Advanced vehicle security control and accident alert system

Jesline James [1*], S. Vasanthadev Suryakala [2]

[1]Embedded Systems Technology, SRM Institute of Science and Technology, Chennai, India
[2]Electronics and Communication Engineering, SRM Institute of Science and Technology, Chennai, India
*Corresponding Author: 313jeslinjames@gmail.com

Abstract

Vehicles are becoming smarter by the combining of greater power to compute connectivity solutions and the improvement in software visions. In modern vehicles automotive designs are interfaced with these features. This particular design includes keyless entry system and immobilizer system as the main weapons to prevent the vehicle theft. But these type of systems provide or detect the unauthorized access of vehicles to a measurable limit only. These security frameworks have straightforward also, lacking nature. So car burglary has been a persevering issue far and wide and a greater test from the profficient criminals. This paper proposes an aim to design efficient security control for auto theft prevention system by adding notable enhancement features such as a fingerprint system, password and OTP generating system. It is also included with some rationalizing security features like GPS fencing, remote engine cut-off, and conveying location of vehicle as a message using GSM module. These features are implemented with the help of fingerprint recognition module, GPS Receiver, GSM cellular modem. Along with these feature accident detection module is also added.

Index Terms: Vehicle Theft, Accident Detection, Fingerprint Verification, Password and OTP Generating System

1. Introduction

As vehicles become more involved, the vehicle security systems need to be stronger than ever before. Vehicles are becoming smarter by the combining of greater power to compute connectivity solutions and the improvement in software visions. In modern vehicles automotive designs are interfaced with these features. This particular design includes keyless entry system and immobilizer system as the main weapons to prevent the vehicle theft. But these type of systems provide or detect the unauthorized access of vehicles to a measurable limit only. These security frameworks have straightforward also, lacking nature. So car burglary has been a persevering issue far and wide and a greater test from the profficient criminals. This paper proposes an aim to design efficient security control for auto theft prevention system by adding notable enhancement features such as a fingerprint system, password and OTP generating system. [8]. This work provides more security to the vehicles and prevent them from being stolen. Implemented sys-tem contains a microcontroller interfaced in the system along with the modern GSM and GPS technologies .We are able to track the vehicle with the help of GSM and GPS technologies. A vehicle contains numerous gadgets which causes the driver to drive the vehicle in a less demanding way. These gadgets inside and out structures a feature, these are either wellbeing related or security related. The word security identifies with shield the vehicle from harms caused amid the mischances. The term Security identifies with ensure the vehicle from an unapproved individual [4]. Road traffic accidents account for more than 1.25 million deaths worldwide every year and more than two hundred thousand deaths in India alone in 2013, as reported by the World Health Organization [4-5]. The number has constantly been on the rise since 2007 in India. The primary reason for this is the inefficiency of prevailing Emergency Medical Services. So there must be solution to this problem. So

the implemented system provides a comprehensive solution to this problem. This system proposes an idea to design efficient security control for automatic theft prevention system by adding notable features such as a fingerprint based system, password and OTP generating system. It is also combined with some updated security features like GPS fencing, ignition cut-off, and conveying location of vehicle as a message using GSM module. These features can be implemented with the help of fingerprint recognition module, GPS Receiver and GSM cellular modem. Alongside these component mischance location module is likewise added. We begin the methodology by investigating the current system and later we move towards the proposed architecture, describing the different modules in detail and the procedure[9].

1.1 Objectives

The following are the objectives of the Efficient Vehicle Security System.
1)   Fingerprint verification system is implemented.
2)   In addition to that Password and OTP generating syste is also implemented.
3)   Ignition cut-off is the important feature in this System.
4)   This deals with a system which is able to detect accident.

