iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 12 **Issue:** V **Month of publication:** May 2024

DOI: https://doi.org/10.22214/ijraset.2024.60389

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 12 Issue V May 2024- Available at www.ijraset.com

Alert System for Emergency State of Vehicle Users

Rahul Singh[1], Rishiraj Nagar[2], Rituraj Sharma[3], Tarun Naruka[4]
[1, 2, 3]*Students,* [4]*Assistant Professor, Dept. of Electrical Engineering, Swami Keshvanand Institute of Technology, Management and Gramothan, Jaipur, Rajasthan, India*

Abstract: ***One of the main reasons for road collisions is over-speeding. The sharp rise in traffic accidents is currently one of the main causes of human deaths. The worth of human life is above all other factors, and providing immediate assistance is more important than lending a hand help. If emergency personnel had been able to get accident reports and get there in time, more lives might have been saved. When it comes to saving lives, the time it takes from the moment of the accident until the ambulance arrives at the scene is critical. We can reduce the time between an accident occurring and a medical ambulance being dispatched to the scene by lowering death rates. Today, GPS is a crucial part of a vehicle's system. The accelerometer senses a quick shift in the axles of the vehicle. It will be evaluated by Arduino. The warning message and its position are sent to the police control room or a rescue team by the Arduino using the GSM module. Therefore, once they get the information, the authorities can use the GPS module to trace the location automatically. The appropriate action will be carried out after the location has been verified.***
Keywords: Accident alert system, Arduino UNO, GPS, GSM.

I. INTRODUCTION

The accident warning system's main objective is to prevent fatalities in collisions. The newest technologies, like GPS, are quite useful nowadays and enable the owner to monitor and track vehicle activity as well as historical vehicle movements. The risk to human life has increased due to the linear improvement in automobile use over the previous ten years. This is due to insufficient emergency services. In this research, we employ an alert system that supports the emergency system of the crash system, [1]. This device detects the accident's occurrence, and it alerts the emergency crew of the coordinated accident. An off-switching mechanismis employed in the absence of causation. An accident is seen using the accelerometer sensor. A message, [2], [3] shows the angle at which the car rolled off. This application intends to offer a viable alternative to inadequate emergency facilities. This accident warning system notifies the listed Smart Phone, device, etc. about the accident as well as its location and GPS coordinates [4].

II. PROBLEM IDENTIFICATION

Accidents sometimes occur at night or in remote locations where no one can be heard, and victims are rarely promptly saved. This is causing a lot of them to pass away. This device resolves the aforementioned issue by sending data to the emergency team immediately following an accident [5].

III. PROPOSED SYSTEM

The vehicle security system has been included in our suggested system. MEMS and vibration sensors have both been used in accident detection development. An alert with the GPS position will be sent to the appropriate person after the accident is discovered. The notification is automatically delivered when the accident happens. So, there is no need for a person to call medical services. This SIM 900, a complete Quade band GSM module that offers an industry-standard interface, is used. As a result, information is conveyed instantly and signals are transmitted quickly. The suggested system's block diagram is shown below.

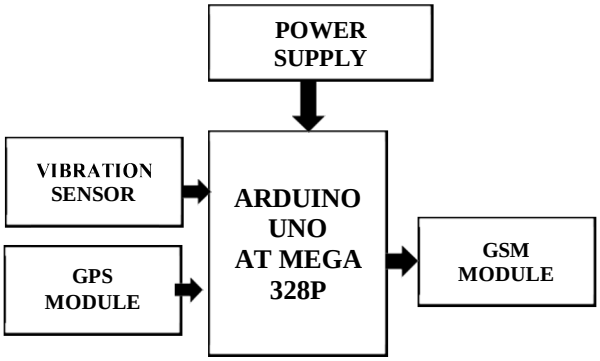


Fig. 1 Block Diagram

IV. REQUIREMENTS

A. Hardware

1) Arduino UNO.
2) MEMS sensor.
3) Vibration sensor.
4) GPS module.
5) GSM module.

B. Software

1) Arduino IDE.
2) Embedded C.

V. WORKING DESCRIPTION

When an accident occurs anywhere, the GPS monitors the location of the car and transmits the information to the specific person over GSM by calling or sending an SMS to notify them. A microcontroller board called the Arduino Uno is based on the ATmega328 (datasheet). It contains a 16 MHz ceramic resonator, 6 analog inputs, 14 digital input/output pins (of which 6 can be used as PWM outputs), a USB port, a power jack, an ICSP header, and a reset button. It comes with everything required to support the microcontroller; to use it, just plug in a USB cable, an AC-to-DC adapter, or a battery to get going [6].

