IOT BASED VEHICLE ACCIDENT PREVENTION SYSTEM

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A PROJECT REPORT

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Department of Computer Science and Engineering

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BONAFIDE CERTIFICATE

Certified that this Project Report titled, "**IOT BASED VEHICLE ACCIDENT PREVENTION SYSTEM** " is the bonafide record of "**RAKESH M, SIVAPRAKASH M, SELVAKUMAR D, SIVASAKTHI R.K**" who carried out the Project Work under my supervision. Certified further, that to the best of my knowledge the work reported herein does not form part of any other project report or dissertation on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

PROJECT GUIDE

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First of all we extend our heart-felt Gratitude to the management of SNS College of Technology, for providing us with all sorts of supports in completion of this project phase-II .

We record our indebtedness to our Director **Dr.V.P.Arunachalam**, and our Principal **Dr.S.Chenthur Pandian**, for their guidance and sustained encouragement for the successful completion of this project phase-II.

We are highly grateful to **Dr.L.M.Nithya**, Professor & Dean/CSE,IT & AIML for her valuable suggestions and guidance throughout the course of this project, her positive approach had offered incessant help in all possible ways from the beginning.

We are profoundly grateful to **Dr.K.Sangeetha**, Associate Professor & Head, Department of Computer Science & Engineering for her consistent encouragement and directions to improve our project phase-II and completing the project phase-II in time.

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We take immense pleasure in expressing our humble note of gratitude to our project guide, **Dr.S.Sathishkumar,** Associate Professor, Department of Computer Science & Engineering, for her remarkable guidance and useful suggestions, which helped us in completing the project phase-II in time.

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ABSTRACT

This paper aims to create a framework to keep the car safe and secure through critical activity. When we run in ignorance we cannot take care of our own. If we make all vehicles with an automatic safety system that gives the driver a high level of protection, an alarm will also be issued. The device has an installed a eye blink sensor. Once the driver has started the engine, the sensors automatically detect the blink of eye. On this device the output of the sensor is provided for comparison with ARDUINO. When the value reaches the set level, the buzzer automatically vibrates, the LED glows, and the car stops automatically when eye blink sensor receives a signal from the transmission module.Driver drowsiness is a significant factor in vehicular accidents and therefore different technologies are being put in place to bring it to the barest minimum. In this wireless technology, eye blink sensor and automatic braking system is used to ensure that the vehicle slows down and comes to a halt when drowsiness is detected.The wireless technology which is the backbone of this project work.It was ascertained from the results that the vehicle accidents prevention system using wireless technology is an effective technology for vehicle accidents prevention due to driver drowsiness.At present criteria, we cannot detect where the accident has occurred and hence no information related to it, leading to the death of an individual. The research work is going on for tracking the position of the vehicle even in dark clumsy areas where there is no network for receiving the signals. In this project GPS is used for tracking the position of the vehicle.

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LIST OF ABBREVIATIONS

ABBREVIATION	EXPANSION
IOT	Internet of Things
SST	Software System Testing
LED	Light Emitting Diode
RFID	Radio Frequency Identification
DC	Direct Circuit
IDE	Integrated Development Environment
USB	Universal Serial Bus

CHAPTER 1

INTRODUCTION

1.1. IOT:

The term IoT, or Internet of Things, refers to the collective network of connected devices and the technology that facilitates communication between devices and the cloud, as well as between the devices themselves. Thanks to the advent of inexpensive computer chips and high bandwidth telecommunication, we now have billions of devices connected to the internet. This means everyday devices like toothbrushes, vacuums, cars, and machines can use sensors to collect data and respond intelligently to users.

The Internet of Things integrates everyday “things” with the internet. Computer Engineers have been adding sensors and processors to everyday objects since the 90s. However, progress was initially slow because the chips were big and bulky. Low power computer chips called RFID tags were first used to track expensive equipment. As computing devices shrank in size, these chips also became smaller, faster, and smarter over time.

The cost of integrating computing power into small objects has now dropped considerably. For example, you can add connectivity with capabilities to MCUs with less than 1MB embedded RAM, such as for light switches. A whole industry has sprung up with a focus on filling our homes, businesses, and offices with IoT devices. These smart objects can automatically transmit data to and from the Internet. All these “invisible computing devices” and the technology associated with them are collectively referred to as the Internet of Things as shown in figure1.1.

Figure 1.1. IOT

1.1.1. Types of IOT

The networking, communication and connectivity protocols depend largely on the specific IoT application deployed. Just as there are many different IoT devices, there are many types of IoT applications based on their usage. Here are some of the most common ones:

- Consumer IoT - Primarily for everyday use. E g: home appliances, voice assistance, and light fixtures.
- Commercial IoT - Primarily used in healthcare and transport industries. E g: smart pacemakers and monitoring systems.
- Military Things (IoMT) - Primarily used for the application of IoT technologies in the military field. E g: surveillance robots and human-wearable biometrics for combat.
- Industrial Internet of Things (IoT) - Primarily used with industrial applications, such as in the manufacturing and energy sectors. E g: Digital control systems, smart agriculture and industrial big data.
- Infrastructure IoT - Primarily used for connectivity in smart cities. E g: infrastructure sensors and management systems.

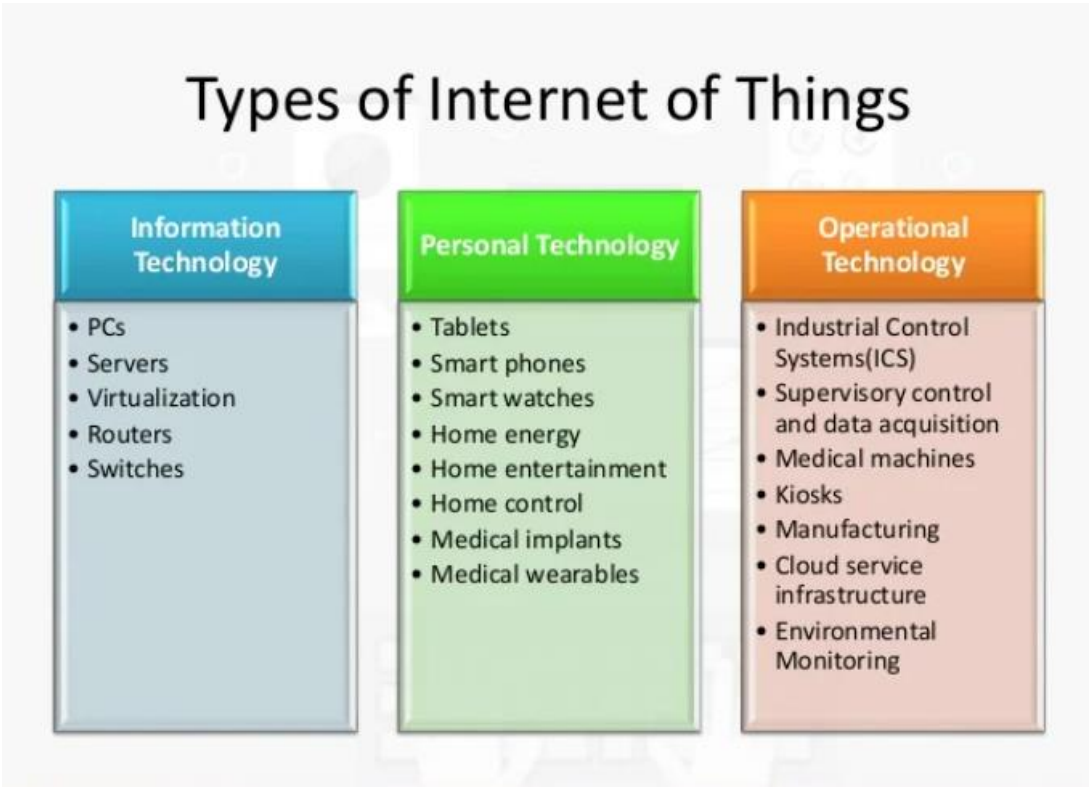

Figure 1.2. Types of IOT

1.2 Accident Prevention System:

We can't watch out of ours whereas in running by less acutely aware. If we tend to done all the vehicles with automatic security system that has high security to driver, conjointly offers alarm. All vehicles should be equipped with eye blink sensor and alcohol sensor in future avoids these types of accidents Vehicle accidents are most common if the driving is inadequate. These happen on most factors if the motive force is drowsy or if he's alcoholic. Driver sleepiness is recognized as a very important think about the vehicle accidents. Advanced technology offers some hope avoid the up to some extent. This project involves live and controls the attention blink mistreatment IR sensing element. The IR transmitter is employed to transmit the infrared rays in our eye. The IR receiver is employed to receive the mirrored infrared rays of eye. If the attention is closed means that the output of IR receiver is high otherwise the IR receiver output is low. This to grasp the attention is closing or gap Position. This output is provide to logic circuit to point the alarm. This project involves dominant accident thanks to unconscious through nictitation. A from PIC and other necessary elements as per our design requirement results as output As chip styles get quicker, the cost of manufacturing a chip (with smaller components built on a semiconductor chip the same size) generally stays the same. Before microprocessors, small computers had been implemented using racks of circuit boards with many medium and small-scale integrated circuits. Microprocessors integrated this into one or some large-scale ICs. Continued will increase in chip capability have since rendered alternative varieties of computers nearly fully obsolete with one or a lot of microprocessors utilized in everything from the littlest embedded systems and Handheld devices to the largest mainframes and supercomputers.

1.2.1Method Solution

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. 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 is positive supply. These wires are also marked on PCB.

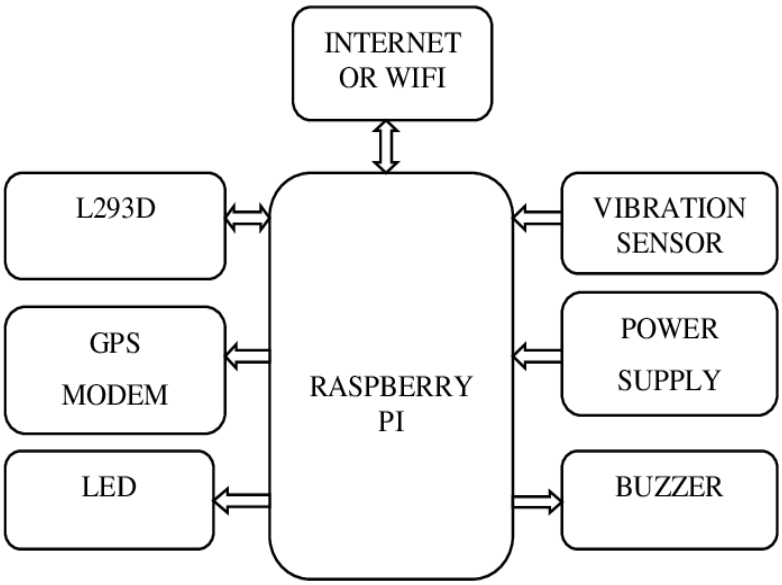

Figure 1.3. Circuit Of Methodology

1.2.2 Related Works of Accident Prevention

Driver drowsiness resulting in reduced vehicle control is one of the major causes of road accidents.

Driving performance deteriorates with increased drowsiness with resulting crashes constituting 20%-23% of all vehicle accidents.

The National Highway Traffic Safety Administration (NHTSA) conservatively estimates that 100000 reported crashes are caused by drowsy drivers each year.

These crashes result in more than 1500 fatalities, 71 000injuries, and an estimated $12.5 billion in diminished productivity and property loss. Many efforts have been made recently to develop on-board detection of driver drowsiness.

1.2.3 Drowsiness Detecting Features

The drowsiness features are characterized by the blinking frequency of the eye by the drive

State	Output	Risk
Awake	Conscious	Normal
Drowsy	Out of Conscious	Risky
Sleep	Less of Conscious	Extreme risk

1.3 Problem Identified

The failure of drivers in any vehicle incidents is a very important part of the dangerous problem facing the community. It can cause serious accidents for a variety of reasons and sometime fatal as most drivers are out of control. Various things involved in car crashes such as high speed, sleep while driving other distractions such as texting while driving, talking to others, playing with children, etc. Citizens are aware of dangerous drive cars but do not understand the level of driving. fatigue. About 1374 people die every day, and about 400 people die. Approximately 57 road accidents and 17 deaths per hour as a result of motor vehicle accidents. In car accidents, 54.1percent are between the ages of 18 and 34. The Government of India, the Department of Border Transport and the Department of Highways are planning to reduce the number of road accidentsand fatalities by 50 percent by 2022. Globally, car accidents have proven to be one of the world biggest security concerns. In 2015 about 5 lakh road accidents occurred in India. A tired driver is notable to steer the car by those who are sleep at work, he is unable to take adequate steps leading to an accident so it is necessary to monitor the driver's drowsiness to avoid accidents. We focuse don this issue using the eye twitch sensor to introduce a car accident prevention program.

