GPS Tracking, Engine Locking and Accident Detection System of Vehicle

Mr. Vaibhav Gawande, Miss. Ishika Kodgule, Miss.Yukta Mahure, Mr. Shashank Nandanwar
Miss. Shivani Pingale, Miss. Renuka Daighvane
Student, Dept. Of Electronic and Telecommunication, Datta Meghe Institute of Engineering,
Technology & Research Wardha, Maharashtra, India.

1.Abstract :

The paper on GPS tracking, engine locking and accident detection system is based on the security of vehicle and safety vehicle owner. In this project we are going to install two features that is GPS tracking and engine locking system with the addition of the accident detection and alert system. Currently most of the public having their own vehicle, theft is happening on parking and in insecure places. The safety of vehicles is extremely essential for public vehicles as well as the safety of user is also important. Keeping the vehicle secure and safe is one of the priority factor and objective of this paper, with the addition of accident detection system. In future this paper will be used everywhere, where require using digital technology. This system very efficient and low cost.

2. INTRODUCTION :

Day by day the theft of the vehicle is increasing so the security of vehicle is very important . As we know that to track our vehicle location and to stop the vehicle anytime is not possible so we made a device which can track the vehicle location whenever we want with the help of message on our smart phone . We are designing this system to improve the security of our vehicle. In that way, we are going to make our Anti-Theft Vehicle Security System for two wheelers[1]. This system is very useful for security of vehicle. This vehicle tracking system found in user vehicles as a theft prevention and rescue device. If the theft identified by the user then user have to send "STOP" massage to the microcontroller then microcontroller send the necessary signals to stop the engine. After switch off the engine, motor cannot restart without permission of password[3]. When a user is sent "FIND" massage to the system, then system automatically sends a return reply to that registered mobile number , indicating the position of the vehicle in terms of latitude and
longitude. A Program has been developed which is used to locate the exact position of the vehicle and also to navigate track of the moving vehicle on Google Map.

According to survey of Government of India, most of the people lost their lives in road
accidents, where 8 % of lives could have been saved if they would have got medical treatment before-hand [2]. This can be achieved by identifying the accident. Now-a-days, it became very difficult to know that an accident has occurred and to locate the position where it has happened[4]. There is no system for identification and finding the location of an accident. When an accident occurs the information only is sent through GSM but there is no possibility to locate the spot . This Project presents an automotive localization system using GPS and GSM- SMS services that provide the exact location . And through the accident detection system we can identify the vehicle is in accident or not.

3. METHODOLOGY :
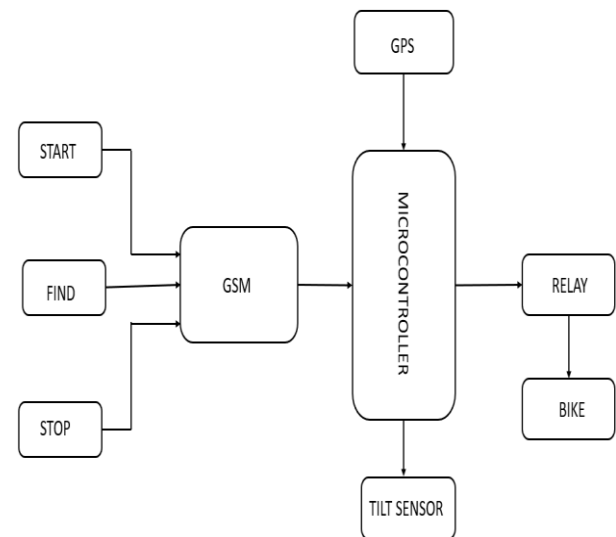
3.1 Block Diagram & Description :

Fig 3.1 Block Diagram of GPS Tracking, Engine locking And Accident Detection System

