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Car Accident Detection and Messaging System Using GPS and GSM Module

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ABSTRACT: In this project we are going to install two features that is GPS tracking and secondly the accident detection and alert system. Currently most of the public having their own vehicle, theft is happening on parking and sometimes driving insecurity places. The safety of vehicles is extremely essential for public vehicles. Vehicle tracking is installed in the vehicle, to track the place and locking engine motor. The place of the vehicle is identified using Global Positioning system (GPS) and Global system mobile communication (GSM). These systems constantly watch a moving vehicle and report the status on demand. When the theft is identified, the responsible person sends SMS to the microcontroller, then microcontroller issue the control signals to stop the engine motor. Authorized person needs to send the password to controller to restart the vehicle. This is more secured, reliable and low cost. Every day, numerous people die all over the world because of traffic accidents occurring along road. The main reason for these accident deaths is the lack of information of the upcoming hindrances on the road and the delay in the arrival of rescue team at the accident point due to their unknown position. An efficient approach to reduce traffic deaths and injuries is to alarm the driver about hindrances on the roadway that can be the reason for mischance, prior and if there is an occurrence of the mishap event, find the mischance spot and give therapeutic help to them as early as possible. The target of this project is to give a brief review on several methodologies that has been given for road accident avoidance and detection of accident based on various parameters and provide medical help. The main intention of this project is to find the accident spot at any place and intimating it to ambulance through the GPS and GSM networks. The GPS based vehicle accident identification module contains MEMS, GSM module and a GPS modem connected to the microcontroller. Global System for Mobiles (GSM) technology is used to establish cellular connection. GPS is used to trace the position of the vehicle.

KEYWORDS -: Arduino Nano, GPS Module, GSM Module, Tilt Sensor

I. INTRODUCTION

In the twentieth century, the number of vehicles exponentially increases due to growth in the automobile industry. As the number of vehicles increases, the accident also increases. The reason of most of the road accidents are mixed traffic and lack of traffic separation. According to World Health Organization (WHO), India is the leading country in the road accident death. In India, 13 million peoples were dead in road accident in the years. These statistics are reported accidental records but there are numbers of accident, which are unreported. Hence, the numbers of actual accident are more than the statistic of WHO. The existing system mostly focuses on the safety of the travelers but not on the immediate help after accident. India has earned the doubtful distinction of having a greater number of death due to road accident in the world. Road safety is emerging as a major social concern around the world especially in India. The system utensil by us aims at automatically detecting an accident and alerting the nearest hospital or medical services about the exact location of the accident.

This system sends the basic information to the medical rescue team within a few seconds of an accident. This device can detect accidents and sends an alert message to rescue teams in significantly less time which will help in saving the lives of the people. The alert message contains the geographical coordinates, time and angle in which the accident has occurred. When an accident occurs, it is detected with help of a sensor which activates the device,



the sensor gives its output to the microcontroller. The microcontroller sends the alert. We have used GPS and GSM module for our project. GPS is a satellite navigation system used to determine the ground position

II. REVIEW OF LITERATURE

In countries where the economic status is poor, it become essential for In countries where the economic status is poor, it becomes crucial for those concerned with developmental policies to adopt appropriate strategies which will ensure that every single unit of money available is used to develop the country in those fields to facilitate a conducive environment for economic development. Road traffic accidents have been recognized as one of the adverse elements which contribute to the suffocation of economic growth in the developing countries, due to the high cost related to them, hence causing social and economic concern. So, Traffic safety is an important key and plays an integral role in sustainable transportation development. Now days, the main negative impacts of modern road transportation systems are injuries and deaths in road accidents. The success of traffic safety and highway improvement programs hinges on the analysis of accurate and reliable traffic accident data. This study discusses the present state of traffic accident information on NH 47 Gandhipuram to Avinashi and NH-209 from Gandhipuram to Annur, Coimbatore District. It shall also discuss the Identification of high rate accident Locations by using GIS Software and safety deficient areas on the highway. Remedial measures and provisions for traffic safety are suggested for reducing the risk of accidents in black spots. Citation classics offer an outlook on those papers that have attracted great and historical interest by a research community and that could be also considered the basis of the research field.

