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LOW POWER SMART VEHICLE ACCIDENT DETECTION AND MONITORING, COLLISION AVOIDANCE AND ANTITHEFT SYSTEM

M. Siva Senker[1], D. Sai Teja[2], U. Manoj Kumar[3], D. Chakradhar[4], D. Murthujavali[5]

[1]Assistant Professor, Department of EEE, Santhiram Engineering College, Nandyal, A.P, India.

[2,3,4,5]UG Student Scholar, Department of EEE, Santhiram Engineering College, Nandyal, A.P, India.

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ABSTRACT

This project presents as the world's population rises, transit improvements are made, leading to more and more serious accidents. Inadequate crisis management is a major killer. Therefore, our project's objective is to aid individuals who have just suffered a disaster right away. In the event of an automobile accident, the accelerometer instantly relays any deviations to the ARDUINO UNO, which subsequently relays the alarm message via the Internet of Things (IOT) to a list of preselected emergency contacts. The driver may turn off the alert by pushing a button if the situation does not pose an immediate danger to their lives. In addition to laying the groundwork for future growth, this effort includes a broad variety of applications, such as alcohol recognition and sleep discoveries.

1. INTRODUCTION

The primary function of vehicle tracking systems is to reliably identify the position and state of the tracked vehicle. & also Rising vehicle ownership rates have been linked to an uptick in both traffic and accidents. This is due to the fact that our country does not have enough cutting-edge emergency care facilities. This system's layout facilitates the rapid detection of accidents and the transmission of vital information to a first aid station, such as the incident's precise coordinates, date and time, and directional information.

The rescue crew will get this life-saving information quickly, increasing the likelihood that lives will be saved. Combinations of methods, such wireless networking, geographical repositioning, and in-device software, are often used in such systems. The project's goal is to set up a communication system between the control room and the mobile units. Vehicles may be tracked in real time via cellular networks thanks to GPS and GSM tracking devices put in each vehicle. The waveform from the vibration sensor will be monitored by the microcontroller's software, which will then utilise that data to manage the device's various features. In the event of an accident, the GPS coordinates of the gadget will be communicated in a message over the GSM network to the control centre. It's a thorough and efficient answer to the problem of inadequate emergency response. The reporting system can automatically identify traffic accidents, locate them, and provide essential information to the responding authority. To remove unnecessary information, the server will execute a command function[1].

2. LITERATURE SURVEY

Sure, conducting a literature survey for projects like low-power smart vehicle accident detection, collision avoidance, and anti-theft systems involves:[2]

Gathering research papers, articles, and patents related to these topics. You'll want to explore recent advancements in sensor technology, machine learning algorithms for collision detection and avoidance, low-power computing platforms, and security mechanisms for anti-theft systems. Look into academic databases like IEEE Xplore, Google Scholar, and ACM Digital Library, as well as relevant industry publications and conference proceedings. Pay attention to key metrics like accuracy, power consumption, and real-world feasibility in the papers you find.

3. EXISTIG SYSTEM

Our group has included GPS technology to track the exact position of any automobile accidents to save unnecessary casualties. In the past, locating an accident site required relying only on visual indications.[2]

4. PROPOSED SYSTEM

The main goal of vehicle tracking systems is to accurately determine the vehicle's location and status. & also Increases in both traffic congestion and automobile accidents have been blamed on the growing popularity of car ownership. As well as keeping us safe from hazards like vehicle fires and smoke, this is essential given our lack of access to top-notch medical care back home.

The design of this system expedites the identification of accidents and the transfer of critical data to a first aid centre, such as the location, time, and direction from which an incident occurred. This critical message will reach the rescue team in a short period of time, improving the chances that lives will be saved. Such systems often make use of a combination of techniques, including wireless networking, geolocation services, and in-device software. The purpose

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of the project is to establish a network between the command centre and the automobile units. GPS tracking devices installed in automobiles will allow their whereabouts to be monitored in real time via cellular networks. The embedded software of the gadget will govern its numerous operations via waveform monitoring.[3]