1.4 Fatigue statistics

Ideally, each individual needs between seven and eight hours of good quality sleep each night. Those with less build up sleep debt, or sleep deficit. At worst, drivers with sleep debt risk nodding off, yet fatigue can impair reaction time and decision making when behind the wheel which increases the risk of being involved in an accident. If a driver falls asleep for just four seconds while traveling at a speed of 100 km/h the vehicle will have gone 111 meters without a driver in control. Those groups of drivers considered at greatest risk of being involved in a fatigue related accident are:

1. Heavy vehicle drivers
2. Drivers with sleep disorders 3
3. Young Drivers.

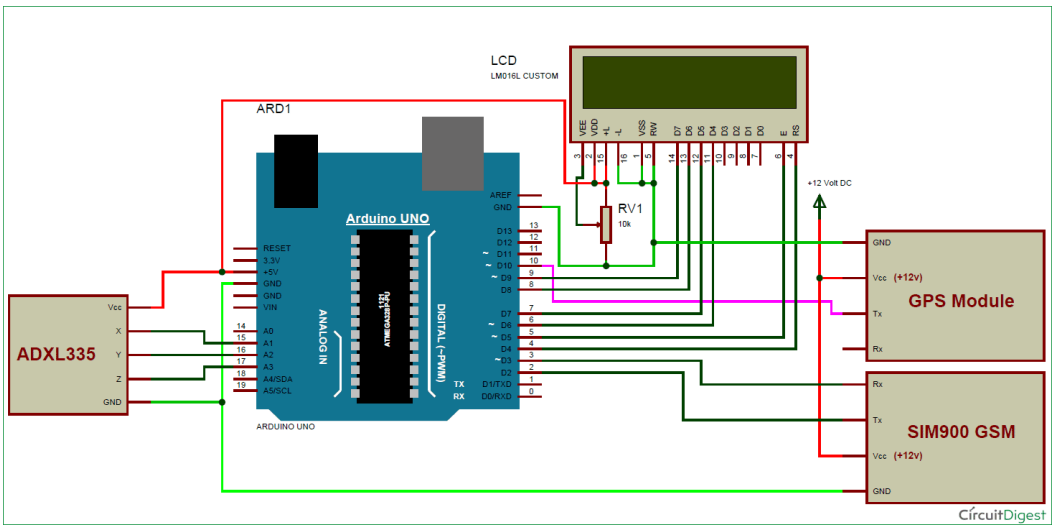

Figure 1.4. Detecting Outer Module

1.5 Monitoring and Maintenance:

Managing a network of IoT devices can be difficult because of the sheer scope. IoT for businesses is a growing frontier with projected market growth of over $1,000B by 2026, but implementing the right technology and procedures remains a common barrier.As the number of devices on a network increases, the necessity for a comprehensive management process rises with it. While IoT systems provide businesses with irrefutable benefits, challenges result from the sheer scale of the network such as:

- Scope of the resources needed to monitor the systems
- The complexity of connections between devices
- Speedy resolution when identifying problems and delivering a solution.
- Securing every device within the network against new and existing threats
- Expanding the network and integrating new devices

When IoT monitoring and maintenance is managed in-house, the IT department can quickly be overwhelmed, left to sort through the massive amounts of data being processed and be responsible for identifying which pieces of data point to performance issues or larger network-level problems. Even for small firms, the amount of data and devices connected to a network can be overwhelming. Businesses must understand how their devices are performing so that they can both optimize their use and anticipate any issues or failures forthcoming. The costs associated with reactive

maintenance are detrimental in today's fast-moving world thus taking critical time to discover the fault leading customers to the point of frustration.

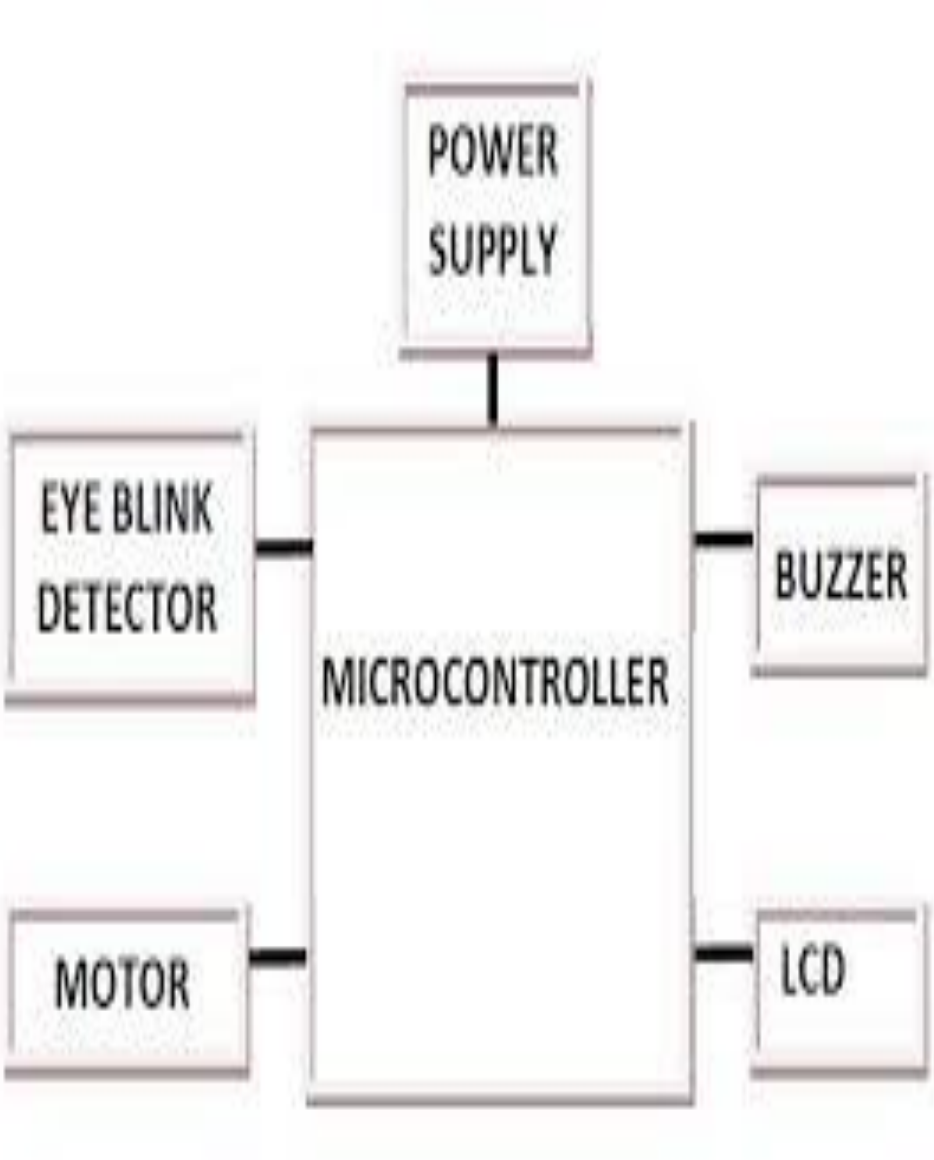

Figure 1.5. Circuit Diagram

1.6 Scope of the Project

The device has an installed a eye blink sensor. Once the driver has started the engine, the sensors automatically detect the blink of eye. On this device the output of the sensor is provided for comparison with ARDUINO. When the value reaches the set level, the buzzer automatically vibrates, the LED glows, and the car stops automatically when eye blink sensor receives a signal from the transmission module. his sensor module consists of the eye blink sensor frame, the IR sensor and a relay. The vibrator device is connected to the eye blink sensor frame which is to be worn by the driver. This vibrator vibrates whenever an accident occurs or the driver falls as lee. The frame consists of the IR transmitter which transmits the IR rays towards the driver's eyes and an IR receiver which receives the reflected rays when the eyes are closed. The relay provides the extra current required by this module and hence is also connected to the SST microcontroller board.

1.6.1 IOT Device Prevention Standards

At present criteria, we cannot detect where the accident has occurred and hence no information related to it, leading to the death of an individual. The research work is going on for tracking the position of the vehicle even in dark clumsy areas where there is no network for receiving the signals. In this project GPS is used for tracking the position of the vehicle, GSM is used for sending the message and the ARM controller is used for saving the mobile number in the EEPROM and sends the message to it when an accident has been detected.

The main component is Arduino Uno which is an AT mega 328 based microcontroller (MC) that performs all functions related to controlling the embedded system circuit. The blinking module works by illuminating the eye area with infrared light, and then detecting changes in scattered light using an image transistor and a separation circuit. Each of the components is described below. When IoT monitoring and maintenance is managed in-house, the IT department can quickly be overwhelmed, left to sort through the massive amounts of data being processed and be responsible for identifying which pieces of data point to performance issues or larger network-level problems. Even for small firms, the amount of data and devices connected to a network can be overwhelming. Businesses must understand how their devices are performing so that they can both optimize their use and anticipate any issues or failures forthcoming.

1.6.2 IOT Device Security

There are IoT device security standards which have been outlined by the National Institute of Standards and Technology and the European Technology Standards Institute. The NIST and the ETSI collaborated to produce their respective IoT standards. So IoT device security standards are the same in most place.There's extensive documentation on IoT device security standards. But this is a quick summary of the IoT device standards:

- Manufacturers must ship devices with a unique default password. No more generic default passwords.
- Manufacturers must provide a means for reporting security vulnerabilities, and act on reported vulnerabilities in a timely manner.
- IoT device manufacturers must release regular software updates.
- Sensitive network security parameters must be securely stored, if an IoT device requires storage of those security parameters.
- IoT devices must use appropriate encryption for all communication with other devices.
- Any unused user interfaces or logical interfaces must be disabled.
- IoT devices should detect unauthorized changes to the onboard software or hardware and report unauthorized changes.
- Personal data transmitted by an IoT device must be encrypted.
- IoT devices must be resistant to data network and power outages, especially devices that are relevant to personal safety.
- IoT devices must provide a way for network administrators to examine network traffic for patterns of device failure or unauthorized network access.
- End users must be able to delete their user data easily.
- Devices must be easy to install and maintain.
- Data received by an IoT device must be validated before the device attempts to use that data.

The failure of drivers in any vehicle incidents is a very important part of the dangerous problem facing the community. It can cause serious accidents for a variety of reasons and sometimes fatal as most drivers are out of control. Various things involved in car crashes such as high speed, sleep while driving other distractions such as texting while driving, talking to others, playing with children, etc. Citizens are aware of dangerous drive cars but do not understand the level of driving. fatigue. About 1374 people die every day, and about 400 people die. Approximately 57 road

accidents and 17 deaths per hour as a result of motor vehicle accidents. In car accidents, 54.1 percent are between the ages of 18 and 34. The Government of India, the Department of Border Transport and the Department of Highways are planning to reduce the number of road accidents and fatalities by 50 percent by 2022. Globally, car accidents have proven to be one of the world's biggest security concerns. In 2015 about 5 lakh road accidents occurred in India. A tired driver is not able to steer the car by those who are sleep at work, he is unable to take adequate steps leading to an accident so it is necessary to monitor the driver's drowsiness to avoid accidents. We focused on this issue using the eye twitch sensor to introduce a car accident prevention program. This paper examines the detection of various collisions and the reduction of such a system.

1.6.3 Benefits

- Provides financial security to your family and loved ones.
- There no external tests and documents needed over and above the current condition
- Extensive coverage at much affordable rates.
- Plans available in two categories, self and family.
- It offers worldwide coverage

This eye blink sensor detects the eye movement .When the eyes of the driver is closed due to continuous driving without sleep which causes drowsiness ,then the eye blink sensor detects it and gives alarm to the driver .In addition to alarm ,it also slow down stothe vehicle. So by this project we can control the accidents that occur due drowsiness of the driver. Globally vehicle accidents have seemed one of the major community health problems. In India almost 5 lakh road accidents happened in the year 2015. A fatigue Driver those who falls asleep at the move fails to control the vehicle, not possible to take immediate action and results in a crash so it is necessary to monitor the drowsiness of the driver to prevent accidents. Automatic driver drowsiness can be detected using artificial intelligence and visual information.