III. METHODOLOGY DETAILING THE ACTIVITIES AND SUBACTIVITIES

In countries where the economic status is poor, it become essential for In countries where the economic status is poor, it becomes crucial for those concerned with developmental policies to adopt appropriate strategies which will ensure that every single unit of money available is used to develop the country in those fields to facilitate a conducive environment for economic development. Road traffic accidents have been recognized as one of the adverse elements which contribute to the suffocation of economic growth in the developing countries, due to the high cost related to them, hence causing social and economic concern. So, Traffic safety is an important key and plays an integral role in sustainable transportation development. Now days, the main negative impacts of modern road transportation.

3.1 Waterfall Model of Methodology

This project has been completed by following strategy, which is given below:

3.2 Description of Methodology

- Project Planning:

We seek for some problems in our real life. Then we found this problem and planned to solve the problem.

- Gather Information:

We read some research papers related to accident detection problem. We search on the internet to find solutions.

- Requirement Analysis:

We use Arduino Uno, GPS, GSM, Accelerometer, ultrasonic sensor, LCD Display, transformer, voltage regulator IC, Buzzer, Vero board, capacitor, Diode, resistor, etc.

- Learn Required Skill:

To complete the project, we learned C++ language, Arduino Uno language, hardware connection.

- Design and Development:

We developed a device which the system communicates with the web server through GPS communication via a GSM. It will send the vehicle location's latitude and longitude data to the web server upon user request or after detection of the accident.



- **Testing and Debugging:**
Final module testing aims to demonstrate correctness, whereas testing during debugging is primarily aimed at locating errors.
- **Maintenance:**
Hardware project maintenance presents the full scope and understanding how to function should operate and be managed in an implementation area. Actions necessary for retaining or restoring a piece of equipment, machine, or system to the specified operable condition to achieve its

V. HARDWARE DESCRIPTION

Opening their eyes or remain conscious for in excess of a couple of minutes. Patient can't talk on account of the breathing cylinder.

At the point when patient is alert enough to open their eyes and move, they can impart recorded as a hard copy. Quiet on ventilators have numerous wires and cylinders on them there may be sensors and other devices that are put on the patient's body like here oximeter to measure BPM(blood pressure).We use max 30100 sensor to monitor the blood pressure and SP02 level in patients' blood and body. That may look unnerving; however, these wires and cylinders help the specialists to painstakingly screen them. Some patients may have limitations on them. These are utilized to keep them from pulling off any significant cylinders and wires. Patients are put on ventilators when they can't inhale alone and require the external device for proper and easier breathing. This might be for any of the accompanying reasons: To ensure that the patient is getting enough oxygen and is disposing of carbon dioxide.

- After medical procedure, the patient may require a ventilator to inhale since they may have been given a few meds that reason themlethargic and their breathing has not come back to typical or as natural.
- A patient has a sickness or damage and can't inhale ordinarily. More often than not, a ventilator is required distinctly for a brief span like hours, days, or weeks. Be that as it may, at times, the ventilator is utilized for a considerable length of time, or now and then years. In the emergency clinic, an individual on a ventilator is observed intermittently by medicinal services suppliers including specialists, attendants, and respiratory advisors. Patients who need ventilators for extensive stretches may remain in long haul care offices. A few patients with tracheostomy might almost certainly be at home if duration of ventilator is required for long duration. Tolerant on a ventilator are watched cautiously for lung diseases. At the point when associated with a ventilator, a patient gets an opportunity of hacking out bodily fluid. In the event that bodily fluid gathers, the lungs can't get enough oxygen. The bodily fluid can likewise prompt pneumonia in patient. To dispose of bodily fluid, the method called suctioning is required. This is finished by bringing a little slender cylinder into the patient's mouth or neck opening to vacuum out the bodily fluid. The block diagram of theventilator is shown in Figure.1.

