

AN AUTOMATED SYSTEM FOR DETECTING AND RESPONDING TO ACCIDENTS

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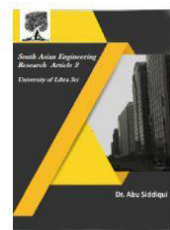
ABSTRACT

A growing population and a significant number of cars on the road are the causes of the rising number of traffic accidents. Although we cannot prevent accidents, we can find ways to prevent them. According to the statistics, a great percentage of people die because they don't receive genuine or prompt support. This essay offers a way to stop it and give the required assistance right away. The Arduino board, temperature sensor, ultrasonic sensor, accelerometer, GPS (Global Positioning System) module, and GSM (Global System for Mobile communication) module make up this WSN-based system. When an accident occurs, a GPS module locates the scene, and a GSM module sends an alarm message to the registered mobile numbers along with the accident's location. This warning will aid in providing the victim with prompt assistance. The suggested device has an inadequate reaction time; it suggests that when a car has an accident, the message is sent in a matter of seconds, potentially saving many lives. Here, we're incorporating an eye blink sensor and a driver sleepiness detection system.

Keywords: Accident detection; alert system; heartbeat sensor; accelerometer; Bluetooth; Android application.

1. INTRODUCTION

Vehicles are now much more powerful, safer, easy to drive and operate, highly efficient in terms of energy, and more ecologically friendly thanks to industry modernisations during the last decade. Nowadays, the majority of auto accidents are caused by due to the driver of weariness [1,2]. The current effort aims to develop a driver drowsy2 caveat scheme prototype. The system design that accurately and reliably views the driver's eye blinking (open and closed) status will be the primary focus. This identification is frequently accomplished by classifying pictures of eyes as well as the movement of the face and head using an accelerometer module. In addition to dozing off while driving, heart attacks and alcohol use are additional factors that contribute to accidents. Additionally, we have developed a warning system to continuously track the heart rate and alcohol intake of the driver and report any unfavourable circumstances to the emergency contacts. One of the primary causes of accidents is fatigued drivers. Road accidents account for about half of all accidents. One of the main causes of traffic accidents nowadays is a driver's sleepiness. It is necessary to establish certain



strategies to keep drivers from becoming sleepy while operating a motor vehicle. Creating a method to prevent this problem has grown to be a significant difficulty. Earlier systems used visual analysis of a driver's eye state and head pose (HP) to continuously evaluate their level of awareness . Both the Raspberry Pi 3 and its camera module were employed to determine the driver's degree of sleepiness . In order to lower the incidence of accidents caused by driver drowsiness, an Advanced Driver Assistance System (ADAS) module was introduced; hence, artificial intelligence and visual information were used . The following metrics have been used by researchers to try and identify driver drowsiness: (1) vehicle-based assessments; (2) behavioural measures; and (3) physiological measures [4]. The development of a driver drowsiness detection system prototype is the goal of this paper. The primary functions of this system are to track the driver's body temperature and eye blink rate. Additionally, it tracks the driver's heart rate. The right sensors are used to measure these elements. The sensor values are compared to the given reference values by the microcontroller. If these numbers deviate from the reference value range, the driver is notified. The GSM module also notifies the concerned parties about the driver by sending them a message. According to all accounts, the advancement of innovation has been both a boon and a bane.

2.LITERATURE SURVEY

The "IOT based Vehicle Tracking & Vehicle Emergency System" case study, developed by Patole Gitanjali and team , focusses on the architectural operation of the system's various components, such as the Traffic, Server, and Vehicle and Ambulance Units. The goal of Saed Tarapiah and team's "Smart on-board transportation management system Geo-Casting featured" is to notify the Subset of the vehicle's geographic location. The main function of the gadget suggested by Aishwarya and colleagues is to provide an Eye Blinking Monitoring System (EBMS) that warns night drivers when they are becoming sleepy. This system is called "An IoT Based Accident Prevention & Tracking System for Night Drivers." In order to help notify the nearest hospital of a crash immediately, Parveen Sultana and the team imported their work by developing recording equipment that connects to the cloud to generate continuous updates [6]. The study conducted by M. Kaavya and Shakeel Ahmed in "IOT BASED REAL-TIME AUTONOMOUS VEHICLE TRACKING SYSTEM" [8] would notify the rescue crew and the family members of the person involved in the accident about a recent mishap. It makes use of MEMS sensors, which can detect sudden vibrations after an accident, and ultrasonic sensors to determine distance.