1.7 Objective

This project involves live and controls the attention blink mistreatment sensinelement. The IR transmitter is employed to transmit the infrared rays in our eye. The IR receiver is employed to receive the mirrored infrared rays of eye. If the attention is closed means that the output of IR receiver is high otherwise the IR receiver output is low. This to grasp the attention is closing or gap Position. This output is provide to logic circuit to point the alarm. This project involves dominant accident thanks to unconscious through nictitation. A from PIC and other necessary elements as per our design requirement results as output. As chip styles get quicker, the cost of manufacturing a chip (with smaller components built on a semiconductor chip the same size) generally stays the same. Before microprocessors, small computers had been implemented using racks of circuit boards with many medium and small-scale integrated circuits. Microprocessors integrated this into one or some large-scale ICs.Continued will increase in chip capability have since rendered alternative varieties of computers nearly fully obsolete with one or a lot of microprocessors utilized in everything from the littlest embedded systems and Handheld devices to the largest mainframes and super computers. It can cause serious accidents for a variety of reasons and sometimes fatal as most drivers are out of control. Various things involved in car crashes such as high speed, sleep while driving other distractions such as texting while driving, talking to others, playing with children, etc. The relay provides the extra current required by this module and hence is also connected to the SST microcontroller board. Using a phototransistor and a separator circuit, the blink sensor illuminates the eye area and eyelid with infrared light and detects changes in the reflected light. This study includes measuring and monitoring the blink of an eye with the help of an IR sensor. Closed eye indicates that the output of the IR receiver is high except that the output from the IR receiver is low. Figure 4 shows an instant blink sensor with an IR attached to it. The vibrator device is connected to the eye blink sensor frame which is to be worn by the driver. This vibrator vibrates stoday. Therefore, neeto take action against this as an engineer and have the solution we need. Any automation is designed to protect a person. Such a model is tasked with developing a system for diagnosing and controlling the speed of vehicles to prevent accidents. To some extent, modern technology offers some hope of stopping these. This paper includes monitoring the blink of an eye with the help of an IR sensor. On this device the output of the sensor is provided for comparison with ARDUINO.

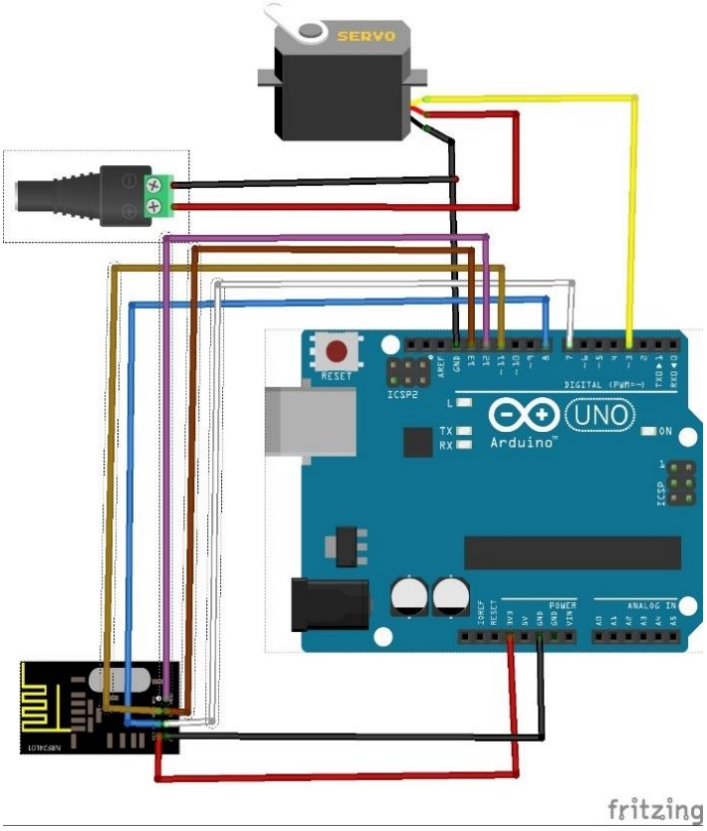

Figure 1.6 Eye Blink Controlled Light Switch

On this device the output of the sensor is provided for comparison with ARDUINO. When the value reaches the set level, the buzzer automatically vibrates, the LED glows, and the car stops automatically when eye blink sensor receives a signal from the transmission module. his sensor module consists of the eye blink sensor frame, the IR sensor and a relay. The vibrator device is connected to the eye blink sensor frame which is to be worn by the driver. This vibrator vibrates stoday. Therefore, neeto take action against this as an engineer and have the solution we need. Any automation is designed to protect a person. Such a model is tasked with developing a system for diagnosing and controlling the speed of vehicles to prevent accidents. To some extent, modern technology offers some hope of stopping these. This paper includes monitoring the blink of an eye with the help of an IR sensor. On this device the output of the sensor is provided for comparison with ARDUINO. When the value reaches the set level, the buzzer automatically vibrates.

CHAPTER 2
LITERATURE SURVEY

[1] C. Prabha, R. Sunitha, R. Anitha "Automatic Vehicle Accident Detection and Messaging System Using GSM and GPS Modem", IJAREEIE, Vol. 3, Issue 7, pp: 10723 – 10727, July 2019

At present criteria, we cannot detect where the accident has occurred and hence no information related to it, leading to the death of an individual. The research work is going on for tracking the position of the vehicle even in dark clumsy areas where there is no network for receiving the signals. In this project GPS is used for tracking the position of the vehicle, GSM is used for sending the message and the ARM controller is used for saving the mobile number in the EEPROM and sends the message to it when an accident has been detected

[2] S. Gupta, K. Sharma, N. Salvekar and A. Gajra, "Implementation of Alcohol and Collision Sensors in a Smart Helmet," 2019 International Conference on Nascent Technologies in Engineering (ICNTE), Navi Mumbai, India, 2019, pp. 1-5. doi: 10.1109/ ICNTE44896.2019. 8945979.

In this survey, he main component is Arduino Uno which is an AT mega 328 based microcontroller (MC) that performs all functions related to controlling the embedded system circuit. The blinking module works by illuminating the eye area with infrared light, and then detecting changes in scattered light using an image transistor and a separation circuit. Each of the components is described below.

[3] Vardhini, P. A. H., Ravinder, M., Reddy, P. S., & Supraja , M. (2019). IoT basedWireless data printing using raspberry pi. Journal of Advanced Research in Dynamical and Control Systems, 11(4 Special Issue), 2141–2145

It is used as a media which is used to control and monitor the transformer load from anywhere by sending a message. It has its own deterministic character. Thereby, here GSM is used to monitor and control the DC motor, Stepper motor, Temperature sensor and SolidState Relay by sending a message through GSM modem. Hence no need to waste time by manual operation and transportation. Hence it is considered as highly efficient communication through the mobile which

will be useful in industrial controls, automobiles, and appliances which would be controlled from anywhere else. It is also highly economic and less expensive; hence GSM is preferred most for this mode of controlling.

[4] R S Tomar, Shekhar Verma, and G S Tomar, "Neural Network Based Lane Change Trajectory Predictions for Collision Prevention", IEEE International Conference on Computational Intelligence and Communication Networks (CICN), pp 566-569 Oct 2011.

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[5] Dr .I. Lakshmi, A Review On Security In Mobile Cloud Computing, Rev Secure. Mob. Cloud Computer, May 06, 2020

Survey, the classification accuracy of this call tree classifier was reported to be eightyseven. 47%. Chang and Wang (2006) applied non-parametric classification tree techniques to analyze accident data from the year 2001 for Taipei, Taiwan. A CART model was developed to determine the link between injury severity and driver/vehicle characteristics, highway/environment variables, and accident variables. The most important variable associated with severity was the vehicle type, with pedestrians, motor cycles, and bicyclists the highest injury risks of all driver types in the RTAs. Using one clustering (Simple K Means) and three classification (J48, naïve Bayes, and On algorithms,

[6] K. Akkaya, F. Senel, A. Thimmapuram, and S. Uludag, "Distributed recovery from network partitioning in movable sensor/actor networks via controlled mobility," IEEE Trans. Comput., vol. 59, no. 2, pp. 258–271, Feb. 2020

Connect DC motor to relay and give relay connection to the Arduino pin A0. N dump the code into Arduino using USB cable Connect USB cable to pc and open arduino software, enter the code and compile & run then select the arduino port and click upload button then your code will be

uploaded into arduino. Now connect the batteries and check the output of eye link sensor. If blink of eye is more than 2 seconds car (motor) will be stopped.

[7] S. Miah, E. Milonidis, I. Kaparias and N. Karcanias, "An Innovative Multi-Sensor Fusion Algorithm to Enhance Positioning Accuracy of an Instrumented Bicycle," in IEEE Transactions on Intelligent Transportation Systems, vol. 21, no. 3, pp. 1145-1153, March 2020, doi: 10.1109/TITS.2019.2902797

In this survey, People are increasingly exposed to dangers today. Therefore, neeto take action against this as an engineer and have the solution we need. Any automation is designed to protect a person. Such a model is tasked with developing a system for diagnosing and controlling the speed of vehicles to prevent accidents. To some extent, modern technology offers some hope of stopping these. This paper includes monitoring the blink of an eye with the help of an IR sensor. On this device the output of the sensor is provided for comparison with ARDUINO. When the value reaches the set level, the buzzer automatically vibrates, the LED glows, and the car stops automatically when the eye blink sensor receives a signal from the transmission component into Arduino using USB cable Connect USB cable to pc and open arduino software, enter the code and compile & run then select the arduino port and click upload button then your code will be uploaded into arduino. Now connect the batteries and check the output of eye link sensor. If blink of eye is more than 2 seconds car (motor) will be stopped.

[8] Y. Iraqi, T. Rachidi and A. Gawanmeh, "Collision-Prevention Conditions for Wireless Personal Area Networks," in IEEE Networking Letters, vol. 1, no. 1, pp. 22-25, March 2019, doi: 10.1109/LNET.2018.2883248.

The failure of drivers in any vehicle incidents is a very important part of the dangerous problem facing the community. It can cause serious accidents for a variety of reasons and sometimes fatal as most drivers are out of control. Various things involved in car crashes such as high speed, sleep while driving other distractions such as texting while driving, talking to others, playing with children, etc. Citizens are aware of dangerous drive cars but do not understand the level of driving. fatigue. About 1374 people die every day, and about 400 people die. Approximately 57 road accidents and 17 deaths per hour as a result of motor vehicle accidents. In car accidents, 54.1 percent are between the ages of 18 and 34. The Government of India, the Department of Border

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[**9] Prof. R.M. Sahu, VivekPatil, GouravHomkar, Sachin Palve, "Intelligent security system for smart vehicle", International Journal of Innovative Research in Electrical Electronics Instrumentation and Control engineering, vol. 4, no. 3, March 2021**.

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 there 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.

[10] "Accelerometer Sensor Working Types Specification Selection Applications", Instrumentation-Electronics, 2020.

The classification accuracy of this call tree classifier was reported to be eighty seven.47%.Chang and Wang (2006) applied non-parametric classification tree techniques to analyze accident data from the year 2001 for Taipei, Taiwan. A CART model was developed to determine the link between injury severity and driver/vehicle characteristics, highway/environment variables, and accident variables .The most important variable associated with crash severity was the vehicle type, with pedestrians, motor cycles, and bicyclists having the highest injury risks of all driver types in the RTAs .Using one clustering (Simple K Means) and three classification (J48, naïve Bayes, and One R) algorithms, Srisuriyachai (Srisuriyachai 2007) analyzed road traffic accidents in the Nakhon Pathom province of Bangkok. Considering the descriptive nature of the results and

classification performance, the J48 algorithm was sufficiently useful and reliable .The outcome of the analysis was traffic accident profiles, which the author presented as a useful tool for evaluating RTAs in Nakhon Pathom.

[11] M. Rahman, J. Mou, K. Tara, M. Sarker, "Real Time Google Map And Arduino Based Vehicle Tracking System", 2nd International Conference on Electrical Computer & Telecommunication Engineering (ICECTE), pp. 1-4, 2018.

Their ensuing rule displayed improved accident risk estimation compared to estimates supported historical accident records alone. The rule was additional economical, particularly for fatality and pedestrian connected accident analyses. The authors claimed that the projected rule may well e accustomed facilitate authorities effectively determine areas with high accident risk, and function a reference for city planners considering road safety.

[12] S. Chandran, S. Chandrasekar, N. E. Elizabeth, "Konnect: An Internet of Things(IoT) based smart helmet for accident detection and notification", 2016 IEEE Annual India Conference (INDICON), pp. 1-4, 2020

They determined that AN accurately calculable classification model for many RTA severity sorts as perform of connected factors provided crucial data for accident bar. Their analysis used 3 data processing techniques, neural network, supply in gregression , and call tree, to pick out a group of cogent factors and to construct classification models for accident severity.

[13] Anil K. Jain, Jianjiang Feng, Karthik Nandakumar, Accident Prevention System, IEEE Computer Society 2010 ,pp. 36-44, 0018-9162/10 [4] Virginia Epsinosa-Duro, Minutiae Detection Algorithm for Fingerprint Recognition", IEEE AESS Systems Magazine , March 2021, pp. 7-10

When the Vibration sensor and Mems is used to detect the accident occurred or not. By using Mems When the car has been rollover it can immediately send the signal to the microcontroller. GSM and GPS will send the information to the server. It also send the SMS to the respective rescue team or Police station.