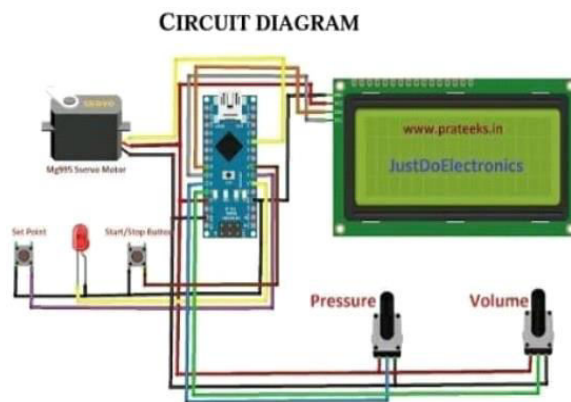


Figure 1. Circuit diagram of ventillator.



3.1 ARDUINO NANO



Fig 1 :- Arduino Nano

Arduino Nano is one type of microcontroller board, and it is designed by Arduino.cc. It can be built with a microcontroller like Atmega328. This microcontroller is also used in Arduino UNO. It is a small size board and also flexible with a wide variety of applications. Other Arduino boards mainly include Arduino Mega, Arduino Pro Mini, Arduino UNO, Arduino YUN, Arduino Lilypad, Arduino Leonardo, and Arduino Due. And other development boards are AVR Development Board, PIC Development Board, Raspberry Pi, Intel Edison, MSP430 Launchpad, and ESP32 board. This board has many functions and features like an Arduino Duemilanove board. However, this Nano board is different in packaging. It doesn't have any DC jack so that the power supply can be given using a small USB port otherwise straightly connected to the pins like VCC & GND. This board can be supplied with 6 to 20volts using a mini USB port on the board.

Arduino Nano Features

The features of an Arduino nano mainly include the following.

- ATmega328P Microcontroller is from 8-bit AVR family
- Operating voltage is 5V
- Input voltage (V_{in}) is 7V to 12V
- Input/Output Pins are 22
- Analog i/p pins are 6 from A0 to A5
- Digital pins are 14
- Power consumption is 19 mA
- I/O pins DC Current is 40 mA
- Flash memory is 32 KB
- SRAM is 2 KB
- EEPROM is 1 KB
- CLK speed is 16 MHz
- Weight-7g
- Size of the printed circuit board is 18 X 45mm
- Supports three communications like SPI, IIC, & USART



3.2.GPS Module:

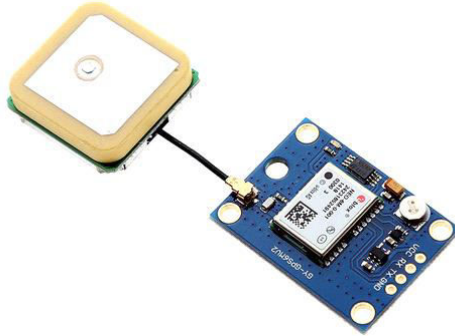


Fig 2- GPS Module

GPS stands for Global Positioning System and is used to detect the latitude and longitude of any location on the earth, with the exact UTC time. GPS module is used in our project to track the location of the accident. This device receives the coordinates from the satellite for each and every second, with time and date. In our project, we have used GPS module SKG13BL, which is a Ultra High Sensitivity and Low Power GPS Receiver Module

3.3.GSM MODULE:



