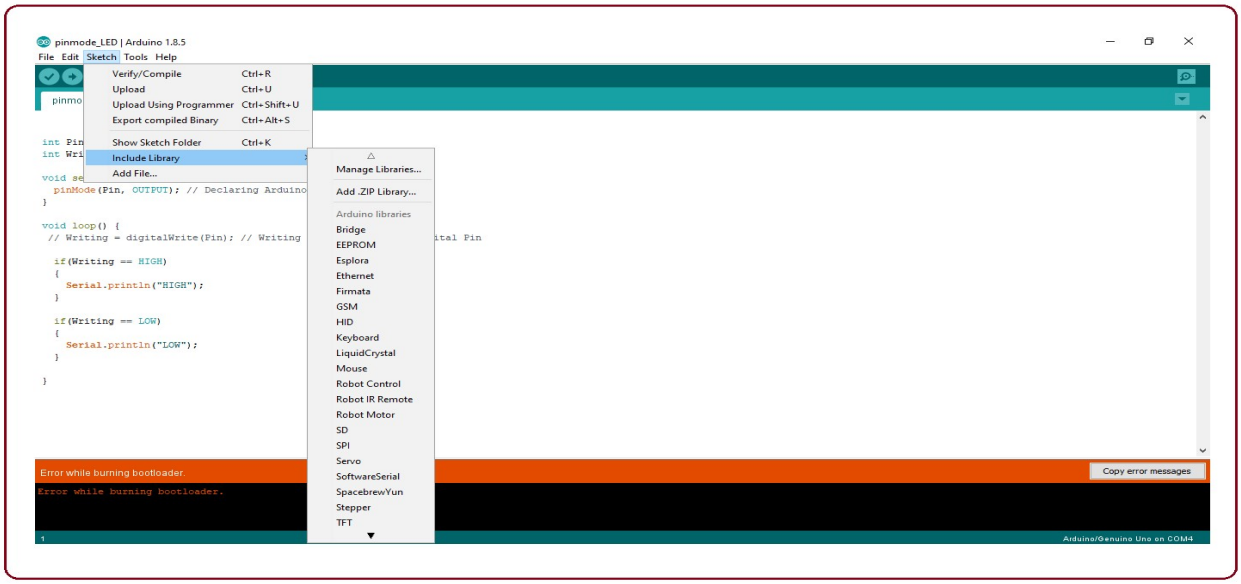
One of the significant benefits of the Arduino IDE is its vast library of pre-written code and functions. These pre-written code snippets or "sketches" can be used to perform a wide range of tasks such as reading sensor data, controlling motors, and displaying information on an LCD screen, among others. These libraries can be easily imported into the IDE, saving time and effort in writing code from scratch.

The IDE also supports third-party libraries, which can be downloaded and installed to expand the capabilities of the Arduino board. This feature allows users to easily add support for additional hardware, sensors, and communication protocols.

The Arduino IDE also has a built-in serial monitor, which allows users to communicate with the Arduino board and receive data from sensors or output from the board. This feature is particularly useful for debugging and testing code.

In conclusion, the Arduino IDE is a powerful and user-friendly platform for developing and programming Arduino microcontrollers. Its simple interface and vast library of pre-written code and functions make it an ideal tool for beginners and experts alike. The ability to expand the capabilities of the Arduino board with third-party libraries further enhances its versatility.