[20] Yang, Jia Mi, Detection of Accident PreventionTerminal Design is based on Fingerprint Recognition, IEEE 2010, pp. 92-95, 978-1- 4244-6349-7/10.

The eye blink sensor is used to detect the driver drowsiness. When the driver is in drowsy state, the eye blink detect it by when the eyelids are closed for more than 5sec. Then state is called drowsy state. Now the signal is passed to microcontroller, ultrasonic sensor which is connected to microcontroller receives the signal and check the condition. Depend upon the condition it send a signal to motor drive. In ultrasonic sensor we give a two condition, one is they are two ultrasonic sensor are connected to the vehicle. We give the ultrasonic distance is 20m, now the ultrasonic sensor measure the distance from both end. If there is any vehicle is present in any one of the end then the signal is send to motor drive and the vehicle stops suddenly and the buzzer is generated and alert the driver to wake up. Then the driver reset the module and continue the journey. Otherwise another condition when there is no vehicle at both side end, then the signal is send to motor drive. Now the motor which is connected to steering is rotate in left side and the main motor rotate only for 5sec to park the vehicle in left side of the road and the buzzer is generated to alert the driver to wake up. Then the driver reset the module and continue the journey. In the exceptional cases when the accident is occurthe vibration sensor which is connected in the front of the vehicle is set at high threshold frequency is detect the accident and send a signal to microcontroller. The microcontroller send a signal to GPS and GSM module. The GSM and GPS module generate and send the GPS location along with the message to the respective person or police station or ambulance service. So the rescue process is more faster than the normal one.

[21] S,Sandhiya, F. Senel, A. Thimmapuram, and S. Uludag, "Distributed recovery from network partitioning in movable sensor/actor networks via controlled mobility," IEEE Trans. Comput., vol. 59, no pp. 258–271, Feb. 2019.

The failure of drivers in any vehicle incidents is a very important part of the dangerous problem facing the community. It can cause serious accidents for a variety of reasons and sometimes fatal as most drivers are out of control. Various things involved in car crashes such as high speed, sleep while driving other distractions such as texting while driving, talking to others, playing with children, etc. Citizens are aware of dangerous drive cars but do not understand the level of driving. fatigue. About 1374 people die every day, and about 400 people die. Approximately 57 road accidents and 17 deaths per hour as a result of motor vehicle accidents. In car accidents, 54.1 percent are between the ages of 18 and 34. The Government of India, the Department of Border

Transport and the Department of Highways are planning to reduce the number of road accidents and fatalities by 50 percent by 2022. Globally, car accidents have proven to be one of the world's biggest security concerns. In 2015 about 5 lakh road accidents occurred in India. A tired driver is not able to steer the car by those who are sleep at work, he is unable to take adequate steps leading to an accident so it is necessary to monitor the driver's drowsiness to avoid accidents. We focused on this issue using the eye twitch sensor to introduce a car accident prevention.

[22] Y. Iraqi, T. Rachidi and A. Gawanmeh, "Collision-Prevention Conditions for Wireless Personal Area Networks," in IEEE Networking Letters, vol. 1, no. 1, pp. 22-25, March 2019, doi: 10.1109/LNET.2018.2883248.

Embedded system devices are an important part of daily life. These are a combination of hardware and software, in which software is commonly known as hardware embedded software. One of the most important features of these systems is that they provide o/p within time limits. So we often use embedded systems on simple and sophisticated devices as well. In many devices like microwave, calculators, TV remote control, home security and crowded control systems, embedded system applications are very much involved in our real life. Embedded system block diagram is shown in Fig 1. Embedded devices are widely divided into several categories, depending on the hardware and software and the microcontroller "8 or 16 or 32-bit"

[23] S. Miah, E. Milonidis, I. Kaparias and N. Karcanias, "An Innovative Multi-Sensor Fusion Algorithm to Enhance Positioning Accuracy of an Instrumented Bicycle," in IEEE Transactions on Intelligent Transportation Systems, vol. 21, no. 3, pp. 1145-1153, March 2020, doi: 10.1109/TITS.2019.29.

Airbags are currently a variety of features found in cars that are useful for car safety and security. In particular, these vehicles have been standard front airbags since 1998. This function aims that when the driver is sleepy, a buzzer signal in the system is provided, which reduces the driver's speed. The marketable design will still shut off the car power to maximize the chances of avoiding road accidents and opening the window for preventive and mitigation measures

Eye blink (IR): related to sleep detection and alert the driver with the components used in the proposed operation are Eye blink length and frequency, Power supply, Buzzer, LED ARDUINO (UNO), Relay Module, DC as shown in Figure 2. The main component is Arduino Uno which is an ATmega328 based microcontroller (MC) that performs all functions related to controlling the embedded system circuit. The blinking module works by illuminating the eye area with infrared light, and then detecting changes in scattered light using an image transistor and a separation circuit. Each of the components is described below.

[**24] Prof. R.M. Sahu, VivekPatil, GouravHomkar, Sachin Palve, "Intelligent security system for smart vehicle", International Journal of Innovative Research in Electrical Electronics Instrumentation and Control engineering, vol. 4, no. 3, March 2021**.

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 there 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.

CHAPTER 3
SYSTEM ANALYSIS

3.1 Existing System

The existing method of this project, Many drowsiness detection systems were introduced namely Electroencephalography[EEG] , Electrocardiography[ECG].Electroencephalography [EEG] is a method that measures the brain electrical activity .It can be used to measure the heartbeat, eye blink and even major physical movement such as head movement .Electro cardiography[ECG] measures the rhythm of the heart.

3.2 Existing Algorithms

Existing his method is nonintrusive and sturdy for finding the driver drowsiness in real time. Support Vector Machine (SVM) is using for extracting the face from video frames and Circular Hough Transform (CHT) is useful for mouth and eye state analysis [7]. In this approach machine learning used to determine the human be havior during driver drowsiness, for this 30 different facial actions including eye blink, yawning and head movements are collected to detect the driver drowsiness.

3.3 Problem Statement

Drowsy driving and Drunken drive is so dangerous because it mirrors so many sypmtoms such as blurred vision, slowed reaction time, and poor decision making.It leads to the occurrence of accidents and loss of human lives.

Current detection systems monitoring the driver's condition requires complex computation and expensive equipment, not comfortable to wear during driving and is not suitable for driving conditions.

The potential for connected vehicles during the interim, however, is an exciting, multi-faceted and high-growth area in the IoT's development – enabling enhanced road safety, smart traffic management, advanced navigation assistance, passenger entertainment and much more. Our free new white paper – 'From here to autonomy: How to fulfil the requirements of the next generation

connected car' – sets out the promise of connected vehicles, assesses the technical and commercial challenges they face, and considers the road ahead. Read on for detail on where the opportunities in connected driving lie, which forms of connectivity are set to enable the next generation of automotive services, and how Quectel can support those planning a move into this space.

3.4 Proposed System

In this proposing method, In order to overcome the issues faced in existing system. We have dour project using eye blink sensor .This eye blink sensor detects the eye movement .When the eyes of the driver is closed due to continuous driving without sleep which causes drowsiness ,then the eye blink sensor detects it and gives alarm to the driver .In addition to alarm ,it also slow down stothe vehicle. So by this project we can control the accidents that occur due drowsiness of the driver. Globally vehicle accidents have seemed one of the major community health problems. In India almost 5 lakh road accidents happened in the year 2015. A fatigue Driver those who falls asleep at the move fails to control the vehicle, not possible to take immediate action and results in a crash so it is necessary to monitor the drowsiness of the driver to prevent accidents. Automatic driver drowsiness can be detected using artificial intelligence and visual information. System is to detect, track and examine face and eyes of drivers for this different real vehicle image of drivers are taken to validate the algorithms.It is a real time system work in different light conditions [1]. The numbers of accidents are increased due to several factor, one of the main factor is that driver fatigue. Driver's sleepiness is also implemented using video based approach. This system is non invasive and human related elements are used. Band power and Empirical Mode Decomposition methods are used to investigate and extract the signal, SVM (Support Vector Machine) used to confirm the analysis and to categorize the state of vigilance of the driver .

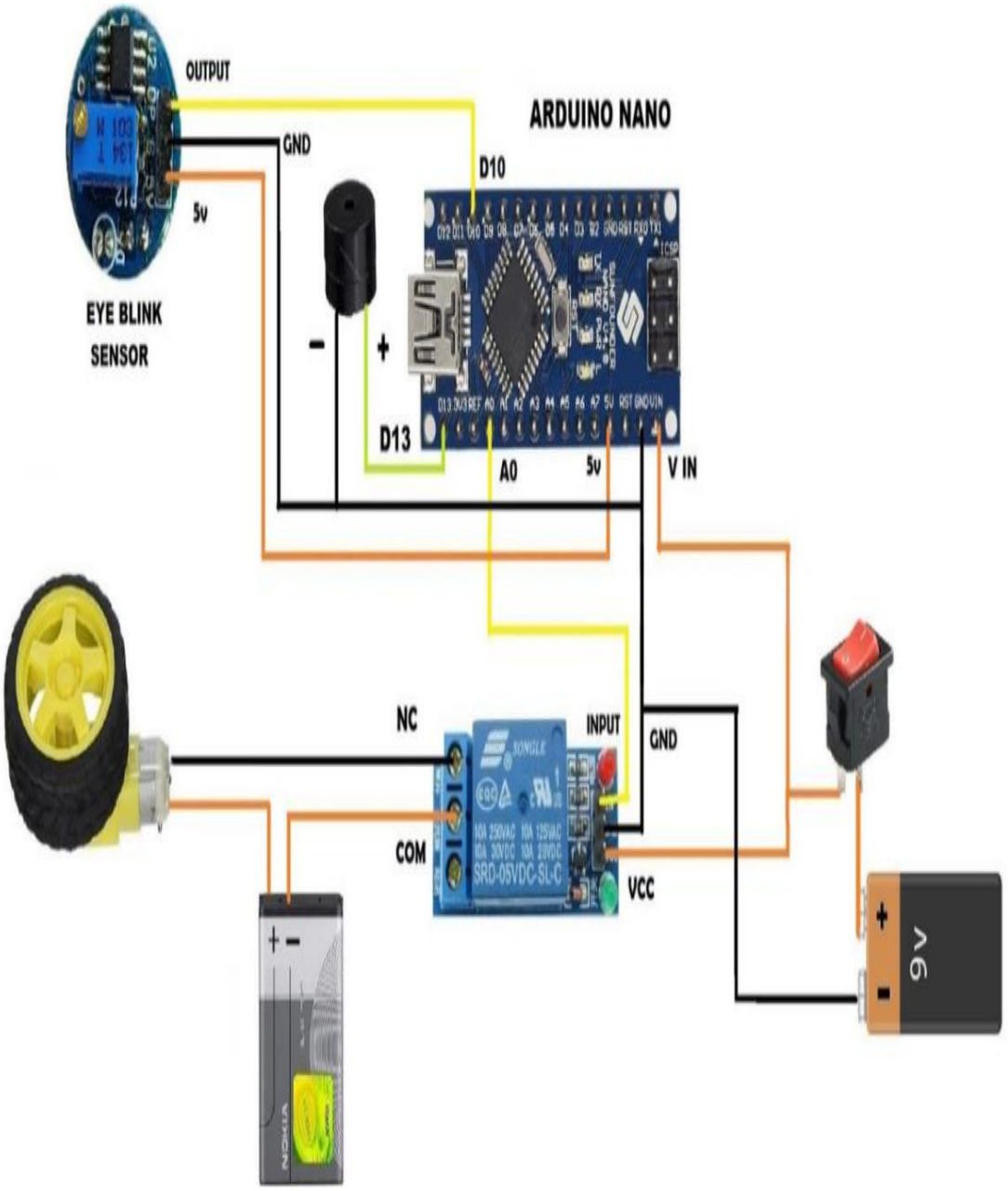


Figure 3.1. Proposed System Architecture

CHAPTER 4

SYSTEM SPECIFICATION

4.1 Hardware specification

- EYE BLINK SENSOR
- LED
- ARDUINO
- DC MOTOR
- BUZZER
- VIBRATOR OUTPUT DEVICE
- LM 358 COMPARATOR
- SST MICRO CONTROLLER
- ALCOHOL SENSOR

4.1.1 Eye Blink Sensor

This sensor module consists of the eye blink sensor frame, the IR sensor and a relay. The vibrator device is connected to the eye blink sensor frame which is to be worn by the driver. This vibrator vibrates whenever an accident occurs or the driver falls asleep. The frame consists of the IR transmitter which transmits the IR rays towards the driver's eyes and an IR receiver which receives the reflected rays when the eyes are closed. The relay provides the extra current required by this module and hence is also connected to the SST microcontroller board. Using a phototransistor and a separator circuit, the blink sensor illuminates the eye area and eyelid with infrared light and detects changes in the reflected light. This study includes measuring and monitoring the blink of an eye with the help of an IR sensor. Closed eye indicates that the output of the IR receiver is high except that the output from the IR receiver is low. Figure 4 shows an instant blink sensor with an IR attached to it.