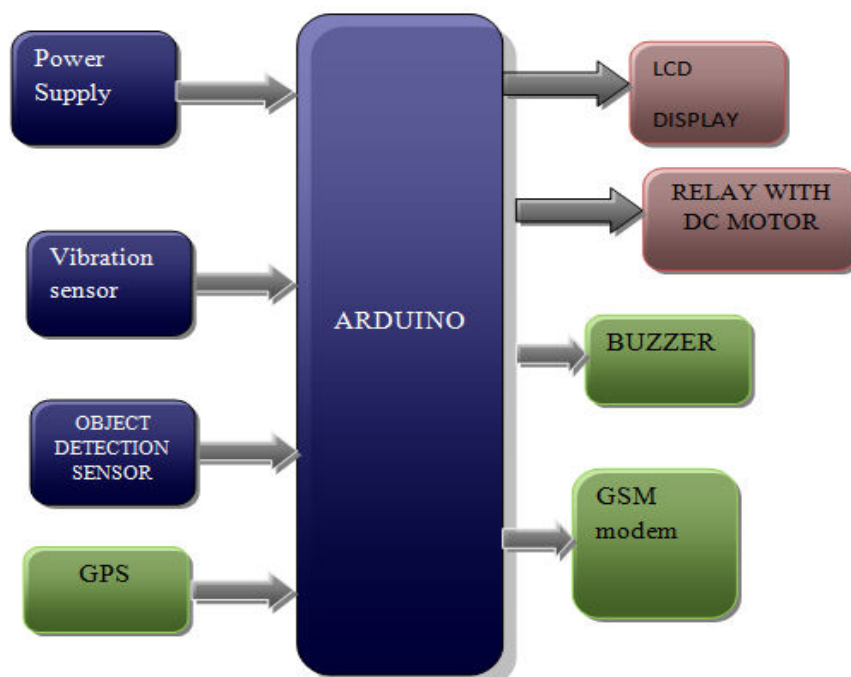
An accelerometer device used in Pooja Shindalkar and the team's "Arduino premised Vehicle Accident Detection System" project may be able to detect the irregularities of vehicle-related vibrations after an incident. This causes the microcontroller to receive a signal. Victimisation of a vehicle accident detection system The GPS and GSM modems are finished. Notifications of messages are sent to the designated mobile phone. [12] Priyanka and her team's study, "Accident Alert and Vehicle Tracking System," demonstrated the system as the most advanced use of early accident detection. It will employ vibration sensors to automatically detect road accidents and use GPS to instantly notify a central emergency

dispatch server that an accident has happened. coordinates. It will send the closest ambulance to the scene of the accident along with that information. To find traffic incidents, the method makes use of gadgets called Raspberry Pis, vibration sensors, and GPS and GSM modules.

3.PROPOSED SYSTEM :

Because there are fewer emergency facilities, technological advancements have led to a rise in traffic risks and traffic accidents. This issue will be resolved in our article. Accelerometers can be used in automobile alarm applications to identify risky driving. It was utilised as crash or rollover detector vehicle in the course of or following an accident. The signal that is used to identify the serious accident is received by an accelerometer. According to this document, the vibration sensor will identify the signal and transmit it to the ATMEGA 8A controller when the vehicle is involved in an accident or rolls over. GSM uses a microcontroller to transmit an alert message to the police control centre or rescue squad. After getting the information, authorities can now use the GPS to pinpoint the position. The required action will then be conducted after the location has been conformed. In the event of an accident, if the The driver can turn off the alarm message using a switch if no one was hurt or if there was no imminent danger to anyone's life. in order to prevent the rescue team's time from being wasted. This uses a vibration sensor to identify the accident.