pinmode_LED | Arduino 1.8.5
File Edit Sketch Tools Help
Verify/Compile Ctrl+R
Upload Ctrl+U
Upload Using Programmer Ctrl+Shift+U
Export compiled Binary Ctrl+Alt+S
Show Sketch Folder Ctrl+K
Include Library
Add File...
Manage Libraries...
Add .ZIP Library...
Arduino libraries
Bridge
EEPROM
Esplora
Ethernet
Firmata
GSM
HID
Keyboard
LiquidCrystal
Mouse
Robot Control
Robot IR Remote
Robot Motor
SD
SPI
Servo
SoftwareSerial
SpacebrewYun
Stepper
TFT
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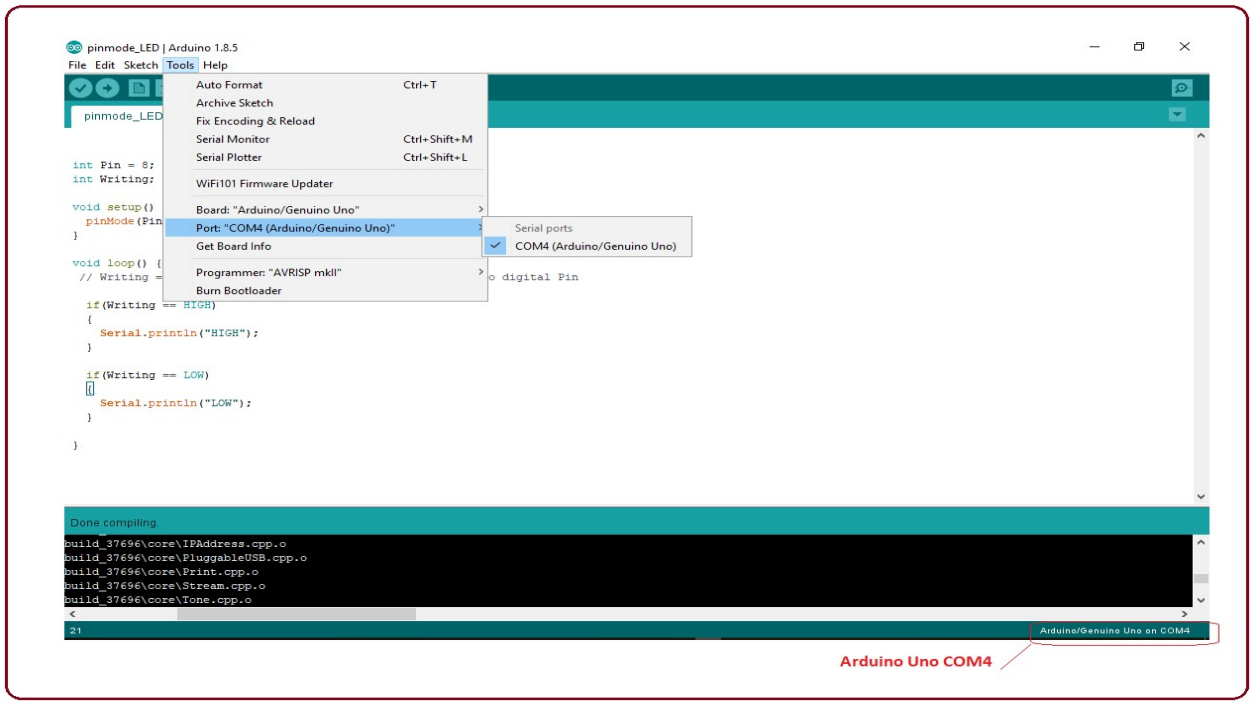
Copy error messages
Arduino/Genuino Uno on COM4


pinmode_LED | Arduino 1.8.5
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 Firmware Updater
Board: "Arduino/Genuino Uno"
Port: "COM4 (Arduino/Genuino Uno)"
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader
Serial ports
COM4 (Arduino/Genuino Uno)
Done compiling.
Arduino/Genuino Uno on COM4
Arduino Uno COM4

CODING

```
int eyeBlinkPin = 8; // connecting eye blink sensor to pin 8

int detectionState; // initializing detection variable
void setup()
{

   pinMode(eyeBlinkPin,INPUT); // setting eyeblink pin as INPUT

   Serial.begin(9600); // Initializing serial monitor with baud rate of 9600
}
void loop()
{
   detectionState = digitalRead(eyeBlinkPin); // saving the eye blink state to
   detection variable

   if (detectionState == HIGH) // check the detection variable is HIGH

   {
      Serial.println("Eye is closed"); // if true, print the following message on serial
monitor

   }

   else {

      Serial.println("Eye is open"); // if false, print the following message on serial
monitor

   }

   delay(50); // providing a delay of 50ms between each loop
}

void setup() {
pinMode(13,OUTPUT);

pinMode(11,OUTPUT);
```

```
pinMode(10,INPUT);

}

void loop() {

  int eye=digitalRead(10);

  delay(2000);

  if(eye==HIGH)
  {
    digitalWrite(13,HIGH);

    delay(500);

    digitalWrite(11,HIGH);

  }

  else

  {
     digitalWrite(13,LOW);

     digitalWrite(11,LOW);

  }

}
```

CONCEPT/THEORY

Arduino is an open-source project that created microcontroller-based kits for building digital devices and interactive objects that can sense and control physical devices.