Figure 4.1. Eye Blink Sensor

4.1.2 LED

LED is an semiconductor light source. LED is a separate diode form and has certain electrical features of the PN junction diode. The LED therefore allows the current to flow forward and blocks the energy flowing in the opposite direction. The LED takes up less than 1 mm in the field. LED technology used to perform various electrical and computer functions. A Light Emitting Diode (LED) is a semiconductor device, which can emit light when an electric current passes through it. To do this, holes from p-type semiconductors recombine with electrons from n-type semiconductors to produce light. The wavelength of the light emitted depends on the bandgap of the semiconductor material. Harder materials with stronger molecular bonds generally have wider bandgaps. Aluminum Nitride semiconductors are known asultra-widebandgap semiconductors.The messages displayed are SLEEPING‖ and ―ACCIDENT OCCURRED‖ as per the situation. All the modules are connected to it so that the particular signals can be received and hence message could be displayed. It uses the power supply from the SST microcontroller board displays a ―WELCOME‖ message. It also provides 5V power to other modules

4.1.3 Arduino

Arduino is an open source MC board based on ATmega328P MC and developed by Arduino.cc. The board has 14 PINs and 6 analog pins. All of this will help the microcontroller by attaching the board to a computer for continuous operation. Strom supply of this board can be made using AC to DC Converter, USB cable, otherwise plug. Arduino is open-source hardware. The hardware reference designs are distributed under a Creative Commons Attribution Share-Alike 2.5 license and are available on the Arduino website. Layout and production files for some versions of the hardware are also available.Although the hardware and software designs are freely available under copyleft licenses, the developers have requested the name Arduino to be exclusive to the official product and not be used for derived works without permission. The official policy document on use of the Arduino name emphasizes that the project is open to incorporating work by others into the official product.[25] Several Arduino-compatible products commercially released have avoided the project name by using various names ending in -arduino. Arduino microcontrollers are pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory. The default bootloader of the Arduino Uno is the Optiboot bootloader.[32] Boards are loaded with program code via a serial connection to another computer. 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 Boarduino, 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.

Figure 4.2. Arduino Board

4.1.4 DC Motor

The motor acts as the wheel of the vehicle and it rotates when the power is supplied to it through L298 chip. The speed of rotation is slowed down when the driver falls asleep as detected by the eye blink sensor, in the other case the wheel is stopped when the accident occur 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. A Direct Current Motor is an electrical device that converts electrical energy into mechanical energy. Going by the dc motor full form, the device uses Direct Current (DC) for its operation. A rotary component called an armature coil rests inside the motor's casing surrounded by strong permanent magnets. When a current is applied to the armature through a rotary electric switch called a commutator, the magnetic field created by the armature interacts with the magnetic field of the stationary magnet to apply a torque on the armature, causing it to rotate.

Figure 4.3. DC Motor

4.1.5 Buzzer

The "Piezoelectric Sound Modules" presented here work on the concept of conversion using natural piezoelectric ceramic oscillation. These buzzers are available in lightweight, portable sizes ranging from a small diameter of 12 mm to large electrical outlets from piezo . The one shown in fig 6 below is a simple word that when enabled makes a continuous beep. To alert the driver when he first falls sleepy, the buzzer will be connected to the Eye-Blink Sensor. Accident prevention means the application of measures designed to reduce accidents or the potential for accidents within a system, organization, or activity. An accident prevention program is one which aims to avoid injury to personnel and / or damage to property, materials or, equipment.

Figure 4.4. Buzzer

4.1.6 Vibrator Output Device

The purpose of this sensor is to sense any jerk given to the vehicle which is the emulation of the accident occurrence in real time. This receives power from the 5V port of the LCD. The output produces and sends signals to dc motor driver and stops the rotation of the wheel, that is, the motor. This module's primary function is to send an audio warning message to the owner's registered number that is, in case of any accident the owner is notified by it android application which plays an audio saying accident occurred, kindly check your phone‖. A sim card is to be ixed in this module to simultaneously send a text message on the vibrator output System.

4.1.7 LM 358 Comparation

This board is connected to the relay chip which in further connected to the eye blink sensor system module. This board's main purpose is to fulfill the power requirements of the eye blink sensor module. IC LM358– LM358 consists of two independent, high gain operational amplifiers in one package. Important feature of this IC is that we do not require independent power supply for working of each comparator for wide range of power supply. LM358 can be used as transducer amplifier, DC gain block etc. It has large dc voltage gain of 100dB. This IC can be operated on wide range of power supply from 3V to 32V for single power supply or from ±1.5V to ±16V for dual power supply and it also support large output voltage swing.

4.1.8 SST Microcontroller

SST (Silicon Storage Technology) has announced a new addition to its Flash Flex family of 8-bit microcontrollers (MCUs), the SST89C58RC. The new device is the industry's first 8051-based MCU to feature two system management buses (SM Bus), each supporting up to 400 Kbit per second data throughput, in a tiny 6mm x 6mm QFN package. The SST89C58RC supports operating voltages from 2.7V to 5.5V for implementation in applications with a variety of power supply requirements. Its dual SM Bus feature, small form factor and support for a wide range of operating voltages make the SST89C58RC MCU an ideal solution for numerous applications, including HDMI, HDTVs, A/V receivers, home appliances, industrial instruments, notebook PCs, DVD players, Blu-ray players, RF modules and security applications such as fingerprint identification.

Figure 4.5. SST Micro Controller

4.1.9 ALCOHOL SENSOR

The alcohol sensor is technically referred to as a MQ3 sensor which detects ethanol in the air.When a drunk person breathes near the alcohol sensor it detects the ethanol in his breathe and provides an output based on alcohol concentration. The Arduino Detector Shield uses a MQ3 alcohol based sensor to identify the existence of alcohol in the breath. LCD is used to display the PPM (Parts per million) amount of the alcohol. An LM358 IC is analog to digital converter which gives digital of alcohol sensed.

Figure 4.6. Alcohol Sensor

4.2 Software specification

- KEIL C COMPILER
- EMBEDDED C
- ANDROID STUDIO

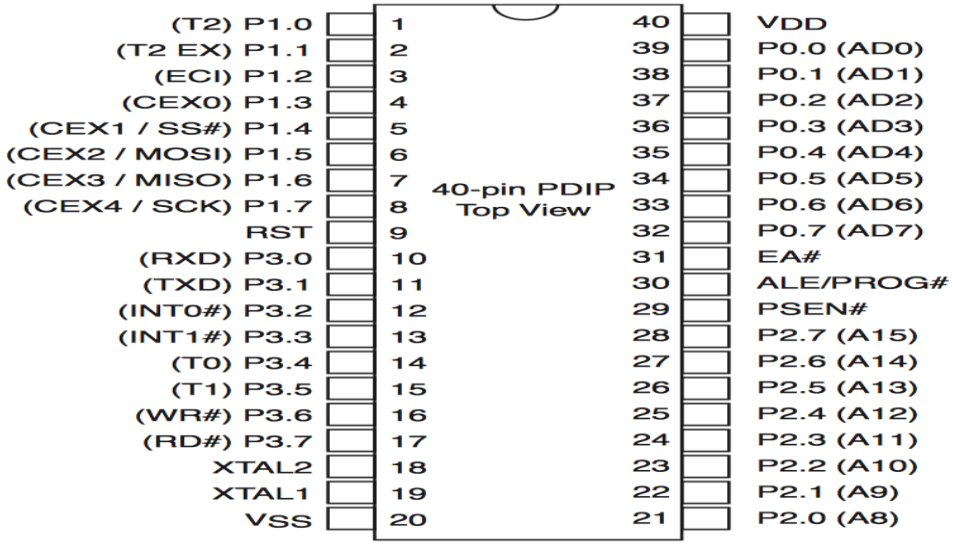


Figure 4.7. SST Microcontroller

4.3 SST Microcontroller Pin

SST is a Software System Testing Microcontroller which was developed in the year 1993 by the General Instruments Microcontrollers. It is controlled by software and programmed in such a way that it performs different tasks and controls a generation line. SST microcontrollers are used in different new applications such as accident Prevention, audio accessories and advanced drowsiness detection devices.

There are many SSTs available in the market ranging from SST16F84 to SST16C84. These types of SSTs are affordable flash SSTs. Microchip has recently introduced flash chips with different types, such as 16F628, 16F877 and 18F452. The 16F877 costs twice the price of the old 16F84, but it is eight times more than the code size, with more RAM and much more I/O pins, a UART, A/D converter and a lot more features.

Figure 4.8. SST89E516RD IC Chip

4.3.1 SST Microcontrollers Architecture

The SST microcontroller is based on RISC architecture. Its memory architecture follows the Harvard pattern of separate memories for program and data, with separate buses.

1.Memory Structure

The SST architecture consists of two memories: Program memory and the Data memory.

Program Memory

This is a 4K*14 memory space. It is used to store 13-bit instructions, or the program code. The program memory data is accessed by the program counter register that holds the address of the program memory. The address 0000H is used as reset memory space and 0004H is used as interrupt memory space.

Data Memory

The data memory consists of the 368 bytes of RAM and 256 bytes of EEPROM. The 368 bytes of RAM consists of multiple banks. Each bank consists of general purpose registers and special function registers.The special function registers consists of control registers to control different operations of the chip resources like Timers, Analog to Digital Converters, Serial ports, I/O ports, etc. For example, the TRISA register whose bits can be changed to alter the input or output operations of the port A.The general purpose registers consists of registers that are used to store temporary data and processing results of the data. These general purpose registers are each 8-bit registers.

Working Register

It consists of a memory space that stores the operands for each instruction. It also stores the results of each execution.

Status Register

The bits of the status register denote the status of the ALU (arithmetic logic unit) after every execution of the instruction. It is also used to select any one of the 4 banks of the RAM.

File Selection Register

It acts as a pointer to any other general-purpose register. It consists of a register file address, and it is used in indirect addressing. Another general purpose register is the program-counter register, which is a 13-bit register. The 5 upper bits are used as PCLATH (Program Counter Latch) to independently function as any other register, and the lower 8-bits are used as the program counter bits. The program counter acts as a pointer to the instructions stored in the program memory.

1.Eeprom

It consists of 256 bytes of memory space. It is a permanent memory like ROM, but its contents can be erased and changed during the operation of the microcontroller. The contents into EEPROM can be read from or written to, using special function registers like EECON1, EECON2, EEDATA, etc.

2. I/O Ports

PIC16 series consists of five ports, such as Port A, Port B, Port C, Port D and Port E.

Port A: It is a 16-bit port, which can be used as input or output port based on the status of the TRISA register.

Port B: It is an 8-bit port, which can be used as both input and output port. 4 of its bits when used as input can be changed upon interrupt signals.

Port C: It is an 8-bit port whose operation (input or output) is determined by the status of the TRISC register.

Port D: It is an 8-bit port, which apart from being an I/O port, acts as a slave port for connection to the microprocessor bus.

Port E: It is a 3-bit port that serves the additional function of the control signals to the A/D converter.

3. Timers

SST microcontrollers consist of 3 timers, out of which the Timer 0 and Timer 2 are 8-bit timers and the Time-1 is a 16-bit timer, which can also be used as a counter.

4. A/D Converter

The SST Microcontroller consists of 8-channels, 10-bit Analog to Digital Converter. The operation of the A/D converter is controlled by these special function registers: ADCON0 and ADCON1. The lower bits of the converter are stored in ADRESL (8 bits), and the upper bits are stored in the ADRESH register. It requires an analog reference voltage of 5V for its operation.