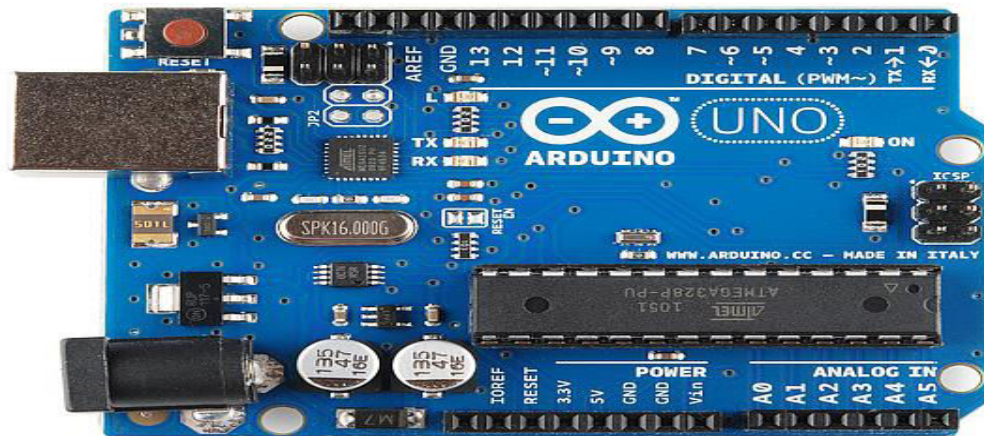
3.1 BLOCK DIAGRAM :



4. HARDWARE DESCRIPTION:

4.1 ARDUINO UNO:

Arduino is a community of users, a project, and an open-source hardware and software firm that creates and produces single-board microcontrollers and microcontroller kits for creating interactive objects and digital devices with physical and digital sensing and control. Its goods



are released under either the GNU General Public License (GPL) or the GNU Lesser General

Fig 4.1 : ARDUINO UNO BOARD

Public License (LGPL), allowing anybody to distribute the software and produce Arduino boards. Commercial preassembled Arduino boards and do-it-yourself (DIY) kits are both available. Numerous microprocessors and controllers are used in Arduino board designs. A variety of expansion boards, breadboards (shields), and other circuits can be interfaced with the boards' sets of digital and analogue input/output (I/O) pins. Serial communications are a feature of the boards' interfaces that are also used to load software from personal computers, such as Universal Serial Bus (USB) on certain models.

4.2 RELAY:

An electrically powered switch is called a relay. It is made up of a set of working contact terminals and a set of input terminals for one or more control signals. Any number of contacts in any combination of contact forms, including make contacts, break contacts, or combinations among them. Relays are employed when multiple circuits need to be controlled by a single signal or when a circuit has to be controlled by a separate low-power signal. In order to refresh the signal coming in from one circuit by transmitting it on another circuit, relays were initially employed as signal repeaters in long-distance telegraph circuits.



Fig 4.2 : Relay

Relays were widely employed to carry out logical processes in early computers and telephone conversations. Although solid-state relays, which use semiconductor qualities for control instead of moving parts, have been developed, the conventional type of relay uses an electromagnet to close or open the contacts. Calibrate delays In contemporary electric power systems, these tasks are carried out by digital devices still known as protective relays. Operating characteristics and occasionally several operating coils are utilised to protect electrical circuits from overload or defects.

4.3 GSM MODULE:

As the most popular cell phone technology worldwide, GSM, or Global System for Mobile Communications, is widely used. Cell phones look for nearby cell phone towers in order to connect to a GSM network operated by a cell phone service provider. A widely recognised standard for digital cellular communication is the Global System for Mobile Communication (GSM). A standardisation committee known as GSM was founded in 1982 with the goal of developing a uniform European mobile telephone standard that would specify requirements for a 900 MHz pan-European mobile cellular radio system. Numerous nations outside of Europe are anticipated to join the GSM cooperation.