OVERVIEW

Arduino is an open-source hardware and software project, created with a simple aim in mind to be as simple as possible. Arduino is widely used by artists, hackers and professionals to casually design prototype and experiment with electronics. Can use it as brain for their robot, to build a new digital music instrument, or to make your house plant tweet you when it is dry.

An Arduino contains a microchip, which is a very small processor that you can program. You can attach sensors to it so it can measure conditions like how much light there is in the room). It can control how other objects react to those conditions (room gets dark, LED turns on). The project is based on microcontroller board designs, produced by several vendors using various microcontrollers. Microcontrollers use inputs and outputs like a computer.

Inputs capture information from the user or the environment while outputs do something with the information that has been captured. A switch and a sensor could be a digital and an analog input respectively into the Arduino and any object we want to turn on and off and control could be an output. It could be a motor or even a computer.

These systems provide sets of digital and analog input/output (I/O) pins that can interface to various expansion boards (termed shields) and other circuits. The boards feature serial communication interfaces, including Universal Serial Bus (USB) on some models for loading programs from personal computers.

For programming the microcontrollers, the Arduino project provides an integrated development environment (IDE) based on a programming language named processing, which also supports the languages, C and C++. The Arduino language is very similar to C. It is almost the same language but Arduino provides us with several libraries to make things a bit easier.

FEATURES

An Arduino board consists of an Atmel 8, 16- or 32-bit AVR microcontroller (although since 2015 other makers' microcontrollers have been used) with complementary components that facilitate programming and incorporation into other circuits. An important aspect of the Arduino is its standard connectors, which let users connect the 14CPU board to a variety of interchangeable add-on modules termed shields.

Some shields communicate with the Arduino board directly over various pins, but many shields are individually addressable via 1°C serial bus-so many shields can be stacked and used in parallel A handful of other processors have also been used by Arduino compatible devices. Most boards include a 5 V linear regulator and a 16 MHz crystal oscillator (or ceramic resonator in some variants).

An Arduino's microcontroller is also pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory, compared with other devices that typically need an external chip programmer. This makes using an Arduino more straightforward by allowing the use of an ordinary computer as the programmer. Currently, opt boot loader is the default boot loader installed on Arduino UNO. Some serial Arduino boards contain a level shifter circuit to convert between RS-232 logic levels and transistor-transistor logic (TTL) level signals.

Current Arduino boards are programmed via Universal Serial Bus (USB), implemented using USB-to-serial adapter chips such as the FTDI FT232. Some boards, such as later-model Uno boards, substitute the FTDI chip with a separate AVR chip containing USB-to-serial firmware, which is reprogrammable via its own ICSP header.

Other variants, such as the Arduino Mini and the unofficial Bo Arduino, use a detachable USB-to-serial adapter board or cable, Bluetooth, or other methods, when used with traditional microcontroller tools instead of the Arduino IDE, standard AVR in-system programming (ISP) programming is used. The Arduino board exposes most of the microcontroller's I/O pins for use by other circuits.

The Diecimila Duemilanove and current Uno provide 14 digital I/O pins, six of which can produce pulse-width modulated signals, and six analog inputs, which can also be used as six digital I/O pins.

These pins are on the top of the board, via female 0.1-inch (2.54 mm) headers. Several plug-in application shields are also commercially available. The Arduino Nano, and Arduino-compatible Bare Bones Board and Board uno boards may provide male header pins on the underside of the board that can plug into solder less breadboard.

METHODOLGY

The PIC microcontroller PIC16f877a is one in all the foremost noted microcontrollers within the business. This controller is extremely convenient to use, the coding or programming of this controller is also easier.