Fig 2:- GSM module

GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries

3.4 Tilt Sensor :

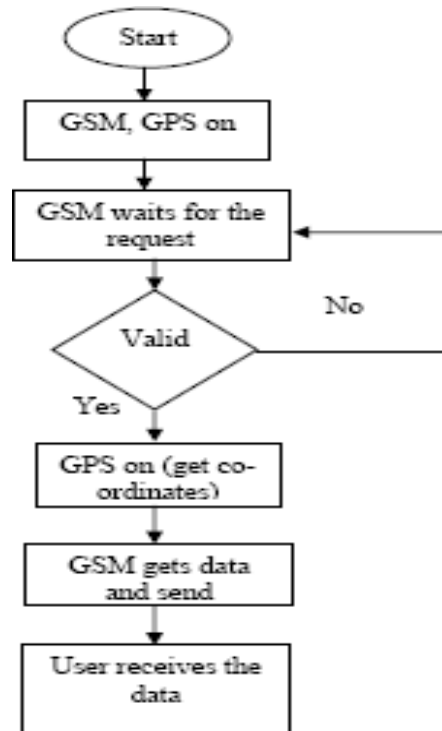
Inclinometers, also called tilt sensors, measure the slope or angle or tilt of objects based on gravity in various applications.

TILT SENSOR MODULE is a device used for knowing the planar movement. Although they are available in various types their basic function remains the same. Their function is to detect the plane shift from horizontal to vertical and sent of a signal when it happen.



fig : Tilt Sensor

FLOWCHART



Message received by the specified phone number

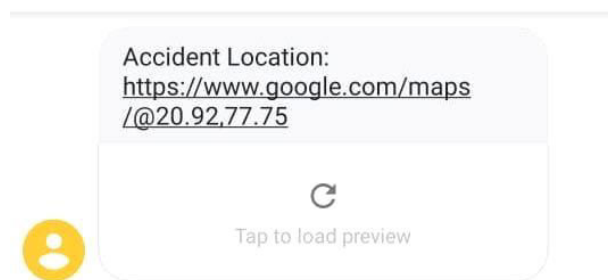


Fig. : Message received by the specified phone number

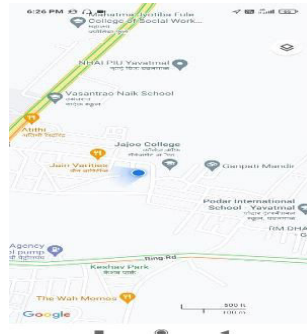


Fig.7 : Location of the accident sent via Google Map

ADVANTAGES

- The vehicle tracking device or unit working along with a central server and a software, which let the user or owner of a car to know the where about of his own vehicle, surely comes with several benefits.
- The GPS and GSM installed inside the vehicle fetches its location information and send it to owner on regular intervals according to user’s preferences, in order to remain up to- date all the time.
- As all the relevant information is displayed on the screen, it is very convenient for the user to monitor and take any actions in case of an emergency.
- The vehicle tracking system plays a vital role if it is used in any companies or organization for any kind of delivery purposes.
- Since the driver is being aware of the fact that the car is constantly being monitored so one would be careful while driving and take shortest possible route to reach destination right on time .
- Another advantage of this project is to find the accident spot at any place and intimating it to ambulance through the GPS and GSM networks.

APPLICATION

- Automatic engine locking system can be used to reduce the probability of vehicle robbery .
- The important application of the system to alert the nearby medical services about the accident so as to provided immediate medical aid.
- The GPS tracking unit provide exact location and can track movement of vehicle ,which mean you can use the system to track the routes of the vehicle

IV. CONCLUSION

Our designed system provides low power consumption, simple architecture and cost-effective. In our project we have developed a vehicle tracking system that is flexible, customizable and accurate. The GSM modem was configured and we tested and implemented the tracking system to monitor the vehicles location via SMS and online on Google map. To display the position on Google map we have used Google map API. The Arduino is the brain of the system and the