4.3.2 The SST Basic Features

1.RISC architecture

- **Only 35 instructions to learn**
- All single-cycle instructions except branches
- Operating frequency 0-20 MHz
- Precision internal oscillator
- Factory calibrated
- Software selectable frequency range of 8MHz to 31KHz
- Power supply voltage 2.0-5.5V
- Consumption: 220uA (2.0V, 4MHz), 11uA (2.0 V, 32 KHz) 50nA (stand-by mode)
- Power-Saving Sleep Mode
- Brown-out Reset (BOR) with software control option
- input/output pins
- High current source/sink for direct LED drive
- Software and individually programmable *pull-up* resistor
- Interrupt-on-Change pin
- 8K ROM memory in FLASH technology
- Chip can be reprogrammed up to 100.000 times
- In-Circuit Serial Programming Option
- Chip can be programmed even embedded in the target device
- bytes EEPROM memory
- Data can be written more than 1.000.000 times
- 368 bytes RAM memory
- A/D converter
- 14-channels
- 10-bit resolution

- independent timers/counters
- Watch-dog timer
- Analogue comparator module with
- Two analogue comparators
- Fixed voltage reference (0.6V)
- Programmable on-chip voltage reference
- PWM output steering control
- Enhanced USART module
- Supports RS-485, RS-232 and LIN2.0
- Auto-Baud Detect
- Master Synchronous Serial Port (MSSP**)**
- Supports SPI and I2C mode

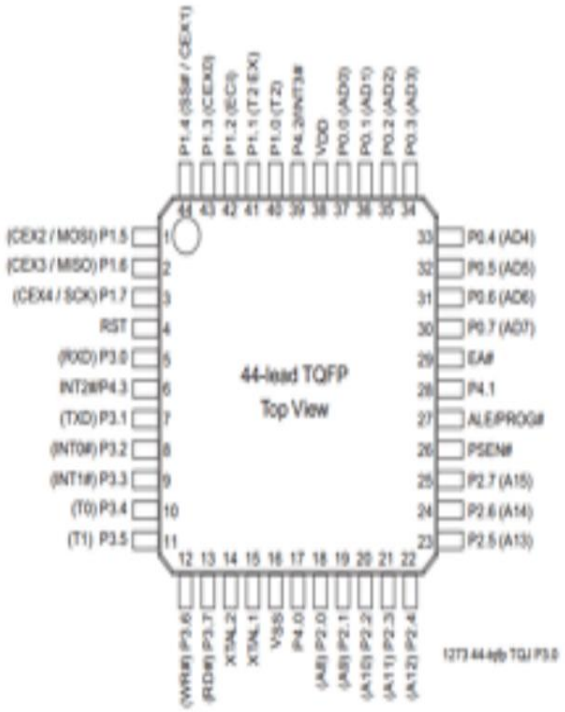


Figure 4.9. SST Chip Architecture

4.4 LED Display

LED (Light Emitting Diode) is a type of The messages displayed are SLEEPING‖ and ACCIDENT OCCURRED‖ as per the situation. All the modules are connected to it so that the particular signals can be received and hence message could be displayed. It uses the power supply from the SST microcontroller board displays a ―WELCOME‖ message. It also provides 5V power to other Models.

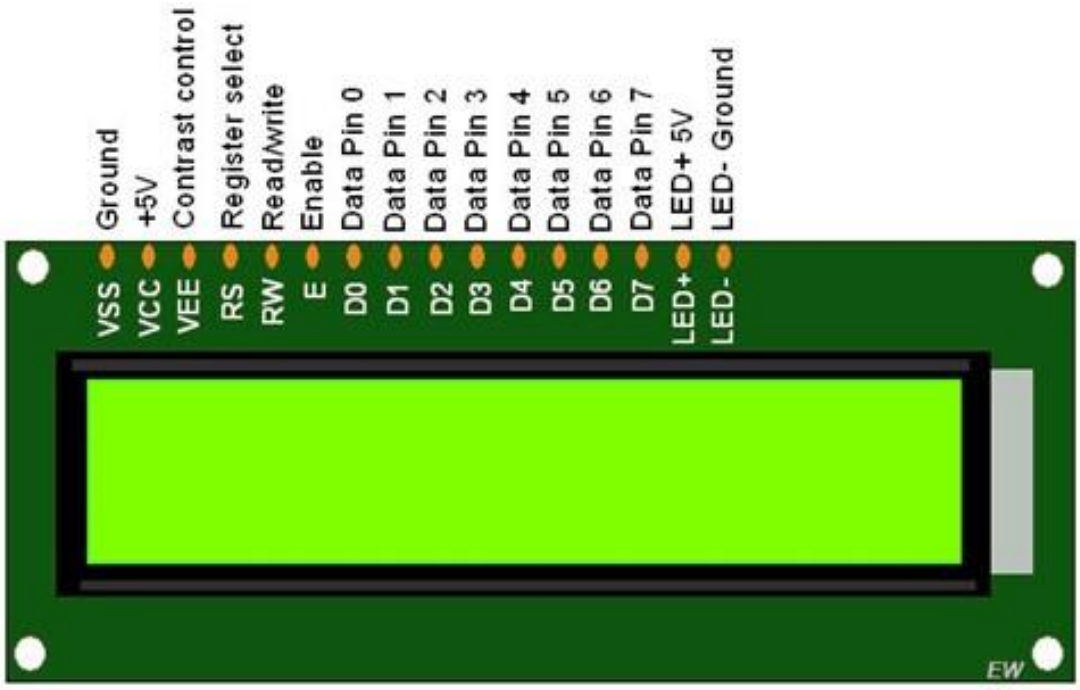


Figure 4.10. LED

4.4.1 Functions Used

The P89V51RD2 is an 80C51 microcontroller with 64 kB Flash and 1kB of data RAM. These devices are designed to be drop-in and software-compatible replacements for the popular P89C51RB2/RC2/RD2 devices. It supports both the In-System Programming (ISP) and In-Application Programming (IAP) boot codes with 12-clock (default) or 6-clock mode selection.it contains three 16 bit times/counters. In-System programming and In-Application Programming on chip flash user code memory is 64 kb. Operating frequency in 12x mode is 0 MHz to 40 M Hz. Non-volatile data storage is the 128-B page erase for efficient use of code memory.

4.4.2 16×2 LED Module Pin Out Diagram

The JHD162A lcd module has 16 pins and can be operated in 4-bit mode or 8-bit mode. Here we are using the LCD module in 4-bit mode. Before going in to the details of the project, let's have a look at the JHD162A LED module.The schematic of a JHD162A LED pin diagram is given below.

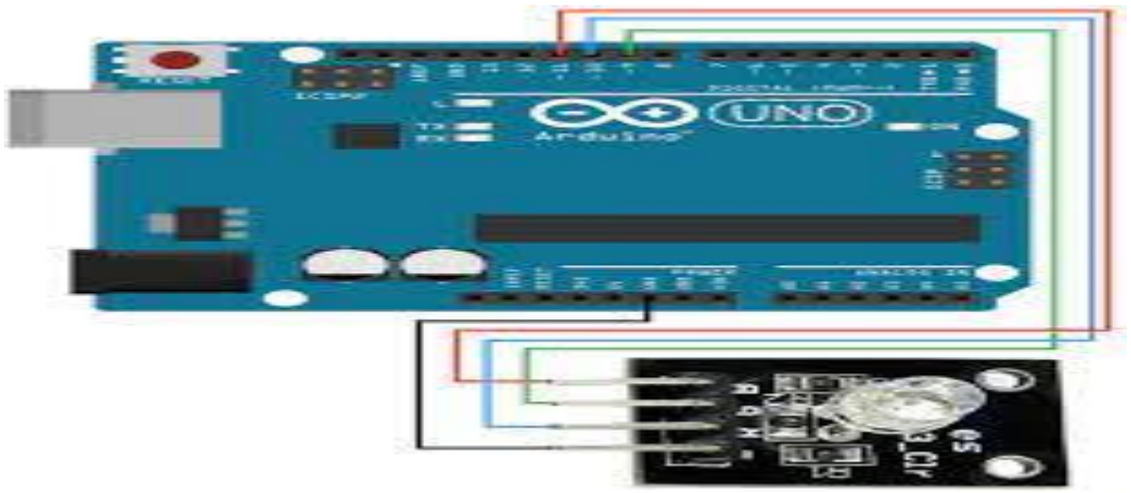


Figure 4.11. LED Module

4.5 Arduino IDE

Arduino IDE stands for “Integrated Development Environment”:it is an official software introduced by Arduino.cc, that is mainly used for editing, compiling and uploading the code in the Arduino Device. Almost all Arduino modules are compatible with this software that is an open source and is readily available to install and start compiling the code on the go. In this article, we will introduce the Software, how we can install it, and make it ready for developing applications using Arduino modules.

The IDE environment is mainly distributed into three sections

1. Menu Bar

- Text Editor
- Output Panel
- Menu bar
- Text editor
- Output panel

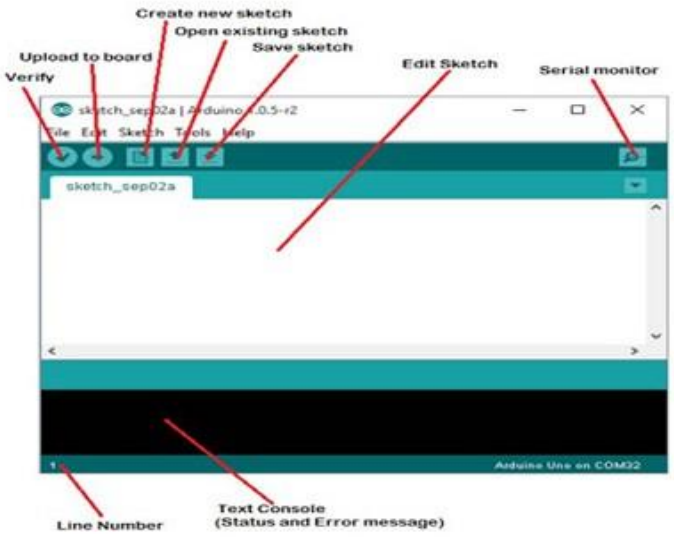


Figure 4.12. Arduino

CHAPTER 5

PROJECT DESCRIPTION

5.1 Data Flow Diagram

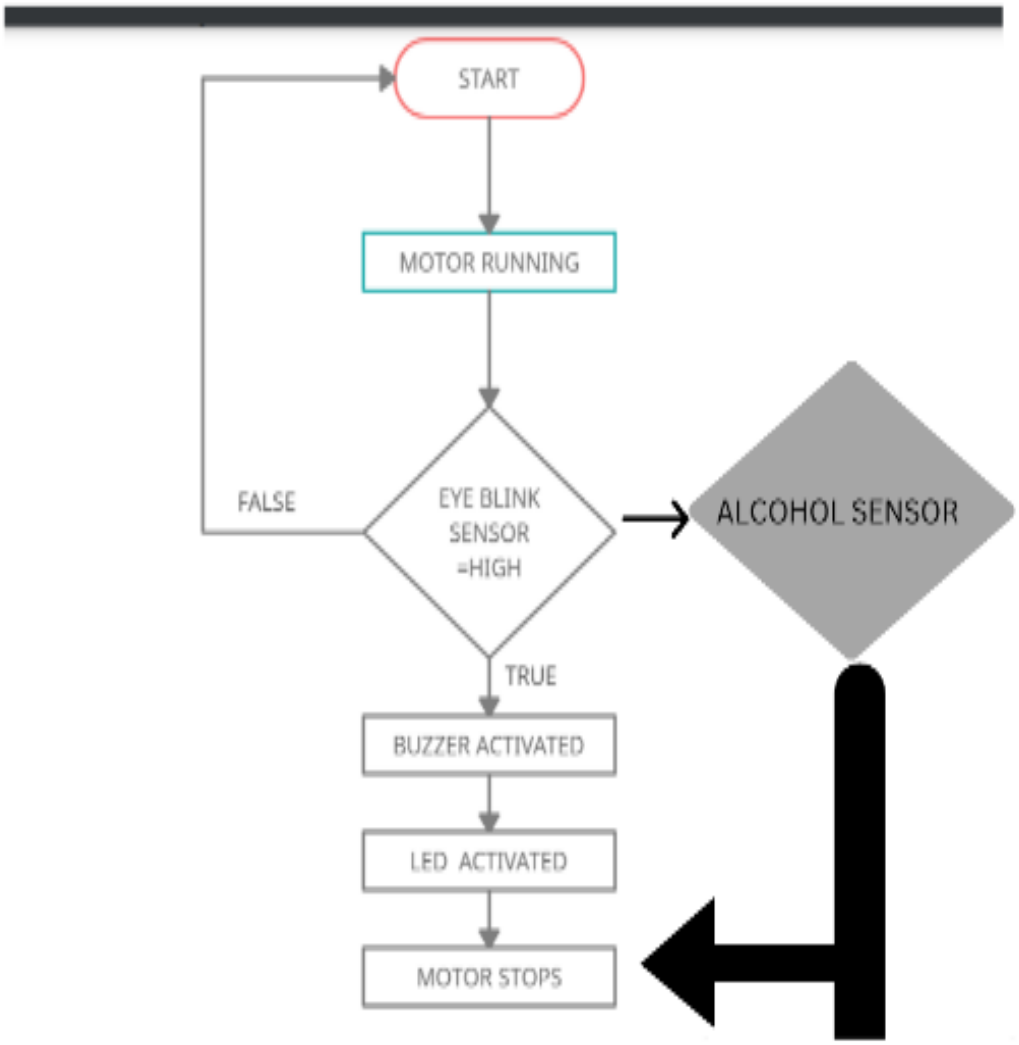


Figure 5.1. Data Flow Diagram

5.2 System Desigh Implementation

System block diagram is comprise of: Eye blink (IR): related to sleep detection and alert the driver with the components used in the proposed operation are Eye blink length and frequency, Power supply, Buzzer, LED ARDUINO (UNO), Relay Module, DC as shown in Figure 2. The main component is Arduino Uno which is an ATmega328 based microcontroller (MC) that performs all functions related to controlling the embedded system circuit. The blinking module works by illuminating the eye area with infrared light, and then detecting changes in scattered light using an image transistor and a separation circuit. Each of the components is described below

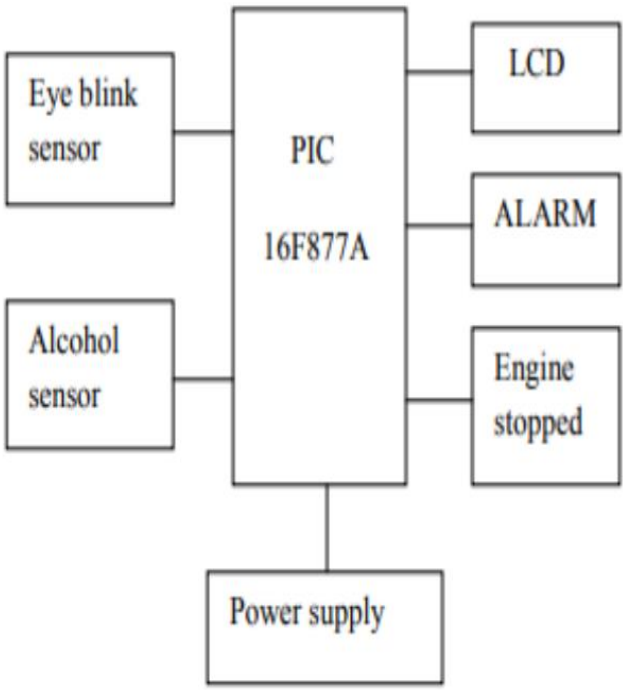


Figure 5.2. Schematic Block Diagram

5.3 Modules Description

1. Arduino Connection
2. IR Sensor
3. Piezoelectric Sound Module
4. Accelerometer
5. Alcohol sensor

5.3.1 Arduino Connection

Arduino is an open source MC board based on ATmega328P MC and developed by Arduino.cc. The board has 14 PINs and 6 analog pins. All of this will help the microcontroller by attaching the board to a computer for continuous operation. Strom supply of this board can be made using AC to DC Converter, USB cable, otherwise plug. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. It is the heart of our system. The Arduino UNO is a widely used open-source microcontroller board based on the ATmega328P microcontroller and developed by Arduino.cc. [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 features 14 Digital pins and 6 Analog pins. It is programmable with the ArduinoIDE(Integrated Development Environment) via a type B USB cable. It can be powered by a USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts. Enables network connection (local and Internet) using the Arduino Ethernet Board or Shield. With this library you can use the Arduino Ethernet (shield or board) to connect to Internet. The library provides both client and server functionalities. Connect the Arduino hardware via USB, by choosing the connection type USB. Choose the board type and the port number from the Choose board and Choose port menus. Then, select the libraries that you want to include in your Arduino server. Click Program to begin uploading the server to your Arduino board. The P89V51RD2 is an 80C51 microcontroller with 64 kB Flash and 1kB of data RAM. These devices are designed to be drop-in and software-compatible replacements for the popular P89C51RB2/RC2/RD2 devices. It supports both the In-System Programming (ISP) and In-Application Programming (IAP) boot codes with 12-clock (default) or 6-clock mode selection.it contains three 16 bit times/counters. In-System programming and In-Application Programming on chip flash user code memory is 64 kb. Operating frequency in 12x mode is 0 MHz to 40 M Hz. Non-volatile data storage is the 128-B page erase for efficient use of code memory.

5.3.2 IR Sensor

An infrared sensor (IR sensor) is a radiation-sensitive optoelectronic component with a spectral sensitivity in the infrared wavelength range 780 nm … 50 µm. IR sensors are now widely used in motion detectors, which are used in building services to switch on lamps or in alarm systems to detect unwelcome guests. Active infrared sensors both emit and detect infrared radiation. Active IR sensors have two parts: a light emitting diode (LED) and a receiver. When an object comes close to the sensor, the infrared light from the LED reflects off of the object and is detected by the receiver. Arduino IR Sensor Interfacing. An infrared proximity sensor or IR Sensor is an electronic device that emits infrared lights to sense some aspect of the surroundings and can be employed to detect the motion of an object. As this is a passive sensor, it can only measure infrared radiation IR sensor's output pin is connected to Arduino, so Arduino will read it and activate the Relay module by making pin 7 high. As soon as relay is activated, it will turn on the DC motor. When there is no object near IR sensor, the output of IR sensor will remain low and DC motor will also remain in Off state.

The motor acts as the wheel of the vehicle and it rotates when the power is supplied to it through L298 chip. The speed of rotation is slowed down when the driver falls asleep as detected by the eye blink sensor, in the other case the wheel is stopped when the accident occur A DC motor is any of a class of rotary electrical motors that converts direct current (DC) electrical energy into mechanical energy

5.3.3 Piezoelectric Sound Module

The "Piezoelectric Sound Modules" presented here work on the concept of conversion using natural piezoelectric ceramic oscillation. These buzzers are available in lightweight, portable sizes ranging from a small diameter of 12 mm to large electrical outlets from peizo. The one shown in fig 6 below is a simple word that when enabled makes a continuous beep. To alert the driver when he first falls Sleepy, the buzzer will be connected to the Eye-Blink Sensor, A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (piezo for short). Typical uses of buzzers and beepers include alarm devices, timers, train and confirmation of user input such as a mouse click or keystroke. The piezometer or pore pressure meter provides significant quantitative data on the magnitude and distribution of pore pressure and its variations with time. It also helps in evaluating the pattern of seepage, zones of potential piping and the effectiveness of seepage control measures undertaken.

5.3.4 Accelerometer

An accelerometer is an electromechanical device. Acceleration force will measure using this device, due to cause of gravity i.e. g force it shows acceleration and it measures in g units. It is used in tilt-sensing applications as well as dynamic acceleration resulting from motion, shock, or vibration. The ADXL335 is a popular three-axis analog accelerometer IC, which reads off the X, Y and Z acceleration as analog voltages. Complete 3-axis acceleration measurement gives the ADXL335, within range ±3 g in the x, y and z axis. Analog voltages are proportional to the acceleration are the output signals of this module. Poly silicon surface-micro machined sensor and signal conditioning circuitry contains in ADXL335. An accelerometer is a basic technology that converts mechanical motion into an electrical signal. It is an electromechanical device that measures acceleration force, whether caused by gravity or motion. No, accelerometer can sense only the change of the speed. It can't physically detect absolute speed. The most you can do it is to integrate the acceleration from a point where the speed was known. Some time after the speed was known you will have updated speed value. By measuring the amount of static acceleration due to gravity, you can find out the angle the device is tilted at with respect to the earth. By sensing the amount of dynamic acceleration, you can analyze the way the device is moving.

5.3.5ALCOHOL SENSOR

The alcohol sensor is technically referred to as a MQ3 sensor which detects ethanol in the air.When a drunk person breathes near the alcohol sensor it detects the ethanol in his breathe and provides an output based on alcohol concentration. The Arduino Detector Shield uses a MQ3 alcohol based sensor to identify the existence of alcohol in the breath. LCD is used to display the PPM (Parts per million) amount of the alcohol. An LM358 IC is analog to digital converter which gives digital of alcohol sensed.

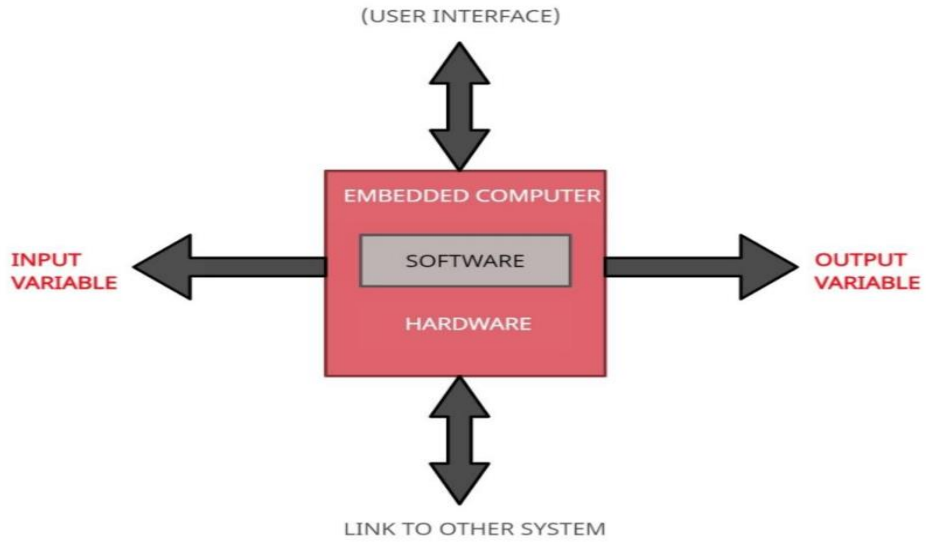


Figure 5.3 Embedded Circuit

1. Oscillators

Oscillators are used for timing generation. SST microcontrollers consist of external oscillators like crystals or RC oscillators. In case of crystal oscillators, the crystal is connected between two oscillator pins, and the value of the capacitor connected to each pin determines the mode of operation of the oscillator. The different modes are low-power mode, crystal mode and the high-speed mode. In case of RC oscillators, the value of the Resistor and Capacitor determine the clock frequency. The clock frequency ranges from 30 KHz to 4 MHz.

2. CCP module:

A CCP module works in the following three modes:

Capture Mode: This mode captures the time of arrival of a signal, or in other words, captures the value of the Timer1 when the CCP pin goes high.

Compare Mode: It acts as an analog comparator that generates an output when the timer1 value reaches a certain reference value.

PWM Mode: It provide pulse with modulated **o**utput with a 10-bit resolution and programmable duty cycle.

Other special peripherals include a Watchdog timer that resets the microcontroller in case of any software malfunction and a Brown out reset that resets the microcontroller in case of any power

fluctuation and others. For better understanding of this PIC microcontroller we are giving one practical project which uses this controller for its operation.

An accelerometer is a basic technology that converts mechanical motion into an electrical signal. It is an electromechanical device that measures acceleration force, whether caused by gravity or motion. No, accelerometer can sense only the change of the speed. It can't physically detect absolute speed. The most you can do it is to integrate the acceleration from a point where the speed was known. Some time after the speed was known you will have updated speed value. By measuring the amount of static acceleration due to gravity, you can find out the angle the device is tilted at with respect to the earth. By sensing the amount of dynamic acceleration, you can analyze the way the device is moving.

5.3.6Methodology

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 there 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 a number of 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.

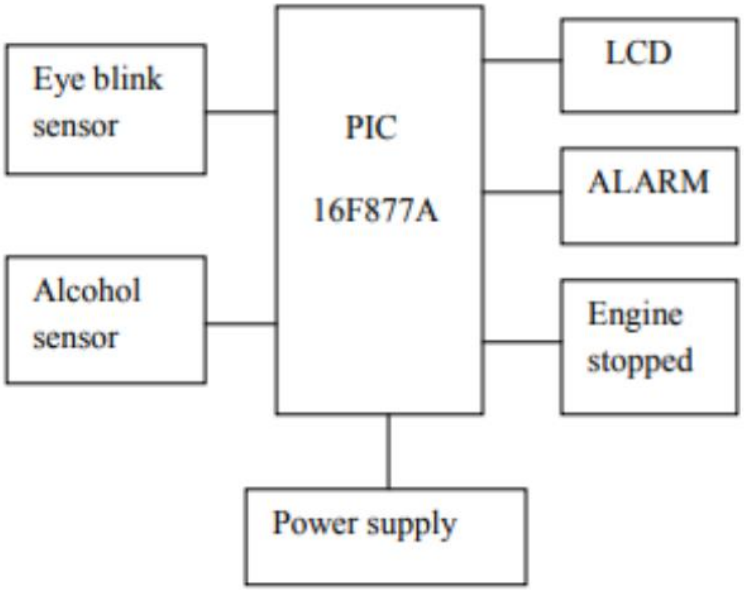


Figure 5.4. Block Diagram

An EEPROM is additionally featured in it that makes it doable to store a number of 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.