One of the most blessings is that it may be write-erase as over and over as attainable as a result of it use non-volatile storage technology. It has a complete variety of forty pins and their square measure thirty-three pins for input and output.PIC16F877A is used in many PIC microcontroller projects.PIC16F877A even have several applications in digital natural philosophy circuits.PIC16f877a finds its applications in a huge number of devices.

It is employed in remote sensors, security and safety devices, home automation and in several industrial instruments. An EEPROM is additionally featured in it that makes it doable to store several the knowledge for good like transmitter codes and receiver frequencies and a few alternative connected data. The cost of this controller is low and its handling is additionally straightforward.

Its versatile and may be employed in areas wherever microcontrollers have not been used before as in coprocessor applications and timer functions etc.

The eye-blink detector works by illuminating the attention and/or lid space with infrared, then monitoring the changes in the reflected light using a phototransistor and differentiator circuit. The exact functionality depends greatly on the positioning and aiming of the emitter and detector with respect to the eye. Connect regulated DC power supply of 5 Volts. Black wire is Ground, Next middle wire is Brown which is output and red wire is positive supply.

These wires are also marked on PCB. To test detector, you simply want power the detector by connect 2 wires +5V and GND. You can leave the output wire because it is. When Eye closed LED is off the output is at 0V. Put Eye blink sensor glass on the face within 15mm distance, and you can view the LED blinking on each Eye blink. The output is active high for Eye shut and may incline on to microcontroller for interfacing applications.

WORKING PRINCIPLE

In this system at first, we worked on the prevention of vehicle accident and even after all the preventive measures applied if the accident occurs the system detects it. After the detection of vehicle accident, the system automatically reports to the ambulance service and police station without any time loss so that the casualty might not loss his/her life due to late in rescue. The system is installed in the vehicle.

As the preventive measures for vehicle accident the sensors like MQ-3 alcohol sensor, eye blink sensor and LM35 temperature sensor are used. For the detection of vehicle accident accelerometer is installed and for reporting GPS module and GSM module are used.

Motor (control switch) is used for engine control and buzzer, led lights etc. are used for warning during prevention. All these devices are interfaced with the central microcontroller (Arduino Uno) unit. Alcohol sensor helps us in detecting if the driver is drunk or not. If he/she is over drunk the vehicle provides warning and the engine stop functioning.

Eye blink sensor is used for detecting the eye blink, if a driver gets sleepy, he gets warned. Temperature sensor helps us in detecting the temperature of the engine and if the engine is overheated then that of a normal condition, driver is warned with red coloured LED. Accelerometer detects the occurrence of accident and sends signal to the microcontroller for further functioning.

GPS module provides the location, speed, time, and date of the certain place where the vehicle is in the real time. If accident occurs, the accelerometer detects it and location of accident is obtained using GPS, and finally sends the information to the ambulance service and police by the help of GSM module.

The message obtained in mobile phone consists of the location of the accidental place in the form of google map link which will help to the emergency units like ambulance service and police station to reach the casualty in time and rescue the lives.
The working principle of an accident prevention system involves detecting potential hazards in the workplace and triggering appropriate safety measures to prevent or

mitigate accidents. Here are the basic steps involved in the working of an accident prevention system:

Sensor Data Collection: The system uses various sensors to collect data from the environment. These sensors may include temperature sensors, gas sensors, motion sensors, and others, depending on the specific industry and hazards involved.

Data Analysis: The collected data is analysed by the control unit, which can be a microcontroller or a computer-based system running algorithms to identify potential hazards. The system compares the sensor data with present thresholds and rules to detect abnormal conditions and potential hazards.

Alert System: If the system identifies a potential hazard, it triggers an alert system to notify workers and supervisors of the situation. The alert system can be in the form of visual, audio, or tactile signals, such as flashing lights, sirens, or vibrating alarms.

Safety Measures: The system also triggers appropriate safety measures to prevent or mitigate accidents. These safety measures can include automatic shutdown of equipment, activation of emergency ventilation systems, or triggering other safety protocols.

Monitoring System: The system continuously monitors the environment and performance of the accident prevention system. It generates reports and analytics to identify trends and improve the system's effectiveness.