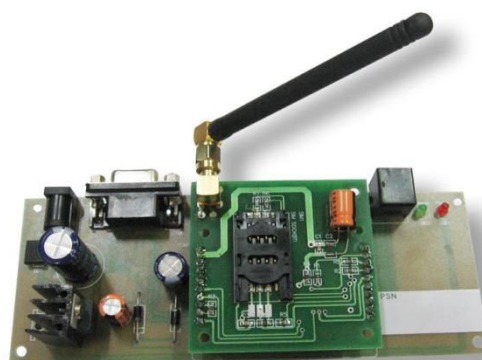
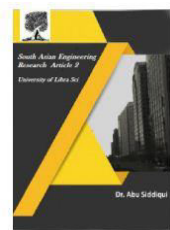


Fig 4.3 : GSM MODULE



5. SOFTWARE DESCRIPTION :

A yellow outline will appear when a project is first launched. The PCB's dimensions are shown by this yellow outline. Usually, the PCB is cropped to the proper size after the parts and traces have been moved to their final positions. But when creating a board with a Before beginning, crop the PCB to the appropriate size if there is a size restriction. The tool for selection: What this does is quite clear. You can move and manipulate pieces with it. When this tool is selected, buttons to rotate and move traces to the top or bottom copper layer will appear in the top toolbar.

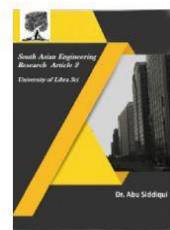
Small soldier pads, which are helpful for board connections or in cases when a part is not in the part library but the part dimensions are known, can be placed using the place pad button. When you select this tool, a wide range of round holes, square holes, and other holes will appear in the top toolbar pads for surface mounting. By selecting a component from the top toolbar and then clicking on the workspace, you may use the put component: tool to position that component in the orientation you've selected using the buttons next to the component list. If the orientation is incorrect, the components can always be rotated later using the choose tool.

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You can apply a solid trace of different thicknesses to the board using the place trace tool. You can choose the top or bottom layer to apply the trace to using the top toolbar. The Insert Corner button in trace: does just that. Upon selecting this tool, To route around components and other traces, click on a trace to insert a moveable corner.

6. RESULTS:

All of the circuit's modules are controlled by the Arduino controller, which is employed in this project. Other from the controller, the two main components are the GSM and GPS modules, which serve as receivers. In order to obtain the GPS module's coordinates, used, and GSM will text the user the received coordinates. An extra LCD is available for showing coordinates or status messages. When an accident occurs when a driver is operating the vehicle, the vibration sensor receives the vibrations and functions as an accident detection module, sending the information to the microcontroller, the GPS module provides the vehicle's location, and the GSM module receives the vehicle's coordinates. The Arduino Uno receives the received data. Information about the received coordinates is gathered and sent by SMS to the appropriate individual. The suggested method addresses the detection and notification of accidents. The Arduino serves as the system's central component, facilitating



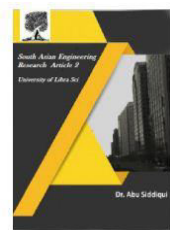
message transmission among its various gadgets.

7.CONCLUSION :

When an accident happens, the vibration sensor will be triggered, and the GSM module will send the information to the registered number. The location can be transmitted by tracking using GPS. System to cover the area's geographic coordinates. A vibration sensor, a key component of the system, can identify the accident. The driver drowsiness detection and accident alarm system is analysed and designed in this project. The purpose of the suggested method is to prevent serious collisions caused by driver weariness and drowsiness. One of the model's Eye Blink sensors determines The heart rate is checked every minute using the Heart Beat sensor and the eye status (open or closed). The buzzer is activated to warn the driver when the parameter value exceeds the threshold value. Thus, by implementing such a system, the accidents brought on by drowsiness can be minimised. We can lower the vehicle's speed by using an automated braking system instead of an alarm. The automatic braking system will first lower the vehicle's speed and then turn on the parking lights at the same time. In the event of drowsiness, the automated braking system can be adjusted using a pressure sensor. The car can be transported from one location to another via the CAN protocol if it is stopped in between.

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