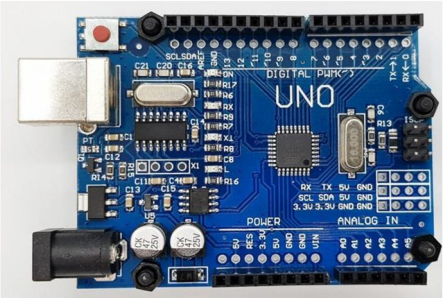


Fig. 2 Arduino Uno [7]

1) Power: 5 volts. This pin provides a regulated 5V output from the board's regulator. The board can receive power from the USB connector (5V), the DC power jack (7–12V), or the VIN pin of the board (7-12V). Bypassing the regulator by applying power to the 5V or 3.3V pins can harm your board

2) Memory: ATmega328's memory capacity is 32 KB (with 0.5 KB used for the bootloader). Moreover, it has 1 KB of EEPROM (which the EEPROM library can read and write to) and 2 KB of SRAM. Output and Input The Uno's 14 digital pins can all be used as inputs or outputs by utilizing the pin mode, digital write, and digital read capabilities. They run on 5 volts. A pull-up resistor of 20 to 50 kilo Ohms is built into each pin, which has a maximum current capacity of 40 mA and is unplugged by default.

3) Vibration Sensor: Sensors that measure, display, and analyze linear velocity, displacement, proximity, or acceleration are known as vibration sensors.

The acquisition of vibration data is depicted in the diagram below in an extremely straightforward manner.

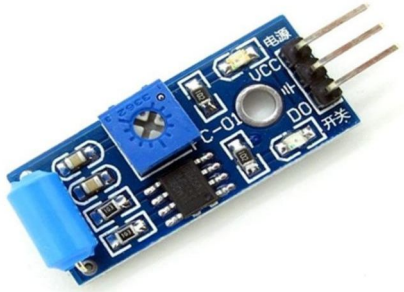


Fig. 3 Vibration Sensor [8]

4) *MESO Senser:* Miniaturized mechanical and electro-mechanical components can be referred to as Micro-Electromechanically Systems, or MEMS, in their most basic form. Inertial sensors with high precision and cheap cost, MEMS inclinometers, and accelerometers are used in a wide range of industrial applications. The suspended mass generates a difference in electric potential that is detected as a change in capacitance when the sensor is tilted. The signal is then amplified to produce a steady digital output signal. VDC or 4-20 mA.
5) *GSM:* With the circuit shown below, the level shifter IC Max232 properly interfaced a GSM modem to the MC. Upon receiving a numeric command through SMS from any cell phone, the SIM card-mounted GSM modem sends the data to the MC using a serial connection. The GSM modem gets the instruction "STOP" while the program is running, creating an output at the MC, whose contact point is utilized to turn off the ignition switch. The user's demand is based on an alert from his GSM modem, which only sends out a predefined message if the input is too low. The entire operation is displayed on a 162 LCD screen [9].

Fig. 4 GSM A900 [10]

6) *GPS:* GPS Stands for "Global Positioning System." GPS is a satellite navigation system used to determine the ground position of an object. Each GPS satellite broadcasts a message that includes the satellite's current position, orbit, and exact time. A GPS receiver combines the broadcasts from multiple satellites to calculate its exact position using a process called triangulation. Three satellites are required to determine a receiver's location, though a connection to four satellites is ideal since it provides greater accuracy.

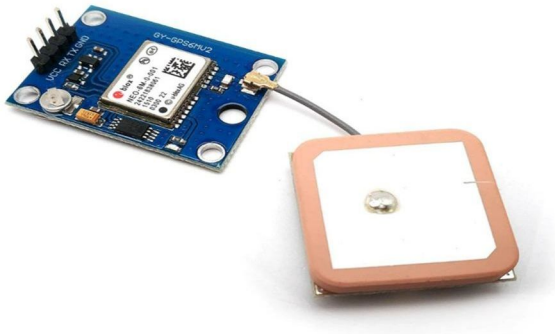


Fig. 5 GPS [11]

VI. ADVANTAGES

1) This method is a system of urgent assistance.
2) Monitors all risks and hazards.
3) To the nearest hospitals and police stations, warning notices are sent.
4) It can be included in an affordable program. The warning message about the accident is sent automatically.
5) It is possible to use this scheme for a social cause.