In conclusion, the working principle of an accident prevention system involves detecting potential hazards in the workplace, triggering appropriate alerts, and safety measures to prevent or mitigate accidents. The system's design and implementation depend on the specific industry and hazards involved, but the goal remains the same: to ensure the safety of workers and prevent accidents.

BLOCK DIAGRAM

The vehicle unit consist of alcohol sensor, eye blink sensor and temperature sensor as preventive measures of an accident, buzzer, and red-light LEDs for alert. First alcohol sensor detects the concentration of alcohol in driver, if it is found below the threshold the motor rotates and vehicle is ready to be drive. The block diagram of an accident prevention system may vary depending on the specific industry and hazards involved, but generally, it consists of the following components:

Sensors: Sensors are used to detect potential hazards and anomalies in the workplace. These sensors can include temperature sensors, gas sensors, motion sensors, and others, depending on the industry and specific hazards.

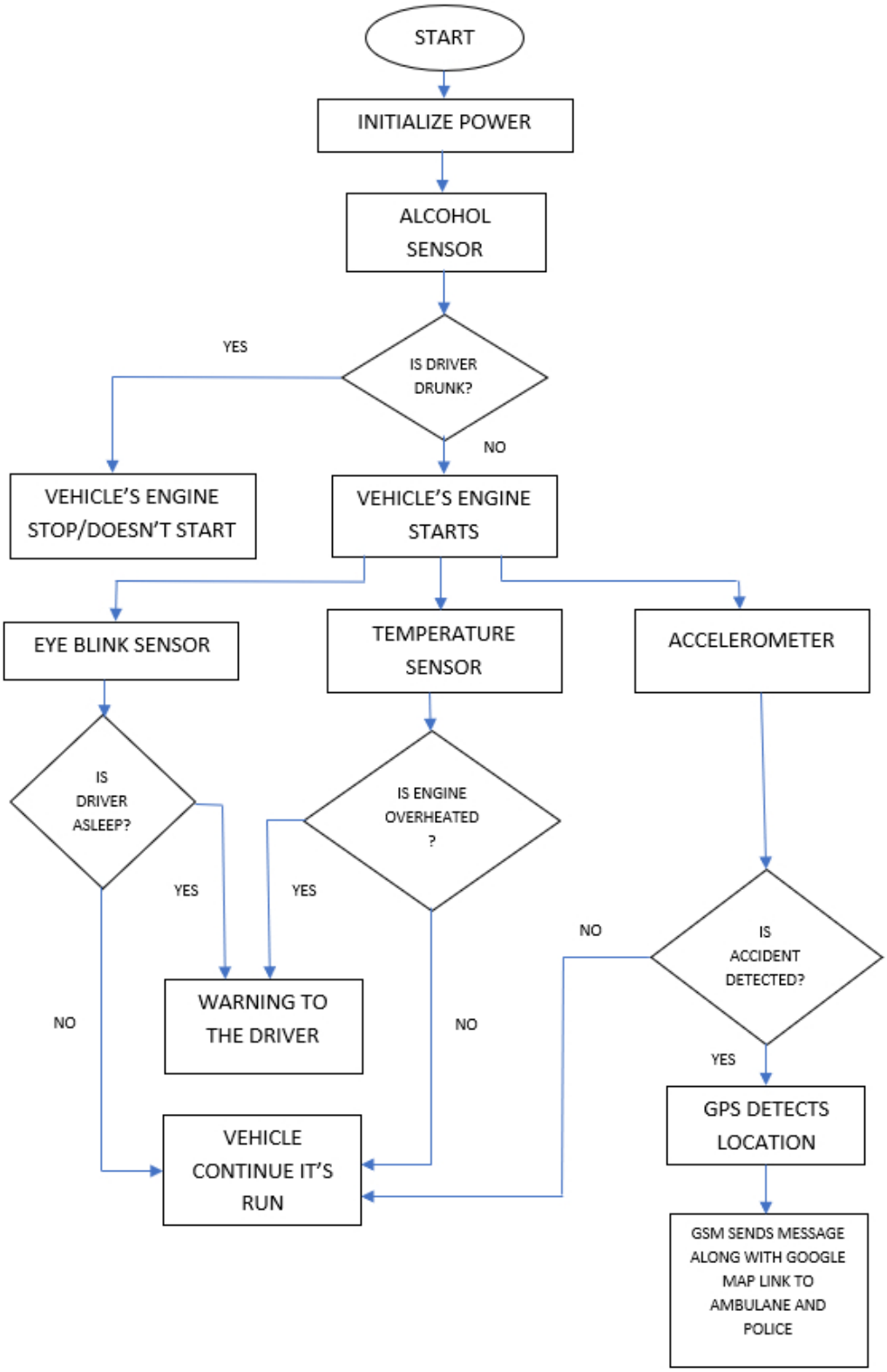
Data Acquisition System: The data acquisition system collects data from the sensors and transmits it to the control unit.

