ACCIDENT ALERT SYSTEM USING ARDUINO UNO

GE19612

PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

Submitted by

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BONAFIDE CERTIFICATE

Certified that this project report titled **"ACCIDENT ALERT SYSTEM USING ARDUINO UNO"** is the bonafide work of **AMRITHAA R S (2116210801009), ANANDHA KRISHNAN S (2116210801010), ANUBAMA J (2116210801013),** who carried out the project work under my supervision.

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Submitted to the Viva-Voce Examination held on _____

Internal Examiner **External Examiner**

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We take this opportunity to express our profound gratitude and deep regards to our Supervisor **Ms. Sushma S. Jagtap, M.E., (Ph.D.),** Department of Electronics and Communication Engineering for his/her exemplary guidance, monitoring and constant encouragement throughout the course of this project.

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ABSTRACT

Significant numbers of accidents occurred last year, contributing to a concerning increase in fatalities due to delayed alerts. In response to this pressing issue, our project introduces an innovative Accident Alert System utilizing accelerometer sensor, GPS module, and GSM module. The system is designed to swiftly detect accidents and autonomously trigger alerts without relying on internet connectivity. Upon detecting a significant impact indicative of an accident through the accelerometer sensor, the GSM module initiates an emergency call to the predefined emergency phone number. Simultaneously, the GPS module captures the precise location of the incident, which is then transmitted to the emergency contact. This integrated approach ensures prompt response and assistance in critical situations. Moreover, the system incorporates a sensitivity setting to differentiate between minor impacts and severe accidents, thereby minimizing false alarms. Regardless of the angle or side of impact, the Accident Alert System guarantees timely notifications to emergency services. With the robust functionality and reliance on basic cellular communication, this project offers a cost-effective and accessible solution for enhancing road safety and saving lives.

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LIST OF ABBREVIATIONS

GSM	Global System for Mobile Communication
GPS	Global Positioning System
LCD	Liquid Crystal Display

CHAPTER 1

ACCIDENT DETECTION AND ALERT SYSTEM

1.1 Introduction

The development of a transportation system has been the generative power for human beings to have the highest civilization above creatures in the earth. Automobile has a great importance in our daily life. We utilize it to go to our work place, keep in touch with our friends and family, and deliver our goods. But it can also bring disaster to us and even can kill us through accidents. Speed is one of the most important and basic risk factors in driving. It not only affects the severity of a crash, but also increases risk of being involved in a crash.

Despite many efforts taken by different governmental and non-governmental organizations all around the world by various programs to aware against careless driving, yet accidents are taking place every now and then. However, many lives could have been saved if the emergency service could get the crash information in time. A study by Virtanen et al. shows that 4.6% of the fatalities in accidents could have been prevented only if the emergency services could be provided at the place of accident at the proper time. As such, efficient accident detection and automatic alert notification is sent to the emergency contact number with the accident location to save the precious human life.

1.2 Advantages of Accident Alert System

- **Rapid Response:** By automatically detecting crashes and promptly sending alerts to emergency contacts, the system ensures that help can be dispatched quickly, potentially reducing response time and improving outcomes for those involved in accidents.

- **Accurate Location Tracking:** Integrating GPS allows the system to provide precise location information to emergency responders, enabling them to locate the accident scene swiftly, especially in remote or unfamiliar areas where traditional address information may be lacking.
- **Reliable Communication:** Utilizing GSM technology enables the system to send both SMS notifications and make voice calls to emergency contacts. This redundancy ensures that alerts are delivered even in areas with limited cellular coverage, enhancing the reliability of communication in critical situations.
- **Minimization of False Alarms:** Incorporating a buzzer with a predefined delay period for false alarm handling reduces the likelihood of unnecessary alerts being triggered by non-accidental impacts, such as potholes or speed bumps. This feature helps prevent unnecessary panic or disruption for both the driver and emergency contacts.
- **User Intervention:** Providing a switch for the driver to cancel the alert within the delay period empowers them to prevent false alarms from escalating into full emergency responses. This user intervention adds a layer of control and discretion, ensuring that alerts are only sent when genuinely needed.
- **Enhanced Safety:** Overall, the system enhances road safety by facilitating faster emergency response times, improving communication between drivers and emergency services, and mitigating the risk of delays or confusion in critical situations. This can potentially reduce the severity of injuries and fatalities resulting from road accidents.