2. Background

2.1 Vehicle Theft

Propel vehicle security framework that utilizations GPS and GSM to avoid burglary and to decide the correct area of vehicle has the element of following the present area of vehicle utilizing GPS framework, there are two sorts of following utilized one is internet following and other is disconnected tracking[7].GSM framework is additionally introduced in the vehicle for sending the data to the

area data from satellites. A novel hostile to burglary control framework for vehicles that tries to keep the burglary of a vehicle makes utilization of an installed chip that has an inductive nearness sensor, which detects the key amid inclusion and sends an instant message to the proprietors versatile expressing that the auto is being gotten to. After that the framework introduce in the auto requests a one of a kind password, which is fundamentally on an electronic gadget which can be utilized at the season of crisis while driving a vehicle .It has implanted the idea of remote correspondence i.e. Zigbee and GSM and numerous different sensors by the assistance of which prompt cause can be conveyed to the individual who has met with a mishap .It utilizes the innovation of Zigbee to guarantee sheltered and sound driving and the capacities like drivers liquor location, vehicle speed moderating and programmed auto bolt with impact location is utilized. The GPS is likewise being utilized here for finding the correct auto area with the goal that it can be found if lost. This innovation incorporates the approach based on the combination of Zigbee, GSM and numerous different modules by the assistance of which quick help can be given to anybody needing it [3].

A GPS vehicle following framework is helpful for armada administrators in checking driving conduct of representatives or guardians checking their high schooler drivers. Besides, this framework can be utilized as a part of burglary counteractive action as a recovery gadget moreover of functioning as a security framework joined with auto alerts. The primary commitment of this examination is giving two kinds of end client applications, a web application and a versatile application. Along these lines this framework gives a pervasive vehicle following framework with most extreme openness for the client whenever and anyplace. The framework's following administrations incorporates procuring the area and ground speed of a given vehicle in the current minute or on any past date. It likewise screens the vehicle by setting speed and topographical points of confinement and in this way accepting SMS alarms when the vehicle surpasses these predefined limits.[1] In a framework that naturally take photographs of driver and contrasts his or her face and database to check regardless of whether he is a confirmed driver or not. He can have access to the vehicle just in the event that he is a validated driver. In the event that he isn't a confirmed driver an alert rings and electrical associations are not initiated. Face location and face regognition continuously are the innovations utilized here. As the photographs are taken continuously, a few issues like unequal enlightenment what's more, changes out of sight may influence the framework. We can defeat this issue by utilizing DCT standardization furthermore, foundation cancelation calculations that are consolidated alongside essential face identification and face acknowledgment calculation gives greater security [1] to the vehicles system contains single-board implanted framework which is furnished with worldwide framework for portable (GSM) and worldwide situating frame-work (GPS) along with a microcontroller introduced in the vehicle. The utilization of GSM what's more, GPS innovations enables the framework to track the protest what's more, gives the most cutting-edge data about on-going trips.

To abstain from taking and to give greater security to the vehicles. The actualized framework contains single-board inserted framework which is furnished with worldwide frame-work for portable (GSM) and worldwide situating framework (GPS) alongside a microcontroller introduced in the vehicle. The utilization of GSM and GPS advances enables the frame-work to track the protest and gives the most breakthrough data about on-going outings. The unique mark check is done in the actualized framework to guarantee the driving of right individual. The executed framework is extremely basic with more prominent security for vehicle anti-theft assurance and minimal effort method contrasted with others[2]. A few frame-works mostly centers around a strategy to give well being all through the auto and in addition security. The wellbeing can be given by utilizing a mix of Bluetooth module, sensors also, camera for staying away from the event of crash too as a mishap control unit has been

proposed to give the data to the Police and also the Driver himself. The security to the auto can be given by picture preparing as a unique mark ID framework utilizing MATLAB[4].

2.2 Accident Detection

Give a chance to consider the most pertinent factors that can portray the seriousness of the mishaps (factors, for example, vehicle speed, vehicle location, accelerometer condition) by utilizing inserted frameworks. This framework comprises of a few remote organize gadgets, for example, Global Positioning System (GPS) and ZigBee. GPS decide the area of the vehicle. The framework contains a solitary board inserted framework that is prepared with GPS and ZigBee, alongside microcontroller which is introduced in the OBU vehicle. In light of vehicle movement, report is created and to be taken by crisis administrations [5]. Whenever the in vehicle mishap recognition module reports a mischance, the primary server naturally dispatches the closest emergency vehicle to the mishap spot.