5. BLOCK DIAGRAM

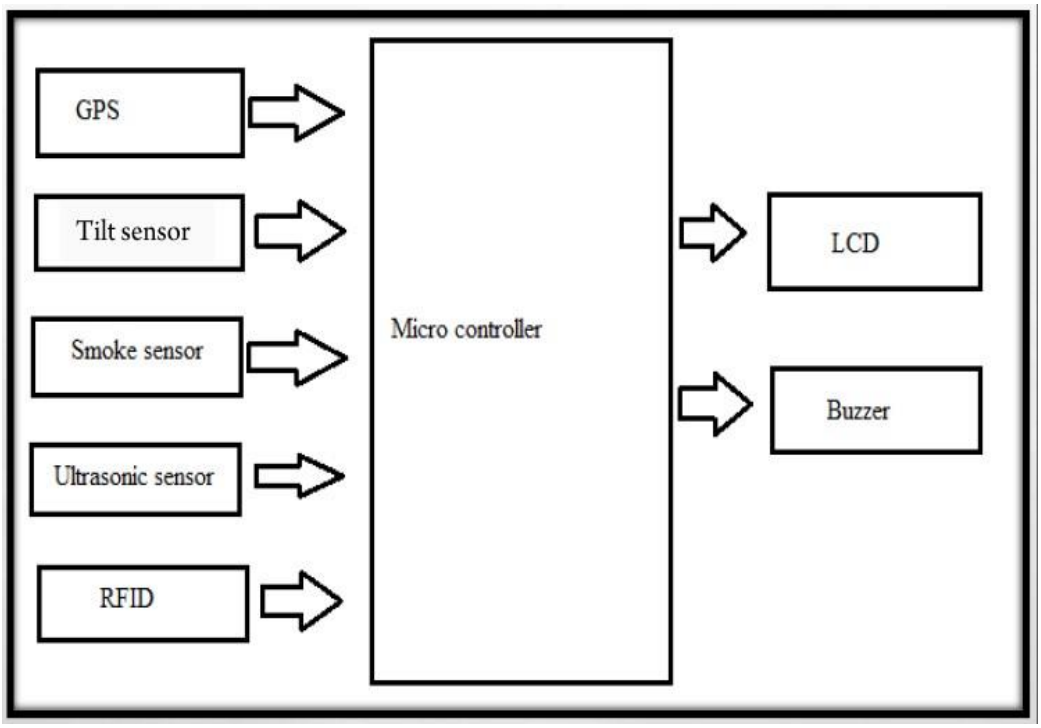

Fig: 1 block diagram

SOFTWARE REQUIREMENTS

1. ARDUINO UNO IDE
2. Embedded C, C++

6. HARDWARE REQUIREMENTS

- GPS
- Tilt Sensor
- Smoke Sensor
- Ultrasonic Sensor
- Buzzer
- RFID

6.1 GPS

Fig:2 gps tracker

GPS Module. NEO-6M GPS Receiver Module. Global Positioning System (GPS) makes use of signals sent by satellites in space and ground stations on Earth to accurately determine its position on Earth. The NEO-6M GPS receiver module uses USART communication to communicate with microcontroller or PC terminal.[7]

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6.2 Tilt Sensor

A tilt sensor, or tilt switch, is a device used for measuring the tilt of an object in multiple axes with reference to an absolute level plane. ... Tilt sensors work by detecting changes in angle from a pre-set “zero” state.[4]

Fig:3: tilt semsor

6.3 Smoke sensor

These are the most common type of detector, and are usually significantly more expensive than single-station battery-operated residential smoke alarms. They are used in most commercial and industrial facilities and other places such as ships and trains, but are also part of some security alarm systems in homes.[8]

Fig4: smoke sensor

6.4 Ultrasonic sensor

The HC-SR04 ultrasonic sensor uses SONAR to determine the distance of an object just like the bats do. It offers excellent non-contact range detection with high accuracy and stable readings in an easy-to-use package from 2 cm to 400 cm or 1” to 13 feet.[7]

The operation is not affected by sunlight or black material, although acoustically, soft materials like cloth can be difficult to detect. It comes complete with ultrasonic transmitter and receiver module.[8]

Fig5; ultrasonic sensor

6.5 Buzzer

The module can be connected to digital outputs to emits a tone when the output is digital and a veriety of tones and effects using an analog pulse – width modulation output[11]

6.6 RFID

An RFID system consists of two main components, a transponder or a tag which is located on the object that we want to be identified, and a transceiver or a reader. The RFID reader consist of a radio frequency module, a control unit and an antenna coil which generates high frequency electromagnetic field.[7]

Fig:6 rfid cards

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7. RESULTS

- If accident causes then tilt sensor activates , immediate case motor stops and gives buzzing sound.
- Any smoke occurs in the vehicle automatically smoke sensor activates and stops the car and also intimates by using buzzer (buzzing sound).
- If any vehicle comes close immediately ultara sonic sensor activates and intimates by using buzzer
- To start the car we need owner permission (RFID CARD scan requires).[1]

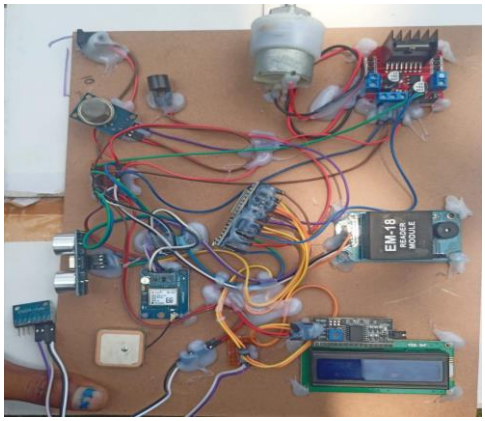

Fig:7 entire project

Fig:8 acces granted after rfid scan and accident detection

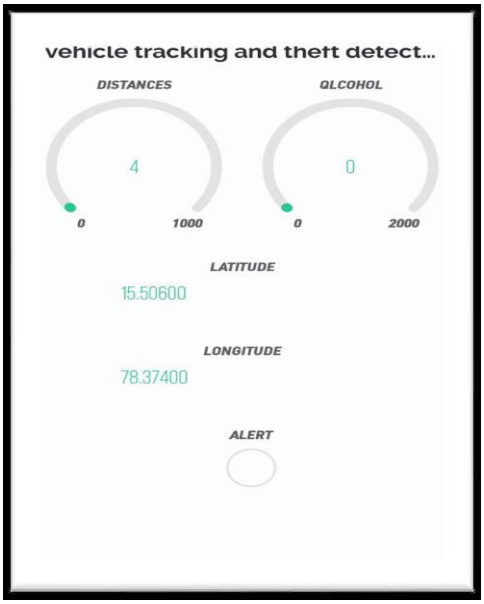

Fig: 9 blink app reading in smart phone

8. CONCLUSION

Proponents of the idea argue that the increasing rate of accidents in today's fast-paced society is mostly attributable to the rapid development of technology and automobiles. The high death toll is exacerbated by the absence of crisis governments. That's why this initiative's primary objective is to speed up the delivery of emergency services to individuals who need them after a disaster. When an accident happens, the accelerometer sends a signal to the ARDUINO UNO, which then uses the GSM MODULE to send an alert message via SMS to pre-stored emergency contacts, including the precise position as identified by the GPS MODULE. In the event that the collision was minor, the driver may silence the warning by pushing a button. Various uses are discussed in this article, ranging from disaster relief to the detection of alcohol and sleep.

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