1.3 Significance of Modern Advancement

The accident alert system, integrating a tri-axis accelerometer sensor, GSM, andGPS, plays a vital role in enhancing road safety and emergency response. The accelerometer detects crashes or significant impacts, triggering immediate responses. GPS technology accurately pinpoints the accident location, aiding emergency responders in swift and efficient navigation to the scene, particularly in remote or unfamiliar areas. The GSM module ensures rapid communication by sending SMS notifications and making calls to preconfigured emergency contacts, facilitating timely assistance. Additionally, a buzzer with a delay period for false alarm handling minimizes unnecessary alerts, reducing panic and confusion. Empowering users to cancel alerts within the delay period adds flexibility and discretion, ensuring alerts are only sent when genuinely needed. Overall, this system significantly improves road safety, reduces response times, and mitigates the severity of accidents, contributing to a safer environment for all road users.

CHAPTER 2

LITERATURE SURVEY

Bhargava A, et al., (2022), "Accident Alert System Using IoT and Machine Learning Techniques", International Journal of Computer Applications (IJCA), presents an Accident Alert System that integrates IoT and machine learning techniques. The system detects accidents using sensor data and analyzes patterns to distinguish between real accidents and false alarms. It then alerts emergency services and nearby vehicles, enhancing overall road safety and accident management.

Haseeb A, et al., (2019), "Real-Time Accident Detection and Alert System for Highways Using IoT and GSM", International Journal of Engineering Science and Computing (IJESC), presents a Real-Time Accident Detection and Alert System designed specifically for highways, integrating IoT and GSM technologies. Sensors installed along highways detect accidents, and the system immediately sends alerts to emergency services and nearby vehicles via GSM networks. This system aims to enhance safety on highways and reduce response time in emergency situations.

Kalaivani M, et al., (2019), "Accident Detection and Alert System Using IoT and GPS", International Journal of Recent Technology and Engineering (IJRTE), proposes an Accident Detection and Alert System utilizing IoT and GPS technologies. The system detects accidents using sensors and immediately sends an alert to predefined contacts via GPS. The aim is to reduce emergency response time and improve accident management efficiency.

Khajuria M, et al., (2023), "Intelligent Accident Alert System Based on Vehicular Ad-Hoc Networks and Machine Learning", International Journal of Advanced Research in Computer Science and Software Engineering (IJARCSSE), proposes an Intelligent Accident Alert System based on Vehicular Ad-Hoc Networks (VANETs) and machine learning algorithms. VANET-enabled vehicles communicate with each other to detect accidents, and machine learning models analyze the data to predict accident-prone zones. This system aims to proactively alert drivers and authorities, preventing accidents and reducing congestion.

Manikandan R, et al., (2020), "Real-Time Accident Detection and Alert System for Vehicles Using IoT and GPS", International Journal of Engineering and Advanced Technology (IJEAT), presents a Real-Time Accident Detection and Alert System for Vehicles employing IoT and GPS. Sensors integrated into the vehicle detect accidents, and the system automatically sends alert messages to emergency contacts with the accident location. This system aims to enhance road safety and expedite emergency responses.

Pandey S, et al., (2020), "Smart Helmet: Accident Detection and Alert System for Two-Wheeler Riders", International Journal of Engineering, Science and Mathematics (IJESM), proposes a Smart Helmet equipped with an Accident Detection and Alert System for two-wheeler riders. The system includes sensors to detect accidents and automatically sends alerts to emergency contacts with the rider's location. By focusing on two-wheeler safety, this system aims to reduce fatalities and injuries among motorcycle and scooter riders.

Patel P, et al., (2021), "Accident Detection and Reporting System Using Wireless Sensor Networks", International Journal of Computer Science and Information Security (IJCSIS), introduces an Accident Detection and Reporting System based on Wireless Sensor Networks (WSNs). The system employs sensor nodes deployed along roads to detect accidents and transmit real-time alerts to a central monitoring station. This system aims to improve road safety by enabling rapid response to accidents and facilitating efficient traffic management.