To reach the location quickly and safely the ambulance driver is being assisted by an android application. Automation of accident detection and ambulance dispatch, along with pro-viding guidance to the ambulance driver, is achieved here. This can save precious time and help standardize the whole process. To distinguish conceivable impact and to counteract it, an effective usage of security framework for the moving vehicles utilizing SMS ready framework is utilized. The framework employments microcontroller which makes it one of a kind similar to the different frameworks. The parts utilized as a part of the proposed work are related with recognizing the mischance, sparing the telephone numbers, sending the SMS. The implanted framework encased with the parts is fit inside the vehicle for mischance identification [6].

3. Methodology

This project Efficient Vehicle Security System and Accident Detection System provides a method to prevent vehicle from theft with high security. In automobile field, the security and theft prevention are one of the main reason in current scenario. A modern vehicle has been using a key fob from last decade to arm and disarm the vehicle. But this system is not more secure. Here a fingerprint regognition module along with a keypad for entering the password and OTP generating system is used to by the user to start the vehicle. This serves as a security for the owners. An engine cut-off process is done whenever theft occurs. GSM and GPS technologies are used for this in order to give information about the vehicle position and theft to the owner. A PIC microcontroller is used to control all the operations.

This also provides a secure method to prevent the vehicle theft. In this project, a fingerprint regognition module is used to identify the fingerprint of the owner. This serves as a password for the engine start. The fingerprint is set in the program and the user can use that for starting the vehicle. If the fingerprint with the set fingerprint, then only the vehicle gets started. Otherwise, the LCD display shows that the access to the vehicle is unauthorised. Along with the fingerprint regognition module a password and OTP generating system is also used. To enter and reset the password, a keypad is provided. The user can reset the password at anytime by entering the old password. After entering the password the owner receives an OTP and this generated OTP is entered in the keypad for accessing the vehicle. If the entered OTP does not match with the generated one the LCD displays unauthorized access of the vehicle. If the password set matches with the password entered then only the OTP is generated. If the OTP matches with the generated one then the vehicle relay is ON and the user can access the vehicle. Whenever the vehicle starts, an engine start message will be send to the holder via GSM. If the vehicle is been hacked, the holder can stop the vehicle by sending an OFF message. If he needs to enable the vehicle, he can send an ON message. A GPS receiver is placed in the vehicle, so that the message content

contains the present position of the vehicle. The proposed system consists of an accident detector also to detect the accident and to ensure quick and better assistance for the people getting injured in the accidents.

3.1 Block Diagram

The block diagram of the proposed efficient vehicle security system and accident system is given below which consists of the fingerprint module ,GPS and GSM module and a vibration sensor.
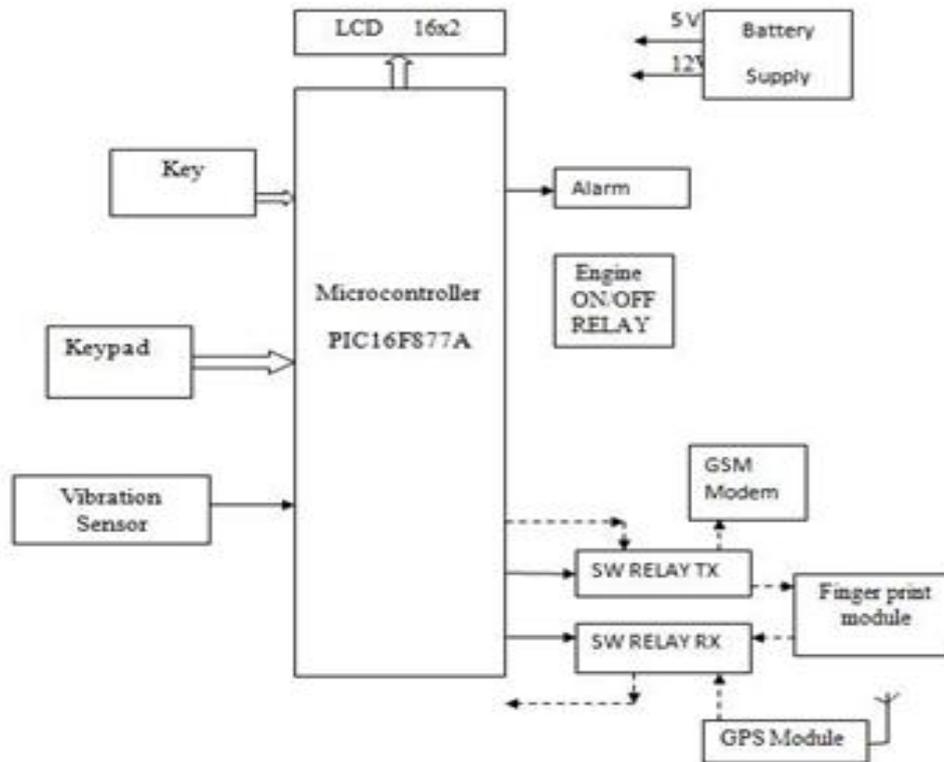
The microcontroller 16F877A is the basic building block of this circuit. A fingerprint regognition module is used to identify the fingerprint of the owner. This serves as a password for the engine start. The fingerprint is set in the program and the user can use that for starting the vehicle. If the fingerprint with the set fingerprint, then only the vehicle gets started. Otherwise, the LCD display shows that the access to the