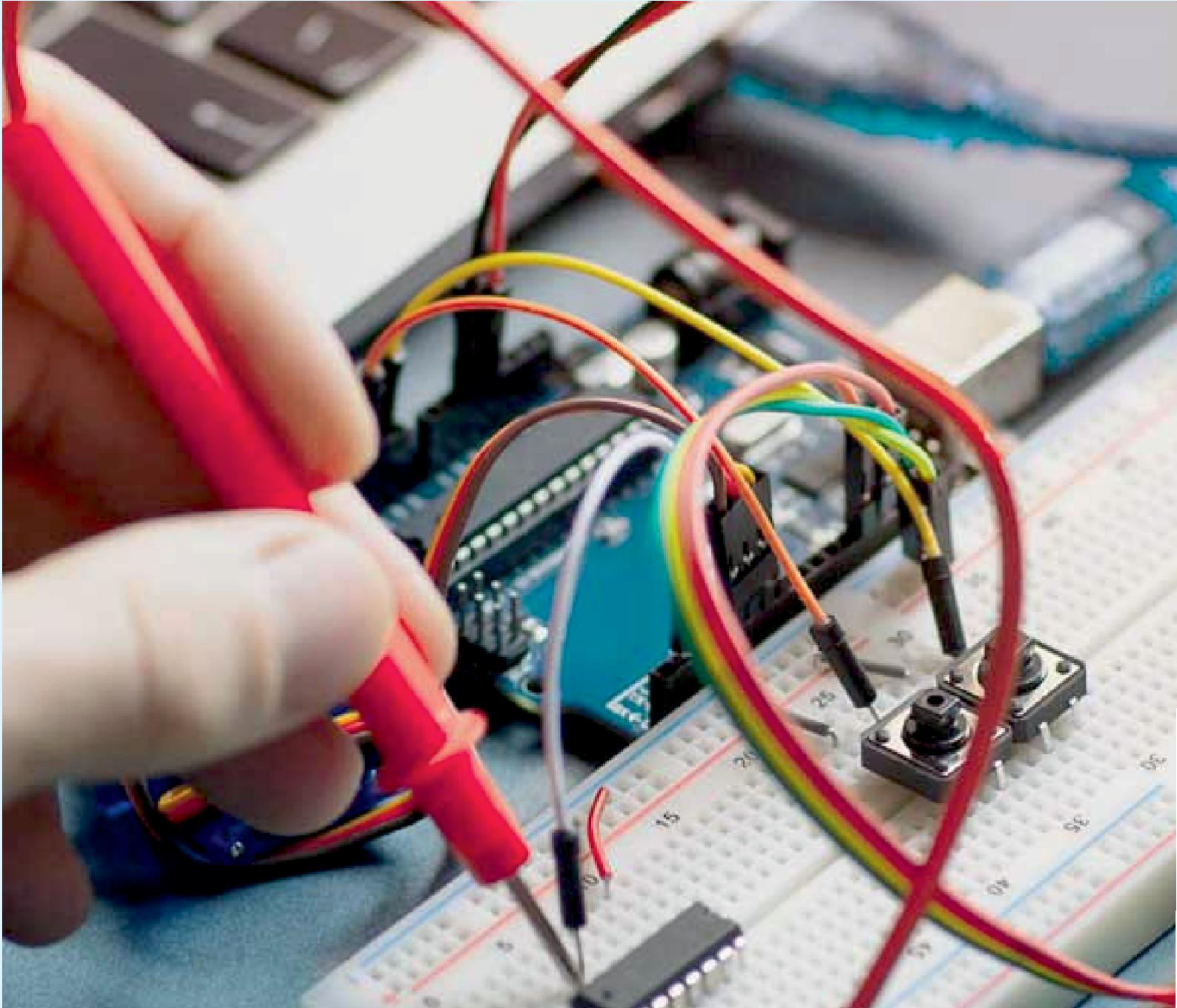
GSM modem is controlled by AT commands that enable data transmission over GSM network while the GPS provide the location data. Whenever the GPS receives a new data it is updated in the database and hence we are able to see the location on the Google map. Our device can provide good control on car tracking. The system provides accurate data in real time that makes it possible for the user to track the vehicle and it also enable an early retrieval if the car is stolen. There can be various other applications that can be built over our existing platform. Hence, we have designed our system in such a way that upgrading this system is very easy which makes it open for future requirement without the need of rebuilding everything from scratch, which makes our system even more efficient. This project has widely increased our knowledge of GPS and also improved our programming skills. We have also ensured the reliability of our system through various field tests that we have done during our project and the initial results that we obtained through our prototype are very promising. This makes our project complete, robust and we can even think of commercialization of this system in future.

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