Sahu DR, et al., (2021), "A Review on Intelligent Accident Detection and Alert System Using IoT and Cloud Computing", Journal of Physics Conference Series, provides an overview of intelligent accident detection and alert systems utilizing IoT and cloud computing. It discusses various sensor technologies, communication protocols, and cloud-based platforms employed in such systems. The paper highlights the potential of these systems in improving road safety and emergency response mechanisms.

Sharma N, et al., (2022), "Development of an Intelligent Accident Alert System Using Artificial Intelligence and IoT", Journal of Intelligent Systems, presents the development of an Intelligent Accident Alert System integrating artificial intelligence (AI) and IoT technologies.The system utilizes AI, algorithms to analyze sensor data and detect accidents, then sends alerts to emergency services and nearby vehicles via IoT networks. By leveraging AI the system aims to enhance accuracy in accident detection and minimize false alarms, thus improving overall road safety.

CHAPTER 3

EXISTING SYSTEM

Many researchers carried out their studies on accident detection system. Traditional traffic accident prediction uses long-term traffic data such as annual average daily traffic and hourly volume. In contrast to traditional traffic accident prediction, realtime traffic accident prediction relates accident occurrences to real-time traffic data obtained from various detectors such as induction loops, infrared detector, camera etc. Real-time traffic accident prediction focuses on the change of traffic conditions before an accident occurrence, while traffic incident detection studies are concerned with the change of traffic conditions after an incident occurrence. However, the performance of these detection and prediction system is greatly restricted by the number of monitoring sensor, available fund, algorithms used to confirm an accident, weather, traffic flow etc. Besides the automatic detection system, manual incident detection methods detects the accident from the motorist report, transportation department or public crews report, aerial surveillance or close circuit camera surveillance. The drawback of this type of detection system is that someone has to witness the incident. Moreover, there are delays and inaccuracies due to the expression problem of the witness. Compared to these detection method, driver initiated incident detection system has more advantages which includes the quick reaction, more incident information etc. However, with the severity of the accident, driver may not be able to report at all. Conventional built-in automatic accident detection system utilizes impact senor or the car airbag senor to detect an accident and GPS to locate the accident place.

CHAPTER 4

PROPOSED METHODOLOGY

4.1 Problem statement

The goal of the project is to detect accidents and alert the emergency contact number in time.The gap between the existing systems in place and the ideal system is that automated system is used once the accident occurs which can give latitude and longitude of accident occurred area without delay. More Human life can be saved using this system.

4.2 Inventive approach

The proposed accident alert system is designed to operate autonomously without relying on an internet connection, ensuring uninterrupted functionality even in areas with limited connectivity. It utilizes a predefined sensitivity threshold tailored to the specific characteristics of each vehicle model, eliminating the need for continuous data exchange or external validation. By embedding the sensitivity threshold directly into the system's hardware or firmware, it can accurately detect crashes or significant impacts without requiring constant calibration or adjustment. This approach enhances the system's reliability and responsiveness, enabling it to provide timely alerts and assistance without relying on external factors. Additionally, by leveraging the vehicle model's inherent characteristics and dynamics, the system can effectively adapt to varying driving conditions and environments, ensuring consistent performance across different scenarios. Overall, this self-contained and adaptable design ensures that the accident alert system remains operational and effective, contributing to improved road safety.

4.3 Experiment methodology

The experiment methodology for assessing the proposed accident alert system involves a systematic approach to evaluate its performance under various driving conditions and potential accident scenarios. Initially, the system is installed in a representative sample of vehicles and calibrated with predefined sensitivity thresholds tailored to each vehicle model's characteristics. Test scenarios are then defined, encompassing a range of driving situations such as sudden braking, collision with obstacles, and simulated crashes at different speeds and angles. Data collection protocols are established to capture relevant information during experiments, including vehicle speed, acceleration, GPS coordinates, and system response times. Controlled experiments are conducted in controlled environments, such as closed test tracks or simulated driving scenarios, to assess the system's performance in detecting and alerting for accidents. The collected data is analyzed to evaluate metrics such as sensitivity, specificity, false positive/negative rates, and alert consistency. Validation of results is ensured through repeated trials and consistency checks, along with validation against real-world accident data or simulated crash scenarios. The experiment methodology is comprehensively documented, including setup procedures, test scenarios, data collection protocols, and analysis techniques, culminating in a detailed report summarizing the findings and conclusions regarding the system's performance and suitability for real-world deployment.