Fig. 1: Block Diagram of Vehicle Security System

vehicle is unauthorised. Along with the fingerprint regognition module a password and OTP generating system is also used. To enter and reset the password, a keypad is provided. The user can reset the password at anytime by entering the old password. After entering the password the owner receives an OTP and this generated OTP is entered in the keypad for accessing the vehicle. If the entered OTP does not match with the generated one then LCD displays unauthorized access of the vehicle. If the password set matches with the password entered then only the OTP is generated. If the OTP matches with the generated one then the vehicle relay is ON and the user can access the vehicle. Whenever the vehicle starts, an engine start message will be send to the holder via GSM. If the vehicle is been hacked, then the holder can stop the vehicle by sending an OFF message. If he needs to enable the vehicle, he can send an ON message. A GPS receiver is placed in the vehicle, so that the message content contains the present position of the vehicle. This system consists of an accident detector also to detect the accident and to ensure quick and better assistance for the people getting injured in the accidents.

4. Results and Discussion

Programming language used in this project is Embedded C. It is a set of language extensions for the C programming language. It is the soul of the processor functioning inside each and every embedded system. Embedded C language is most frequently used to program the microcontroller. The C code written is more

dependable, ascendable, transferable and much easy to understand. And the results are simulated using proteus software. Ignition cut-off is the important feature in this project, which helps maximum accuracy. The position of the vehicle can be detected using GPS system.GSM module helps the owner for getting information that whether the vehicle is stolen or not. Navigation system can be implemented for getting largest distance positioning of the vehicle