Control Unit: The control unit processes the data from the sensors and identifies potential hazards. It can be a microcontroller or a computer-based system that runs algorithms to analyse the data and trigger alerts or safety measures if necessary. Alert System: The alert system is responsible for notifying workers and supervisors of potential hazards. It can be in the form of visual, audio, or tactile signals, such as flashing lights, sirens, or vibrating alarms.

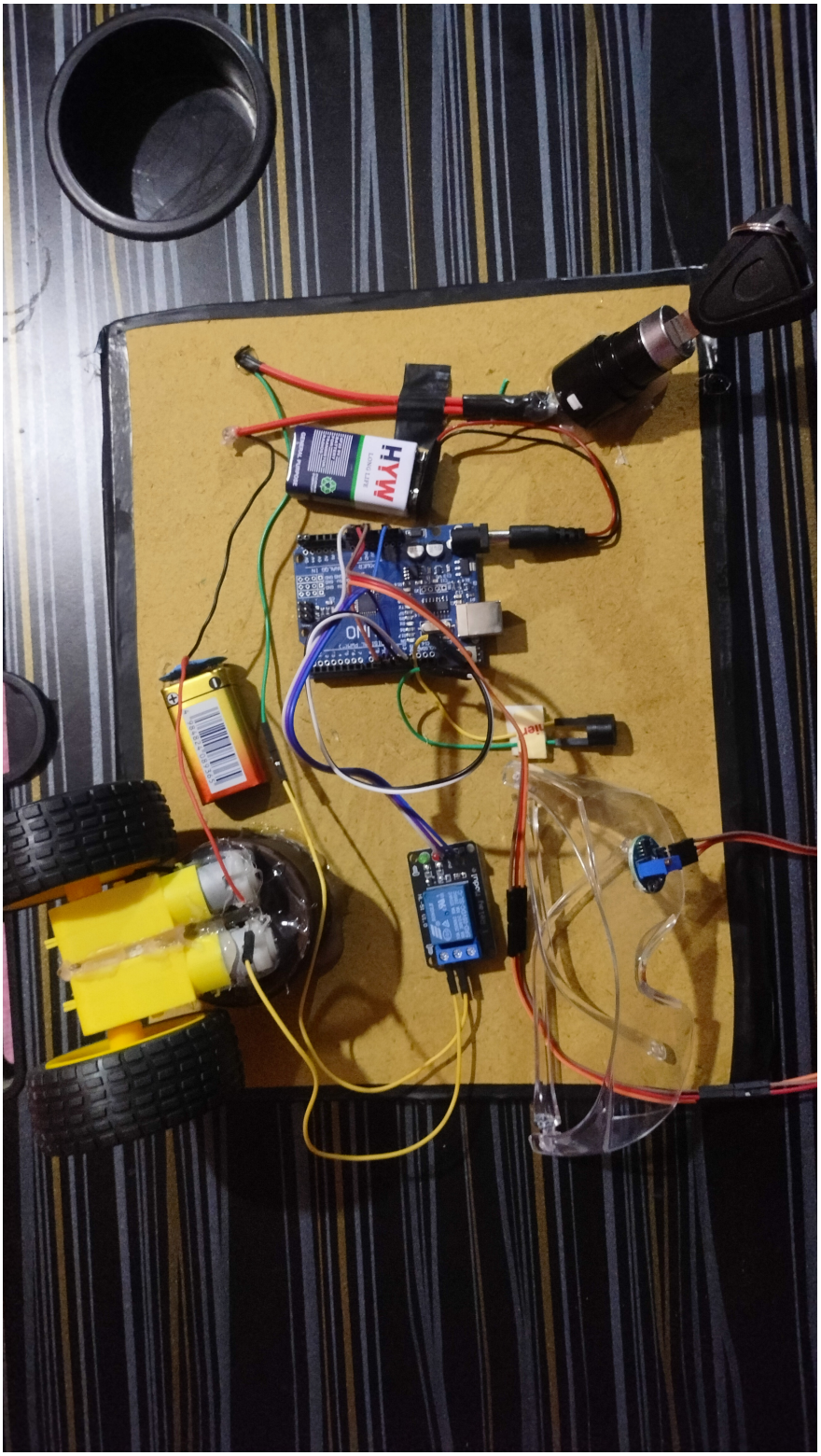
Safety Measures: Safety measures can include automatic shutdown of equipment, activation of emergency ventilation systems, or triggering other safety protocols to prevent or mitigate potential accidents.