This is the block diagram consisting Arduino Nano, GSM, GPS, Tilt Sensor and Relay. Arduino is a main block interfacing the GSM, GPS, Tilt sensor and Relay. Whenever we start the vehicle then the vehicle gives the power supply to system. After providing power supply to system Arduino Nano, GSM, GPS and Tilt Sensor are also starts. If the theft is identified by the user, then user have to send "STOP" massage to the GSM. As soon as the microcontroller receives the massage from GSM, the microcontroller send control signal to relay circuit to stop the running vehicle. To find the location of vehicle, the user have to send "FIND" massage to the GSM. When the microcontroller receive massage form the GSM then Arduino receive location of vehicle from GPS and send it to the GSM in the form of latitude and longitude. As soon as the GSM receive massage from the microcontroller then it resends that massage containing location of the vehicle on registered mobile number. If the accident is happened then the tilt sensor will sense the accident. The tilt sensor send signal to the Arduino. And get the location of the vehicle form GPS and send it to

the GSM. Then the GSM sends the massage to the registered mobile number which containing "Your vehicle is in accident" and location of the vehicle. In this way we can track the location of vehicle and protect our vehicle form theft as well as we can detect if vehicle is having accident or not.

4. HARDWARE MODULE :

4.1 Arduino Nano :

The **Arduino Nano** is a small Arduino board based on **ATmega328P** or ATmega628 Microcontroller. The connectivity is the same as the Arduino UNO board. The Nano board is defined as a sustainable, small, consistent, and flexible microcontroller board. It is small in size compared to the UNO board. The Arduino

Nano is organized using the Arduino (IDE), which can run on various platforms. Here, IDE stands for Integrated Development Environment. The devices required to start our projects using the Arduino Nano board are Arduino IDE and mini USB. The Arduino IDE software must be installed on our respected laptop or desktop. The mini USB transfers the code from the computer to the Arduino Nano board.

4.2 GPS Module :

GPS chips and modules provide users with instantaneous location and time data anywhere on Earth. The Global Positioning System (GPS) is navigation system which provides exact location and time information to any GPS receiver. The system is freely available to anyone with a GPS receiver and unobstructed line of sight to at least four of GPS satellites. A GPS receiver calculates its position by precisely timing the signals sent by GPS satellites. GPS is nowadays widely used everywhere

4.3 GSM module :

GSM stand for Global System for Mobile Communication .The SIM800L is a GSM module from Simcom that gives any microcontroller Global System for Mobile Communication functionality, meaning it can connect to the mobile network to send and receive text messages, and also connect to the internet using GPRS, TCP, or IP. Another advantage is that the board makes use of existing mobile frequencies, which means it can be used anywhere in the world.

4.4 Tilt Sensor :

Tilt sensor module is a device which is used to sense the planar movement. they are available in different types but their working remains the same. The work of the tilt sensor is to detect the plane shift from horizontal to vertical , If the planer position is change then it will send of a signal .

4.5 Relay :

Relay is electrical device, which is work on electromechanical mechanism. That uses an electric current to operate(open and close) the switch. The single-channel relay module is much more efficient than just a plain relay. it is made up of components that make switching and connection easier. Relay is act as indicators to show if the module is powered and if the relay is active or not.

5. SOFTWARE MODULES :

5.1 Arduino IDE :

Arduino IDE is an open-source software, created by Arduino.cc which is mainly used for write, compile & upload the code to Arduino Modules. It is an open source software, making code compilation too easy that even a common person with no prior technical knowledge can easily understand . It connect to the arduino hardware to uplod program and communicate them. It is available for MAC, Windows, Linux.

5.2 Google maps :

Google Maps is a desktop and mobile web mapping service application that provides detailed information about geographical regions and sites around the world. In addition to conventional road maps, Google Maps offers aerial and satellite views of many places. In some cities, Google Maps offers street views comprising photographs taken from vehicles. Google Earth support states that most of the images are no more than 10 years old.
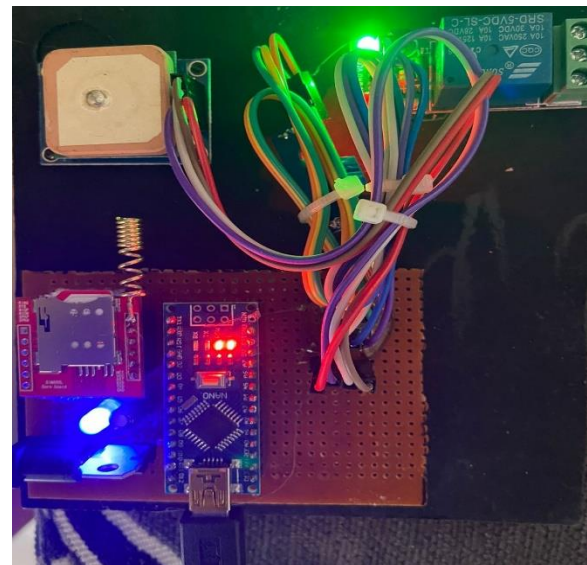
6. RESULT AND DISCUSSION :