4.1 Implementation of Fingerprint Module

The four cases such as enrolling of fingerprint, identifying fingerprint, deleting, deleting all are carried out and the finger print is verified. If the fingerprint matches with the stored fingerprint then the user can access the vehicle. If the fingerprint does not match with the stored fingerprint then the user cannot access the vehicle. In the fig 2, the LCD displays "UNAUTHORISED ACCESS OF VEHICLE" and in the fig 3, the LCD displays "AUTHORISED ACCESS OF VEHICLE" and then the vehicle relay gets switched ON. The fingerprint is identified and it is being compared with all other elements and we delete the unauthorized and verifies the other one .The fingerprint detection is an efficient form of vehicle security system. If the fingerprint matches with the stored one, then it shows that "fingerprint is verified" .or else it displays "fingerprint not verified".
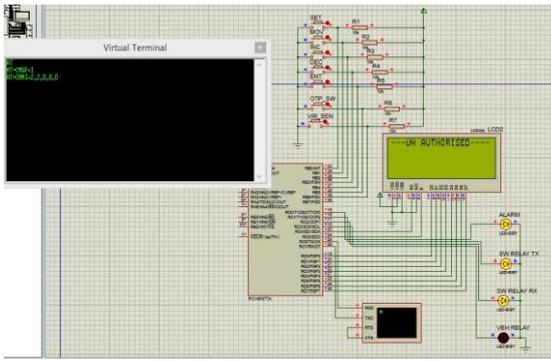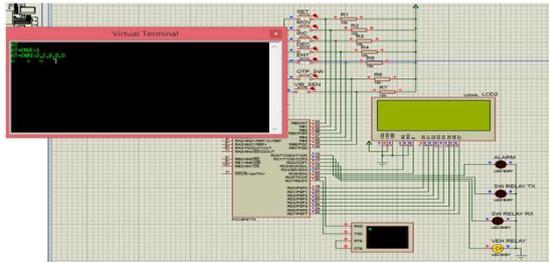
Fig. 2: Unauthorised Access of Vehicle
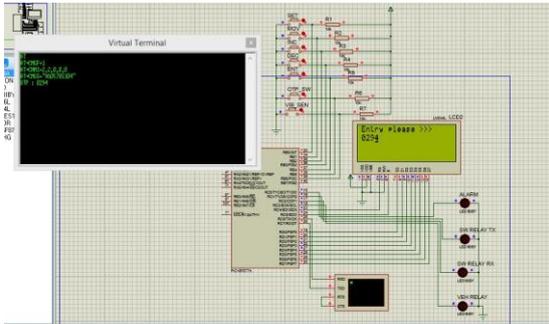

Fig. 3: Authorised Access Of Vehicle

Fig. 4: Entering the OTP

The password entry should match the generated OTP. Then only we can access the vehicle. If the OTP generated matches-then the vehicle can be accessed and automatically the vehicle relay is switched ON. Then the LCD displays "AUTHORISED ACCESS" as the vehicle relay is switched ON. The framework

4.2 Password and OTP Generating System

As an additional feature the password and OTP generation is added to the proposed system of vehicle security. A keypad is present which is used for entering the password. If the entered password matches with the stored password the an OTP is generated in the registered mobile number. After entering the generated OTP as shown in fig 4, a user can access the vehicle. If not the LCD again displays "UNAUTHORISED ACCESS OF VEHICLE" If the password is incorrect then it automatically shows the vehicle security system is UNAUTHORISED.
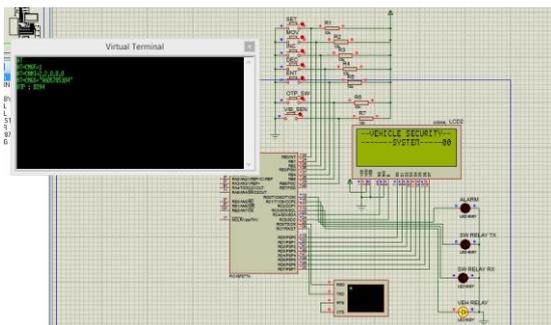

Fig. 5: Authorised Access

Demonstrates to abstain from taking and gives greater security to the vehicles. The executed framework contains single-board installed framework. The utilization of GSM and GPS advances enables the framework to track the question and gives the most exceptional data about on-going excursions. The unique mark confirmation is done in the executed framework to guarantee the driving of approved individual.

5. Conclusion

A fingerprint regognition system, password and OTP gener-ating system and remote ignition cut-off mechanism is used in this project. It is implemented in real vehicle. GSM module is used for conveying information about the vehicle theft to the owner. GPS technology is implemented to restrict the vehicle within the particular area by the owner. Ignition cut-off is used to reduce or cut the ignition when the vehicle gets stolen by the thief or misused by the other person. So the system can also be used for track and monitor the vehicle by the owner at anytime from anywhere. Thus techniques presented in this project provide high security and dependability to the vehicle.

The scope of the proposed methodology lies in achieving a faster and efficient vehicle security system.The demand for auto-guard systems for protecting the vehicle from theft and loss is increasing day by day. The proposed system will be an intellectual system to meet this demand. As part of enhancement, this system can be implemented not only in bikes but also in other vehicles as well as in various other sector like financial, banking, military and so on.The method of image processing and possible collision detection can be included that makes the system unique and competitive compared with the other systems.

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