5.3.7 Serial Ploter Arduino

Serial plotter is another component of the Arduino IDE, which allows you to generate a real-time graph of your serial data. The serial plotter makes it much easier for you to analyze your data through a visual display. You're able to create graphs, negative value graphs, and conduct waveform analysis. The data memory consists of the 368 bytes of RAM and 256 bytes of EEPROM. The 368 bytes of RAM consists of multiple banks. Each bank consists of general purpose registers and special function registers.The special function registers consists of control registers to control different operations of the chip resources like Timers, Analog to Digital Converters, Serial ports, I/O ports, etc. For example, the TRISA register whose bits can be changed to alter the input or output operations of the port A.The general purpose registers consists of registers that are used to store temporary data and processing results of the data. These general purpose registers are each 8-bit registers. SST is a Software System Testing Microcontroller which was developed in the year 1993 by the General Instruments Microcontrollers. It is controlled by software and programmed in such a way that it performs different tasks and controls a generation line. SST microcontrollers are used in different new applications such as accident Prevention, audio accessories and advanced drowsiness detection devices.

The purpose of this sensor is to sense any jerk given to the vehicle which is the emulation of the accident occurrence in real time. This receives power from the 5V port of the LCD. The output produces and sends signals to dc motor driver and stops the rotation of the wheel, that is, the motor. This module's primary function is to send an audio warning message to the owner's registered number that is, in case of any accident the owner is notified by it android application which plays an audio saying accident occurred, kindly check your phone‖. A sim card is to be fixed in this module to simultaneously send a text message on the vibrator output System.
Serial plotter is another component of the Arduino IDE, which allows you to generate a real-time graph of your serial data. The serial plotter makes it much easier for you to analyze your data through a visual display.

CHAPTER 6
CONCLUSION AND FUTURE ENHANCEMENTS

6.1 Conclusion

People are increasingly exposed to dangers today. Therefore, we need to take action against this as an engineer and have the solution we need. Any automation is designed to protect a person. Such a model is tasked with developing a system for diagnosing and controlling the speed of vehicles to prevent accidents. To some extent, modern technology offers some hope of stopping these. This paper includes monitoring the blink of an eye with the help of an IR sensor. On this device the output of the sensor is provided for comparison with ARDUINO. When the value reaches the set level, the buzzer automatically vibrates, the LED glows, and the car stops automatically when the eye blink sensor receives a signal from the transmission component. Nowadays, people have become more prone to accident. So, we as an engineer need to take some action against this and provide the desired solution. For the safety of the human being some automation is made. The purpose of such a model is to advance a system to detect fatigue symptoms in drivers and control the speed of vehicle to avoid accidents.

Advanced technology offers some hope avoid these up to some extent. This project involves measure and controls eye blink using IR sensor. We can automatically park the vehicle by first using Automatic braking system, which will slow down the vehicle and simultaneously will turn on the parking lights of the vehicle and will detect the parking space and will automatically park the vehicle preventing from accident.

6.2 Future Enhancements

In future,by using wireless technology we can provide radio frequency wave to send an information, If the accident is detected, the location is traced by GPS, GPS unit which give the position of the vehicle to the microcontroller. Arduino microcontroller sends SMS to the handheld mobile phone with the help of GSM modem. User can click on the link in the received SMS, helpful to avoid vehicle accidents because of driver's sleepiness using eye blink sensor, in this paper we study International Journal of Engineering & Technology and design the system for driver fatigue detection.

If the driver becomes drowsy the eye blink sensor's frame vibrates attached to the vehicle and also the LED displays the warning messages and it alerts the driver's through alarm sound to avoid the road accidents.This is accompanied by the owner being notified through the GSM module, so the owner can retrieve the driver's location, photograph and a list of nearby police stations.

APPENDIX I

SAMPLE CODE

Training Phase

```
sbit en=P3^6;
void delay(unsigned int ch) //delay function
        {
          unsigned int i=0,j=0;
for(i=0;i<=ch;i++)
          {   for(j=0;j<=i;j++)
                        {
                        }
        }
        }
        void clcd(unsigned char ch)
{
         P2=ch;
         rs=0; en=1;
      delay(15);
       en=0;
}

        void dlcd(unsigned char ch)
        {
         P2=ch;
         rs=1;
         en=1;
         delay(15);
         en=0;
         }
```

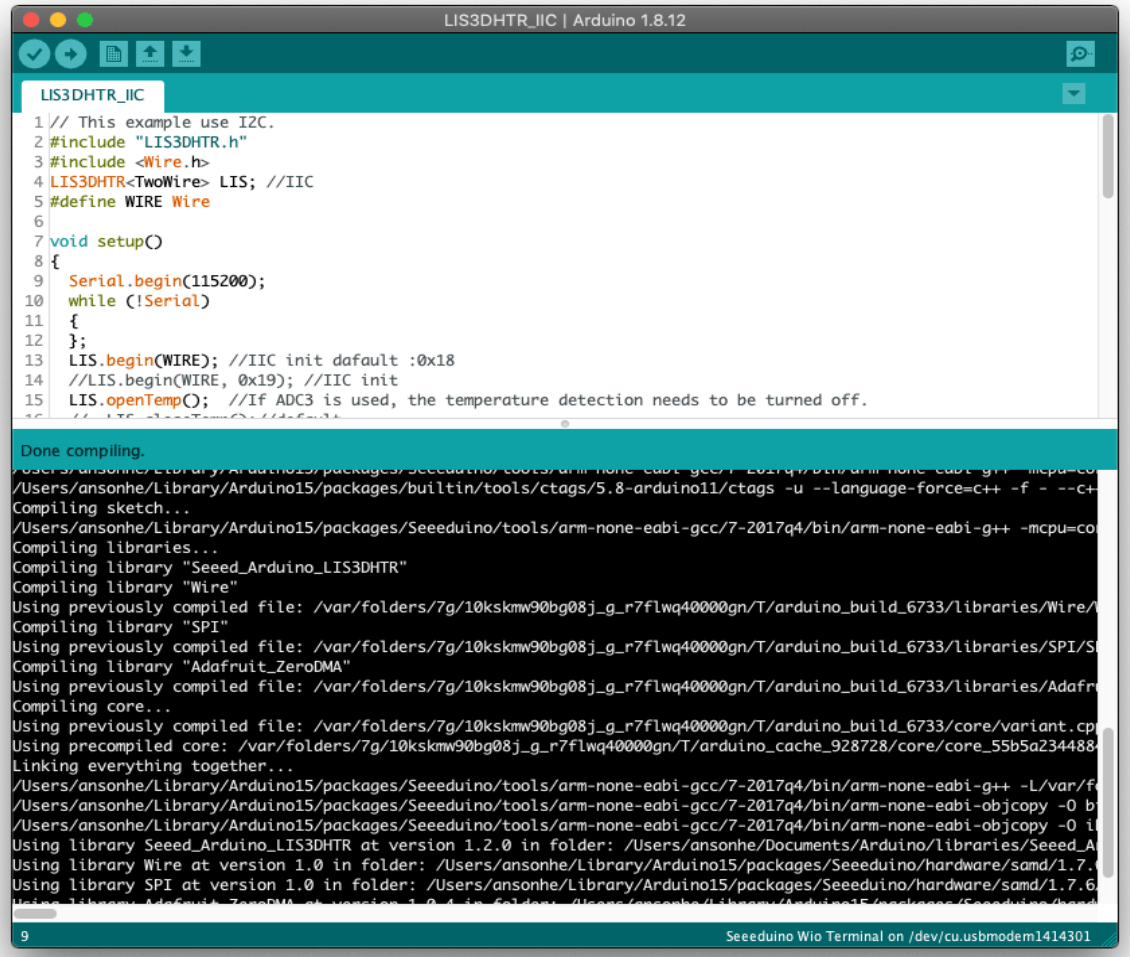
```
unsigned int ix=0;
if(ch==0x80)
clcd(0x01);
clcd(ch);
for(ix=0;chrt[ix]!='\0';ix++)
{
dlcd(chrt[ix]);
}
}
void initlcd()
{
clcd(0x38);
clcd(0x0e);
clcd(0x06);
clcd(0x01);
```

```
void main()
{
P1=0x00;
initlcd();
stringlcd(0x80,"hai");
        while(1)
        {
                if(s1==0)  //front
                {
                r1=1;
                r2=0;
                r3=1;
                r4=0;
                stringlcd(0xc0,"front   ");
                }
```

```
else if(s3==0){
        r1=1;
        r2=0;
        r3=0;
        r4=1;
        stringlcd(0xc0,"left   ");    }
        else if(s4==0){
        r1=0;
        r2=1;
        r3=1;
        r4=0;
        stringlcd(0xc0,"right   ");}
        else {
        r1=0;
        r2=0;
        r3=0;
        r4=0;stringlcd(0xc0,"stopped   ");}
        delay(300);
}
```

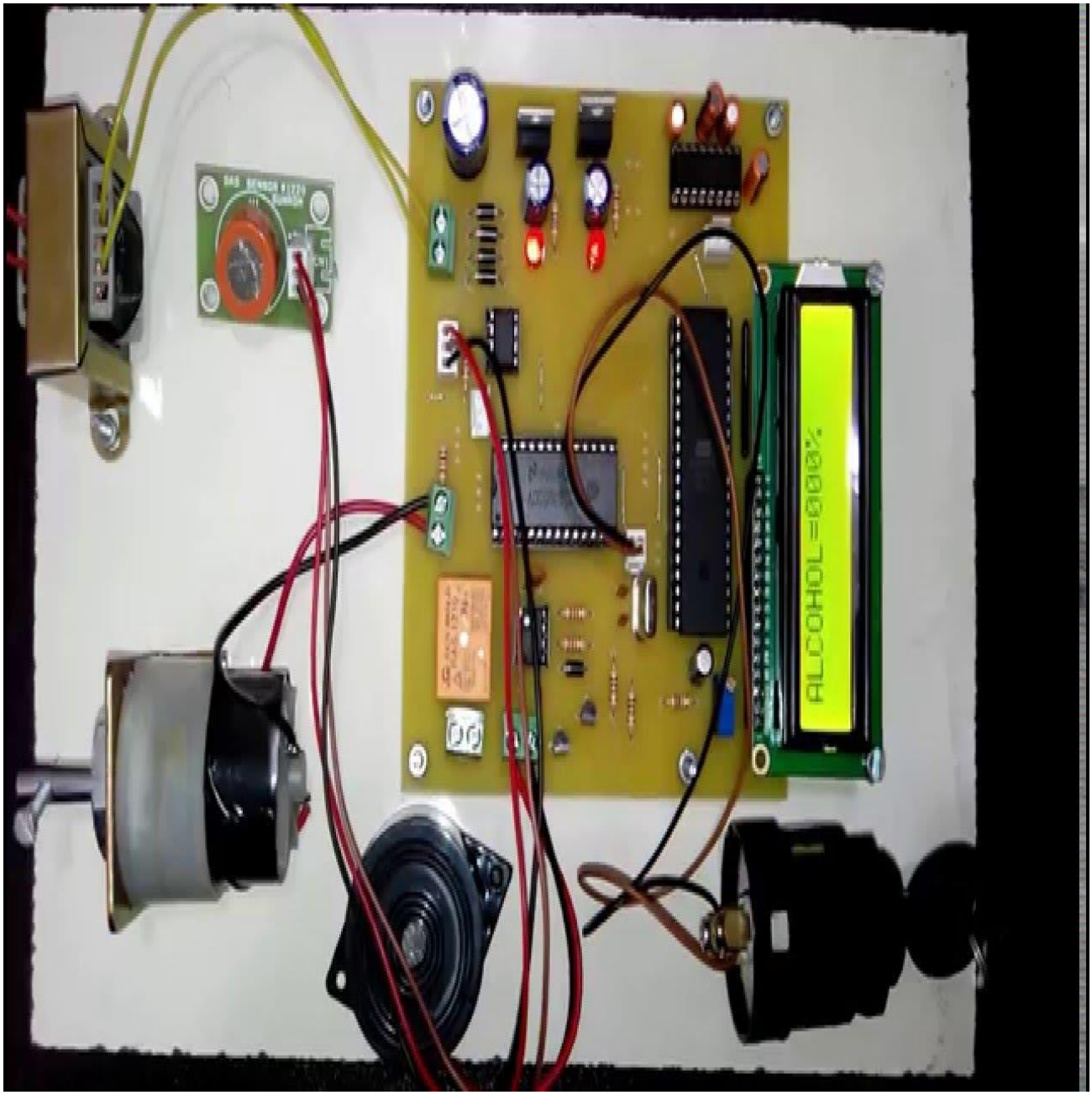
Arduino Compiler

There are two ways to compile code using the Arduino IDE. You can click the tick-mark button at the top-left. That will begin the compilation. The compilation progress will be shown at the bottom of the screen,



APPENDIX II

SNAPSHOTS



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In the work “IOT BASED VEHICLE ACCIDENT PREVENTION SYSTEM”,Organized by CHRIST THE KING ENGINEERING COLLEGE on May 2023.

INDUSTRY CONNECT