4.4 Block diagram

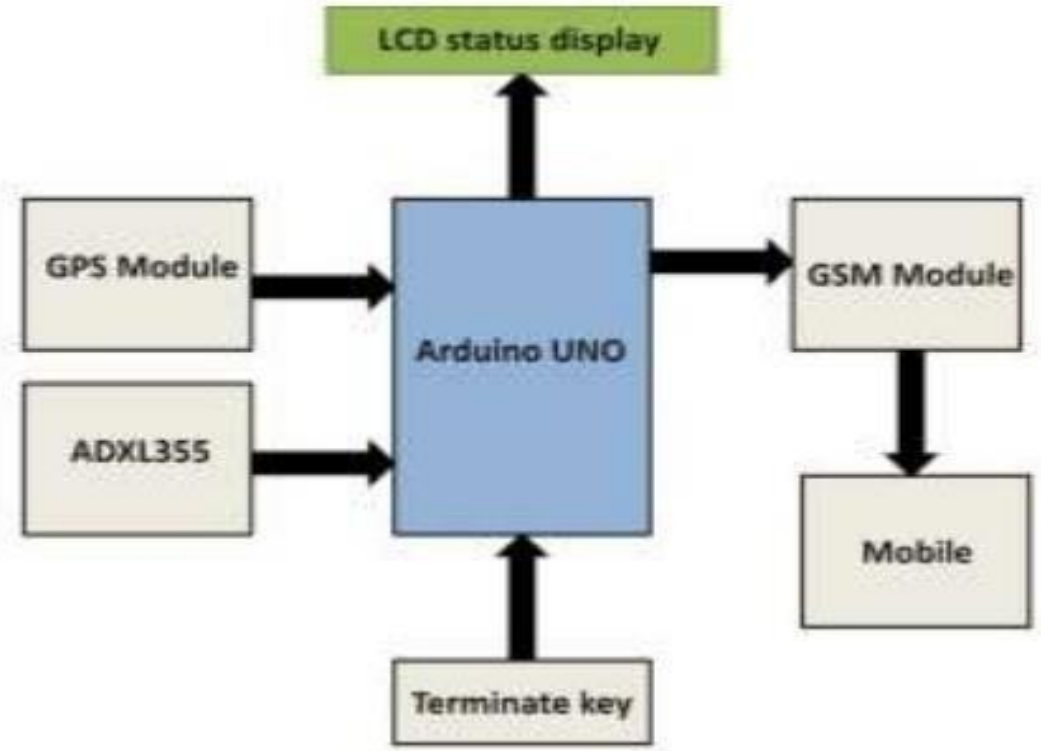

Figure 4.1. Block diagram

4.5 Hardware components

4.5.1Arduino UNO

Arduino is an open-source microcontroller-based kit for developing digital gadgets and interactive things that sense and control physical items. These systems have digital and analog I/O pins that can interface with shields and other circuitry.

Atmega328p-pu microcontroller

Arduino can be used to develop interactive objects, taking inputs from a varietyof switches or sensors, and controlling a variety of lights, motors and other physical outputs. It can be stand-alone, or they can communicate with software running on your computer.

ATmega328 Microcontroller-Arduino UNO is a single chip Microcontroller of the Atmel family. The processor code inside it is of 8-bit. It combines Memory, Analog to Digital Converter, SPI serial ports, I/O lines, registers, timer, externaland internal interrupts, and oscillator.

- **ICSP pin** - The In-Circuit Serial Programming pin allows the user to program using the firmware of the Arduino board.
- **Digital I/O pins**- The digital pins have the value HIGH or LOW. The pinsnumbered from D0 to D13 are digital pins.

Open source and extensible software – The Arduino software is published as open-source tools, available for extension by experienced programmers. The language can be expanded through C++ libraries, and people wanting to understand the technical details can make the leap from Arduino to the AVR.