Monitoring System: The monitoring system keeps track of the system's performance and can generate reports and analytics to identify trends and improve the system's effectiveness.

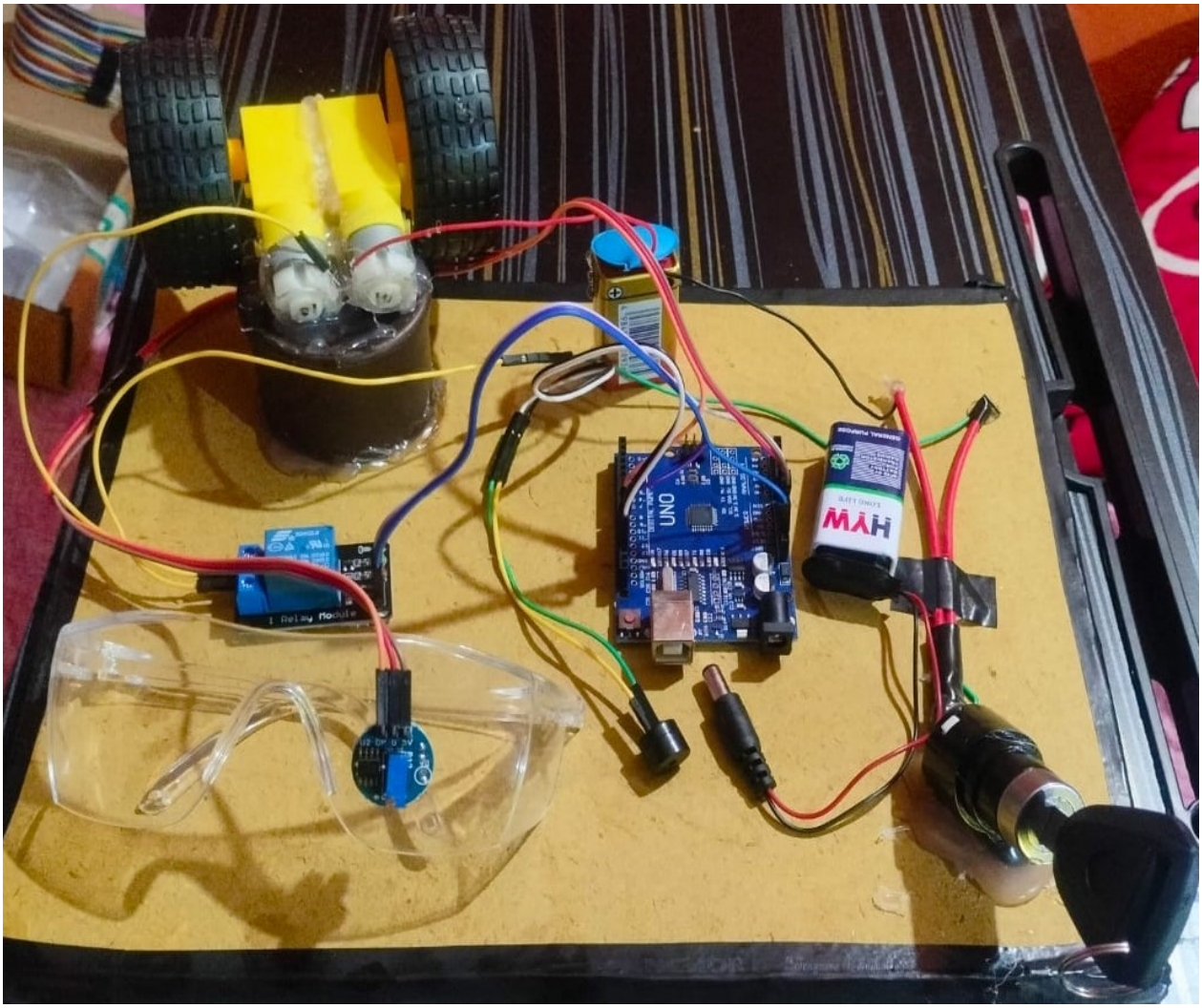
FLOWCHART


START
INITIALIZE POWER
ALCOHOL SENSOR
IS DRIVER DRUNK?
YES
NO
VEHICLE'S ENGINE STOP/DOESN'T START
VEHICLE'S ENGINE STARTS
EYE BLINK SENSOR
TEMPERATURE SENSOR
ACCELEROMETER
IS DRIVER ASLEEP?
IS ENGINE OVERHEATED ?
IS ACCIDENT DETECTED?
YES
YES
NO
NO
NO
YES
WARNING TO THE DRIVER
VEHICLE CONTINUE IT'S RUN
GPS DETECTS LOCATION
GSM SENDS MESSAGE ALONG WITH GOOGLE MAP LINK TO AMBULANE AND POLICE

PROJECT PICTURE



Accident Prevention System



PROBLEM FACED

During the progress of our project, we came to encounter numerous problems that slowed our progress. some of the major problems are mentioned below:

Due to the lack of electronics stores we could not get our hands on the equipment in time, which was required in our project.

As electronics devices are very sensitive to voltage and temperature and could be damaged easily, few sensors and devices were damaged which resulted in delay in time and increase in cost of project.

Arduino IDE was corrupted; it took time to delete and install it again in computer. This caused irregular output in serial monitor.

Initially, GSM SIM card was not getting signal, later changing the SIM card fixed that problem.

RESULT & CONCLUSION

In this 21's century, with the continuous advancement in science and technology, more emphasis is given for vehicle safety. With the increase in number of vehicles, the number of road accident is also increasing day by day, so it is our duty to control it.

Mostly the accident takes place because of drunk drivers, drowsiness while driving and overheating of engine causing fire. Implementation of this project will help to decrease the accident caused because of above reason.