VII. APPLICATIONS

1) It can be used to shield passengers in cars/motor vehicles.
2) It may be used by the health department to survey the wider scale of incidents that have occurred.
3) We can also use this framework in traffic estimation with some modifications.

VIII. RESULTS AND DISCUSSION

The project's hardware implementation is shown in the picture below, where the Arduino is combined with elements including an accelerometer, a vibration sensor, a GSM module, and a GPS module. In this case, the accident is detected by an accelerometer or vibration sensor, the location of the accident is determined by GPS, and the network connection is made by GSM, allowing the geolocation to be communicated to the registered cell number.

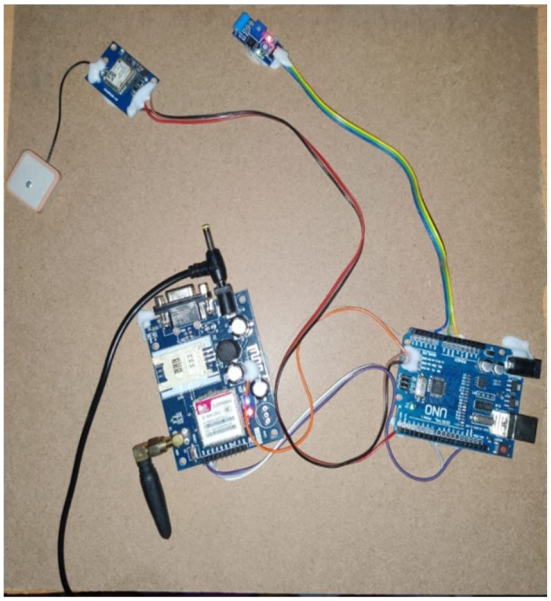


Fig. 6 Emergency Alert System of vehicle.