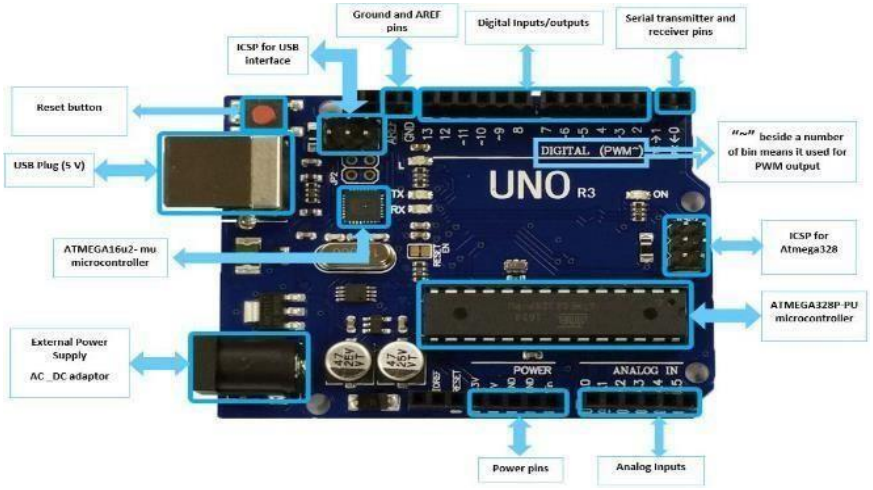

Figure 4.2 Arduino Uno

4.5.2 16X2 LCD

LCD means liquid crystal display. They come in 8x1, 8x2, 10x2, 16x1, 16x2, 16x4, 20x2, 20x4, 24x2, 30x2, 32x2, 40x2, etc. Philips Hitachi Panasonic and other multinationals develop custom LCDs for their products. All LCDs display numbers, special characters, ASCII characters, etc. They all have 14 or 16 pins (0-13 or 0-5) with the identical programming. Alphanumeric displays are utilized in palmtops, word processors,

photocopiers, POS terminals, medical devices, cellphones, etc .This is an E-block LCD display. The 16-character, 2-line alphanumeric LCD display has a single 9-way D-type connector.. The user guide below specifies serial data format for the LCD display. A 5V power supply powersthe display. Exceeding 5V will damage the gadget. The 16 x 2 intelligent alphanumeric dot matrix shows 224 characters and symbols.

I2C (Inter-Integrated Circuit)

This is a communication protocol that allows multiple devices to communicate with each other using only two wires (in addition to power and ground). It uses a master-slave architecture where the master device (like a microcontroller) initiates communication with slave devices (like sensors, memory chips, or displays).

LCD applications

- Liquid crystal thermometer
- Optical imaging
- The liquid crystal display technology is also applicable in thevisualizationof the radio frequency waves in the waveguide

Figure 4.3 16x2 LCD

4.5.3 NEO-6M GPS Module

The NEO-6M GPS module is a compact and cost-effective Global Positioning System (GPS) receiver designed for various navigation and tracking applications. It is based on the u-blox NEO-6M GPS chipset, which integrates a GPS receiver with an embedded antenna and provides accurate positioning information with low power consumption. The NEO-6M module communicates with a host microcontroller or computer system using a serial interface (commonly UART) and outputs standard NMEA (National Marine Electronics Association) format sentences containing GPS data such as latitude, longitude, altitude, speed, and time.

GPS Applications

- **Navigation Systems:** Used in GPS navigation devices, vehicle tracking systems, and marine navigation equipment.
- **Location-Based Services (LBS):** Enables location-based services such as asset tracking, fleet management, and geocaching.
- **Outdoor Recreation:** Supports outdoor activities like hiking, biking, and camping by providing accurate position data.
- **IoT (Internet of Things) Devices:** Integrated into IoT devices for location-aware applications and smart city infrastructure.
- **Robotics and UAVs (Unmanned Aerial Vehicles):** Utilized in robotics and UAVs for autonomous navigation and path planning.
- **Weather Stations:** Incorporated into weather stations for precise location information.

Figure 4.4 GPS

4.5.4 Triaxis accelerometer

A triaxis accelerometer sensor is a sophisticated device designed to measure acceleration along three perpendicular axes: X, Y, and Z. Typically based on MEMS (Micro-Electro-Mechanical Systems) technology, these sensors use microscopic inertial mass structures that respond to acceleration forces, generating electrical signals proportional to the acceleration along each axis. Triaxis accelerometers are available in analog and digital types. Analog accelerometers provide voltage output proportional to acceleration, while digital accelerometers offer acceleration data in digital format through interfaces like I2C or SPI, often with additional features like motion detection and orientation sensing.

Accelerometer sensor applications

- **Motion Sensing in Consumer Electronics**: Triaxial accelerometers are extensively used in smartphones, tablets, and gaming devices for screen rotation (landscape/portrait modes), step counting, gesture recognition (e.g., shaking to undo), and image stabilization in cameras.

- **Vehicle Stability and Safety:** In automotive applications, triaxial accelerometers contribute to vehicle stability control systems, airbag deployment algorithms (to detect sudden deceleration), and rollover detection.

- **Health and Fitness Monitoring:** Wearable fitness trackers and health monitoring devices use triaxial accelerometers to track movement, measure steps, analyze gait, monitor sleep patterns, and detect falls for elderly care.

- **Navigation and Positioning:** Inertial measurement units (IMUs) containing triaxial accelerometers are crucial in GPS-assisted navigation systems. They help in dead reckoning navigation (estimating position based on previous locations) in GPS-denied environments.

Figure 4.5 Accelerometer Sensor

4.5.5 SIM800L GSM module

The SIM800L is a popular GSM (Global System for Mobile Communications) module that provides GSM/GPRS (General Packet Radio Service) communication capabilities to embedded systems and IoT devices. It is widely used for projects that require cellular connectivity, such as remote monitoring, tracking systems, SMS alerts, and more.

GSM applications

- **IoT Devices:** Used in IoT applications where cellular connectivity is required for data transmission and remote monitoring/control.
- **Remote Sensing and Control Systems:** Allows for remote control and monitoring of devices using SMS commands or data communication over GPRS.
- **Tracking Systems:** Integrated into GPS tracking devices for real-time location reporting.

- **Security Systems:** Utilized in alarm systems for sending alerts and notifications via SMS.

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Figure 4.6 GSM MODULE

4.5.6 Push button

A push button, also known as a tactile switch, is a simple yet fundamental electronic component used in a wide range of applications for user input and control. It is a type of momentary switch, meaning it only maintains its active state (pressed) as long as force is applied to it. Once the force is removed, the button returns to its original state (unpressed).

Figure 4.7 PUSH BUTTON

Push button applications

- **User Interfaces**: Used in electronic devices and appliances for functions like power on/off, mode selection, or setting adjustments (e.g., volume control).
- **Microcontroller Input**: Integrated into circuits with microcontrollers (e.g., Arduino) for user interaction and control in electronics projects.

4.5.7 Buzzer

The Buzzer, available in a convenient pack of 5, is a versatile audio alert device designed to provide clear and loud audible signals in electronic systems. This buzzer is suitable for a wide range of applications where robust and reliable sound alerts are essential.

Buzzer applications

- Alarm Systems
- Industrial Automation
- Automotive Warning Signals

Figure 4.8 Buzzer

CHAPTER 5

RESULTS AND DISCUSSION

The integration of an accident alert system comprising a tri-axis accelerometer sensor, GPS technology, GSM communication module, and customizable alert mechanism has shown considerable promise in enhancing road safety and emergency response effectiveness. This system operates by promptly detecting crashes or significant impacts using the accelerometer, which triggers immediate responses. GPS technology accurately pinpoints the accident location, aiding emergency responders in swiftly navigating to the scene, particularly in remote or unfamiliar areas. The GSM module ensures rapid communication by sending SMS notifications and making calls to preconfigured emergency contacts, facilitating timely assistance. Additionally, a buzzer with a delay period for false alarm handling minimizes unnecessary alerts, reducing panic and confusion. Users have the flexibility to cancel alerts within the delay period, ensuring that notifications are sent only when genuinely needed.

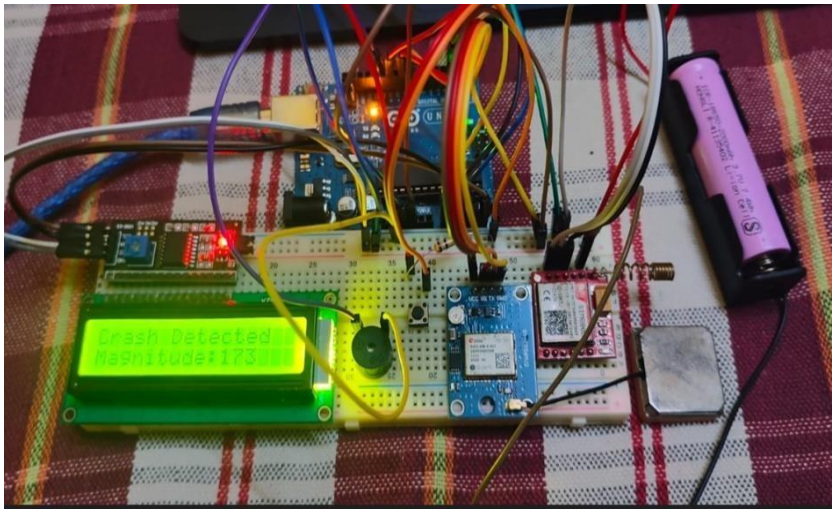

Figure 5.1 Prototype of the Accident Alert system

The effectiveness of this integrated system lies in its ability to improve detection accuracy and response times during emergencies. The accelerometer sensor reliably detects crash events, allowing for rapid activation of emergency protocols. Simultaneously, GPS technology provides precise location data, enabling responders to quickly locate and reach the accident site. The seamless communication facilitated by the GSM module ensures efficient coordination between affected parties and emergency services, expediting assistance and potentially reducing injury severity. By minimizing false alarms through customizable alert mechanisms, the system enhances user trust and overall reliability.

Figure 5.2 Display of the Magnitude in LCD

In practice, the implementation of this accident alert system has demonstrated tangible benefits in enhancing road safety and mitigating accident severity. By reducing response times and improving communication efficiency, the system contributes to a safer environment for all road users. The prompt detection and communication of crash events enable swift interventions, potentially saving lives and reducing the overall impact of accidents on individuals and communities. Further advancements in this technology could lead to even more effective solutions for improving emergency response capabilities and reducing road accident fatalities.