The system is automatic, low cost and power efficient which makes it easy to install in vehicle. Unfortunately, if accident happens to take place, the system detects it and with the help of GPS exact location can be pointed and informed to emergency unit using GSM module.

This helps to save many lives by informing rescuing agent in time. Over all, this system is very affordable, targets common people and easily implemented in all types of vehicles.

FUTURE SCOPE

With the completion of this project there are certain enhancement that can be done. They are as follows:

• Along with the stopping of vehicle after a driver is found drunk, he can be fined automatically by connecting central system with traffic control room.

• Scientifically proved music which keeps people awake, can be played time to time in driver's cabin.

• CCTV camera can be installed in the driver's cabin and can be controlled from central room of travel agencies, this can prevent accident considerably.

• Vehicle unit can be connected with central server to find contact no. of ambulance and police control room.

• Vehicle if obtains over speed, the accelerometer can determine it and automatically complain to traffic by which driver can be fined. This will limit the speed of vehicle and can prevent from accident too.

• Surveillance using A.I. cameras and solving hit and run cases.

REFERENCES

References Books

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2. Getting Started with Sensors: Measure the World with Electronics, Arduino, and Raspberry Pi by Tero Karvinen.

Web References

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2. https://www.researchgate.net/publication/354450605_Accident_Prevention_Road_Safety_Model_with_Light_Control

Accident Prevention System