Fig. 6.1 : Overall Connection of a GPS Tracking, Engine Locking & Accident Detection System

Whenever theft of the vehicle is occurred then owner have to send "STOP" massage to stop the moving vehicle then the vehicle immediately stops. It can not be start without the owner permission. If owner wants to find the location of vehicle, then he have to send "FIND" massage to device. Then microcontroller send location of the vehicle in the form of latitude and longitude. If an accident of vehicle is occurred then microcontroller send massage containing "Your vehicle is in accident." With location to the registered mobile number.

7. CONCLUSION :

Our system is energy efficient, has a basic architecture and is cost-effective. We built a vehicle tracking and accident detection system that is adaptable, customizable and accurate. We configured the GSM modem, tested and implemented the vehicle tracking system. Which allows us to track the whereabouts via SMS and online on Google Maps. We used Google map API to display the location on a

Google map. The Arduino is the brain and instructions control the GSM modem. Which enables data transmission over the GSM network while the GPS provides location data. Low power consumption, simple architecture, and cost-effectiveness are all features of our system design. We designed a flexible, adjustable, and accurate vehicle tracking and accident detection system for our propose work.

8. REFERENCES :

[1] Pavan R. Shiraskar, Ketan D. Lokhande, Vishal G. Hushange, Harshda M. Bodhe, Kirti B. Nagne "GSM and GPS Vehicle Theft Detection and Tracking Based System " in International Research Journal of Engineering and Technology (IRJET) [12 Dec 2020]

[2] P. Amrith, E. Umamaheswari, R.U. Anitha, Devi Mani, D M Ajay "Smart Detection of Vehicle Accidents using Object Identification Sensors with Artificial Intelligent Systems" in International Research Journal of Engineering and Technology (IRJET) [January 2019]

[3] Jyoti Mahadev Sandur Prof.S.S.Savkare "Intelligent vehicle control in embedded system using GPS and GSM" in International Journal for Scientific Research & Development (IJSRD) [2017]

[4] Sanjivani S. Kadam , Rukhsana G. Sache , Nimisha D. Deval & Rupali M. Shinde "Accident Detection System using MEMS" in Journal of Engineering, Computing and Architecture [2020]

[5] Mayur Pawar, Shivani Wakhare, Amit Yewale, Harsha Gawari "Vehicle Security And Tracking System With Clash Driving Alert" in International Research Journal of Engineering and Technology (IRJET) [1April 2017]

[6] Pankaj Verma and J.S Bhatia: "Design and Development of GPS-GSM based on tracking system with Google map based monitoring", International Journal of Computer Science, Engineering and Applications, Vol.3, Issue. 3, pp. 33-40, [2013].

[7] Ramani, S. Valarmathy, D. N. SuthanthiraVanitha, S. Selvaraju and M. Thiruppathi.R. Thangam, "Vehicle Tracking and Locking System Based on GSM and GPS," I.J. Intelligent Systems and Applications, vol. 09, pp. 89-93,[1 Augest 2013]

[8] P. Fleischer, A. Nelson, R. Sowah and A. Bremang, "Design and development of GPS/GSM based vehicle tracking and alert system for commercial inter-city buses," IEEE 4th International Conference on Adaptive. Science & Technology (ICAST), [October 2012]

[9] M. N. Ramadan, M. A. Al-Khedher and S. A. Al-Kheder, "Intelligent Anti-Theft and Tracking System for Automobile," International Journal of Machine Learning and Computing, vol. 2, no. 1,[February 2012] .