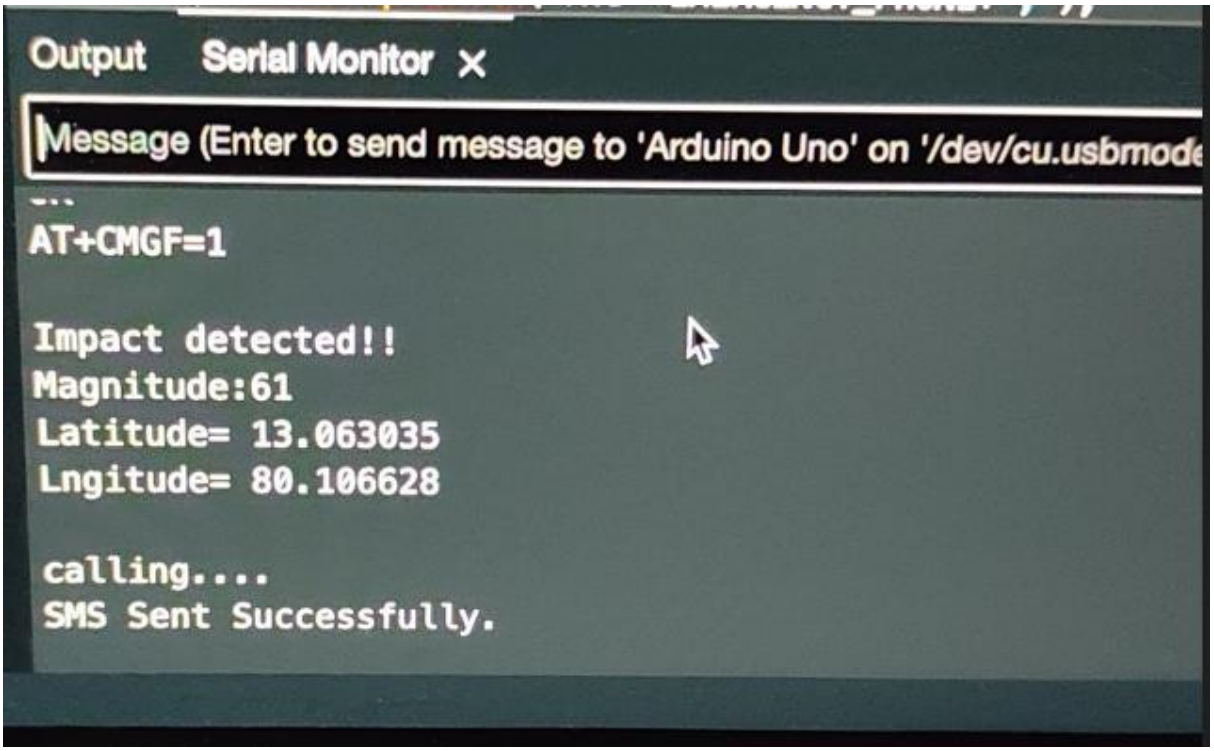

Figure 5.3 Display of Output in Serial Monitor

CHAPTER 6

CONCLUSION AND FUTURE WORK

6.1 Conclusion

A system to detect an event of accident has been developed. The proposed system deals with accident alerting and detection. It reads the exact latitude and longitude of the vehicle involved in the accident and sends this information to the emergency contact number provided. Arduino helps in transferring the message to different devices in the system. Accelerometer sensor detects the crash in the vehicle. The information is transferred to the registered number through GSM module. Using GPS, the location can be sent through tracking system to cover the geographical coordinates over the area.

6.2 Future work

The future scope of this system can have some improvisation using a wireless webcam can be added in this for capturing the images which will help in providing driver`s assistance. This can also be bettered by locking all the brakes automatically in case of accident. Mostly in accidents, it becomes serious as the drivers lose control and fails to stop the vehicle. In such cases, the vibration sensor will be triggered because of the vibrations received and also processed by the processor. The processor has to be linked to the devices which can lock the brakes when triggered. With this improvement, we can stop the vehicle and can weaken the impact of the accident. This system can also be utilized in fleet management, food services, traffic violation cases, rental vehicle services etc.

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RAJALAKSHMI ENGINEERING COLLEGE

DEPARTMENT OF ECE

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

PO1 Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2 Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6 The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7 Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8 Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11 Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12 Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAM SPECIFIC OUTCOMES (PSOs)

PSO1: An ability to carry out research in different areas of Electronics and Communication Engineering fields resulting in journal publications and product development.

PSO2: To design and formulate solutions for industrial requirements using Electronics and Communication engineering

PSO3: To understand and develop solutions required in multidisciplinary engineering fields.

COURSE OUTCOMES (COs)

CO1	Up skill in emerging technologies and apply to real industry-level use cases
CO2	Understand agile development process
CO3	Develop career readiness competencies, Team Skills / Leadership qualities
CO4	Develop Time management, Project management skills and Communication Skills
CO5	Use Critical Thinking for Innovative Problem Solving and develop entrepreneurship skills

GE19612

PROFESSIONAL READINESS FOR INNOVATION, EMPLOYABILITY AND ENTREPRENEURSHIP

Project Title: ACCIDENT ALERT SYSTEM USING ARDUINO UNO

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Name of the Supervisor: MS.SUSHMA S.JAGTAP, M.E., (Ph.D.),

ASSISTANT PROFESSOR.

CO - PO – PSO matrices of course

PO/PSO / CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO2	3	3	3	3	2	2	2	2	2	2	2	2	2	2	2
CO3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
CO4	3	3	3	3	3	3	1	1	1	2	2	3	3	3	3
CO5	3	3	3	3	3	3	1	1	1	3	3	3	3	3	3
Average	3	3	3	3	2.8	2.8	2	2	2	2.6	2.6	2.8	2.8	2.8	2.8

Note: Enter correlation levels 1, 2 or 3 as defined below:

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High), If there is no correlation, put -“

Signature of the Supervisor