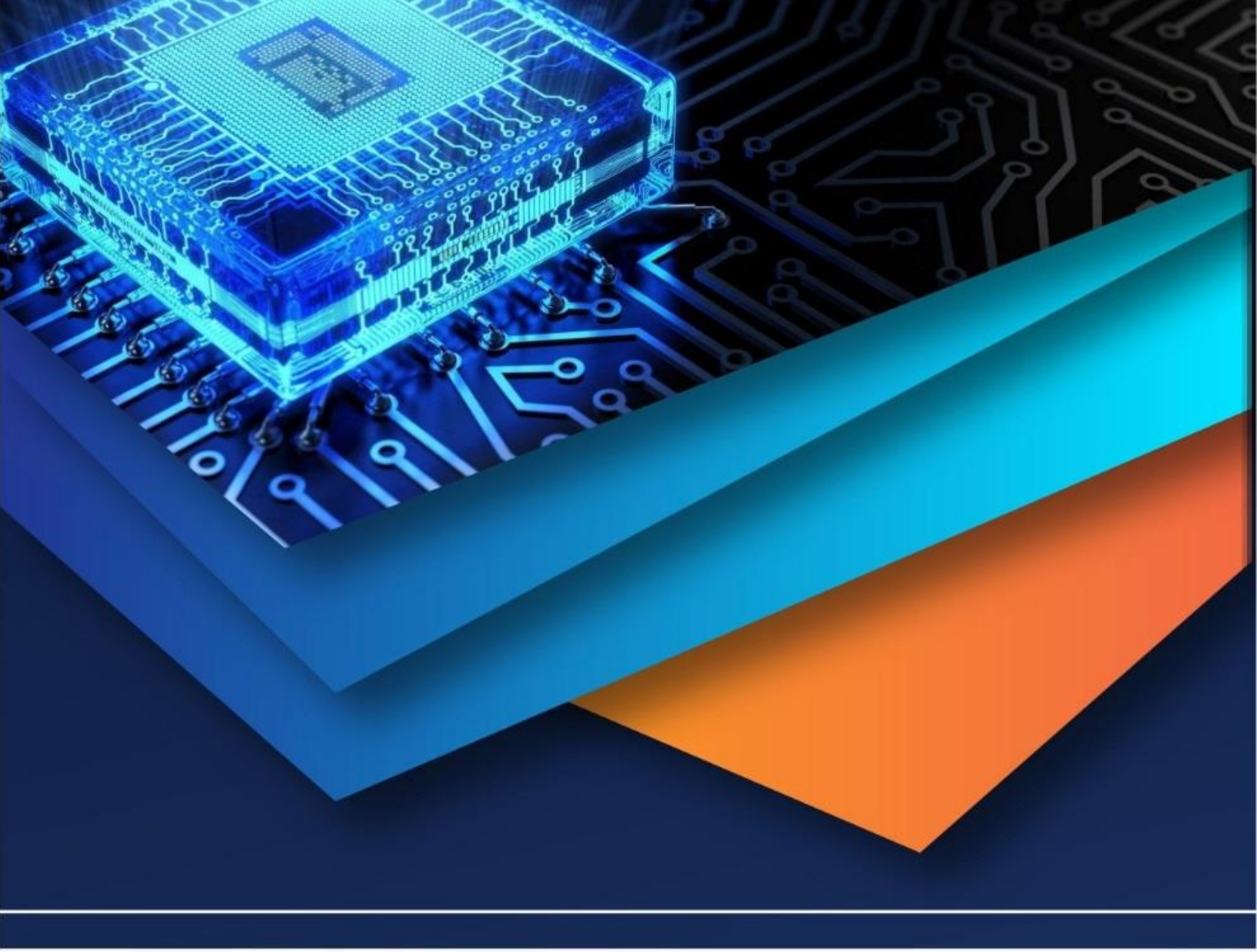
IX. CONCLUSIONS

Several people have died in accidents in our nation as a result of causalities or poor communication. Hence, a system for automatically detecting theft and car accidents is put into place. By utilizing this approach, we can decrease the number of fatalities brought on by accidents and respond quickly to mishaps. Moreover, theft detection employs it. The owner of the car is informed about the theft via a GSM module. The owner uses GPS technology to limit the vehicle's movement within a specific area. The owner can use the system at any time, from anywhere, to track and monitor the car. Hence, the methods used in this project give the car exceptional levels of security and dependability. The goal of the suggested methodology is to create a vehicle security system that is quicker and more effective. Auto-guard systems for preventing car theft and loss are becoming more and more popular every day. To satisfy this desire, the proposed system will be an intellectual system.

REFERENCES

[1] Tanushree Dalai, "Emergency Alert and Service for Automotives for India", International Journal of Advanced Trends in Computer Science and Engineering (IJATCSE) Mysore India, vol. 2, no. 5, pp. 08-12, 2013.
[2] Manuel Fogue, Piedad Garrido, Francisco J. Martinez, JuanCarlos Cano, Carlos T. Calafate, and Pietro Manzoni (2012) “Assistance through Communication Technologies and Vehicle”, IEEE vehicular technology magazine.
[3] PL Needham, Collision prevention: The role of an accident data recorder. Automated Emergency Call for Road Accident, European Commission Press G. Singh and H. Song, Using Hidden Markov Models in Vehicular crash detection, IEEE Transactions.
[4] Aldunate R.G., Herrera O.A., Cordero J.P. (2013) Early Vehicle Accident Detection and Notification Based on Smartphone Technology. In: Urzaiz G., Ochoa S.F., Bravo J., Chen L.L., Oliveira J. (eds) Ubiquitous Computing and Ambient Intelligence. Context-Awareness and Context-Driven Interaction. Lecture Notes in Computer Science, vol 8276. Springer, Cham. https://doi.org/10.1007/978-3-319-03176-7_46
[5] C. J. Behr, A. Kumar, and G. P. Hancke, “A smart helmet for air quality and hazardous event detection for the mining industry,” Proc. IEEE Int. Conf. Ind. Technol., vol. 2016- May, pp. 2026-2031, 2016

[6] . Jung, H. S. Shin, and W. Y. Chung,"Highly sensitive driver health condition monitoring system using nonintrusive S. J. Jung, H. S. Shin, and W. Y. Chung, "Highly sensitive driver health condition monitoring system using nonintrusive active electrodes," Sensors Actuators, B Chem., vol. 171- 172, pp.691-698, 2012.
[7] https://wolles-elektronikkiste.de/wp-content/uploads/2019/07/UNO_2.jpg
[8] https://microcontrollerslab.com/wp-content/uploads/2021/03/SW-420-Vibration-Sensor-Module.jpg
[9] Yellamma Pachipala1, Tumma Srinivas Rao2, G Siva Nageswara Rao3, D Baburao4," An IoT Based Automatic Accident Detection and Tracking System for Emergency Services", Jour of Adv Research in Dynamical & Control Systems, Vol.12, Issue.02,2020, PP:111117, DOI:10.5373/JARDCS/V12I2/S202 01001 3
[10] https://geekelectronics.io/wp-content/uploads/2017/08/gsm-2.jpg
[11] https://5.imimg.com/data5/SELLER/Default/2020/11/IM/GK/QV/15458098/gps-module-neo-6mv2-1000x1000.jpg



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY