ANTI-THEFT CAR SECURITY SYSTEM USING IOT

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Abstract :   In this modern and insecure world, it becomes very necessary to be aware of one's security. There are increasing number of car thefts. Through this system we can prevent such crimes. Thus, this project is based on building an Anti-Theft Car System using raspberry pi. This system is designed not just to alarm the surroundings but to alert the owner through message, tracking the car, locking the car remotely with or without the owner's consent according to the stealing parameters. The user can also directly contact the police officials about the events with coordinates of the location of the car getting stolen and can shut down the engine remotely. The existing technologies for car security systems have a number of limitations such as high false alarm rate, easy deactivation and high cost. This proposed system thus, includes GSM, WIFI and GPS module for the above-mentioned features.

I. INTRODUCTION

1.1 INTRODUCTION

The crime statistical data shows that thefts of vehicle, especially car are increasing dramatically around the world. This uptrend has started to ascend rapidly and reaching an alarming proportions particularly in Asia and the rest of the world for the past few years. New guidelines driven by the insurance companies are being set for vehicle manufacturers to make their products more secure. In 2015, a vehicle is stolen every 13 minutes in Delhi. In 2014, the average interval was 23.6 minutes.Thieves have never been this efficient before, and your car or bike never more unsafe. For comparison, consider the Big Apple. In 1990, a vehicle was stolen in New York City every 3.5 minutes, but new anti-theft technologies and a police crackdown ensured a 95% fall in vehicle thefts by 2013.Now, a vehicle is stolen in NYC once every 72 minutes. The same anti-theft technologies--engine immobilisers and chip-implanted keys--have been part of most Indian vehicles sold over the past few years, so what is behind the rocketing theft rate?[1]

1.2 PROBLEM STATEMENT

Based on the discussion of data related to stolen cars, it is observed that the car theft is a global problem. Nobody is in favour of their car getting stolen. The insurance companies also feel the pressure as they have to pay the claims made by the customers. As a result, the insurance companies have to increase the insurance premium. When this happened only a small percentage of people could afford a good insurance premium. The increase of the insurance premium is mainly due to the lack of security system installed in the car. The car manufacturers installed a minimum standard security system such as an alarm based security system. However, this device is not effective enough. It does not have any pager system attached to it. The car thief can easily deactivate the security system. Furthermore, nobody will pay an attention when the car alarm goes off. Based on these reasons, it is proposed that a GSM-based vehicle anti-theft system development is designed and developed to improve the performance of the current vehicle security system.

A microprocessor based ANTI-THEFT CAR SECURITY SYSTEM using *GSM, GPS and GPRS technologies*. The main aim of this project is to intimate the owner of the vehicle about any unauthorized entry into his/her vehicle by alerting the surroundings with alarms and by notifying the owner by a message about the event being occured The advantage of this project is that the owner can send back the SMS with the necessary instructions to stop the vehicle instantly by cutting off the ignition of the vehicle and controlling the doors of the vehicle so that the intruder cannot escape the scene. Additionally, a mobile application will be also present with all these actions in them and the owner can directly monitor the door locks system and can remotely lock the car.

The proposed system will have a tracker which will notify the user about the whereabouts of his/her car. The door locks can be remotely controlled since it is connected with the OBD (On Board Diagnostic) port. The owner will be able to directly contact the police officials with a message along with the coordinates of the location where the car was stolen. This proposed system will be using image processing, so that a camera can be used for taking real time pictures of the thief at the time of robbery and checking it with database in where drivers' images will be stored and will alert the owner if an unrecognized driver intrudes the car and will do the actions as set by the owner. No internet is required unless any cloud functionality is being added to the system, but can be provided as GSM module is being added to it which can provide the internet facility.

1.3 STEALING PARAMETERS

●   Theft of an unattended vehicle without a key: The removal of a parked vehicle either by breaking and entry, followed by hot wiringor other tampering methods to start the vehicle, or else towing. car thefts are now from high tech OBD (Onboard Diagnostic Port) key cloning kits (available online) and bypass immobilizer simulators.

●   Taking without owner's consent (TWOC) Unauthorized usage of a car short of theft.

●   Opportunistic theft: The removal of a vehicle that the owner or operator has left unattended with the keys visibly present, sometimes idling. Alternatively, some cars offered for sale are stolen during a "test drive". A "test drive" may also provide a potential thief with insight into where the vehicle keys are stored, so that the thief may return later to steal the vehicle.

●   Carjacking: Refers to the taking of a vehicle by force or threat of force from its owner or operator.

1.4 PROPOSED SYSTEM

● 　　Provide security to the vehicles by engine locking system which prevents the vehicle from unauthorized access. It can also prove beneficial to find out the exact location of the accident.

● 　　Car alarms make it harder for a car thief to operate anonymously. Thieves don't want attention, and a loud, blaring siren is bound to get the attention of anyone nearby, including the car owner.

● 　　When a thief tries to start the car without a key, the kill switch cuts off the fuel to the car or shuts off the electrical system, preventing the thief from taking the car anywhere. It makes it harder for a thief to take the car after he has broken into it

● 　　A tracking device uses GPS technology to follow your car after it is stolen, aiding in its recovery. Also after all this if the car gets stolen, the Camera captures the image of the thief which can be later used for investigation.

II. LITERATURE SURVEY

Car security systems have been popular recently and used in most of the cars and automobiles. There are several anti theft devices available in India which are considered as safeguard for the vehicle. The most common has been the demobilizer. Though many of the cars come with immobilizers wherein the fuel/ignition is stopped which makes sure that the vehicle is unable to start. Gear locks are considered one of the best defense mechanisms. Cutting off the ignition is another way where there's a hidden manual switch which interrupts the power supply from the battery of the ignition. One of the most common ways to tackle thefts is using car alarms which go off when there is intrusion in any form It alerts the owner in case of a forced entry but the installation of the speakers should be in such a way that it is not easily visually accessible to the intruder or else it will be disabled by them. Steering the lock with a metal bar which fits on the steering wheel disables the wheel from operating.

1.Sir Syed University of Engineering & Technology, Karachi, Pakistan- they control automobile peripherals by **Voice Recognition System**. The profile of the authorized user is saved such that system will initiate by identifying the users voice for eg. adjusting the side and rear mirrors.

2.Kiruthiga, N., & Latha : "A Study of Biometric Approach for Vehicle Security System Using Fingerprint Recognition", have studied the use of **Biometric Approach** for Vehicle Security System Using Fingerprint Recognition. It has been implemented using embedded system with Global System for Mobile (GSM) and Fingerprint Recognition.

3. An auto security anti-theft system with an Immobilizer system through the radio frequency identification (RFID) has been presented by Jayendra, G., Kumarawadu, S., & Meegahapola developed a system titled "RFID-Based Anti theft Auto Security System with an Immobilizer", which characterizes low hacking rate while ensuring the safety supports of the passengers when the vehicle is hijacked. The active RFID technology is used for the operation of the immobilizer system, namely, ignition circuit, power control unit, and automatic gear changing system, enabling the vehicle speed is brought down to zero in a gradual.**[3]**

4. Some of the common systems in use are immobilizers wherein the fuel/ignition is stopped which makes sure that the vehicle is unable to start, Gear locks, Cutting off the ignition, alarms which go off when there is intrusion in any form, ICAT (Intelligent Computerized Anti-Theft system) where the car starts only when the season in the vehicle accepts the chip and the sensors even create alarms buzz when someone tries to insert a fake key. **[4]**

III. Objectives

A conceptual design study was conducted. It included a systematic concept generation and evaluation process to identify as many promising anti-theft concepts as possible. This morphological approach included the identification of methods characteristic to each energy or signal transmission medium for code insertion, decoding, latching, and vehicle function lock. The study included both mobilization protection systems and sensor screen concepts. The latter class included both alarms and tamper protection systems. In addition, a number of improvements in the protection systems were identified and evaluated. The main objective of this project is to design, construct and test a GSM and Raspberry Pi based vehicle anti-theft car security system that can be used to enhance the performance of car immobiliser system and car security alarm system. When either the immobiliser or the alarm is activated, the proposed system will activate its image capturing system and at the same time send signals to the user's cellular phone, informing the user the current status of the car. An app will be made available to the user where he can get the image of the intruder and at the same time he can use this app for controlling the ignition locks as well as the door locks along with the alarm system. The proposed system also allows the user to lock and unlock the car door remotely using the cellular phone.

For the purpose of achieving our objectives the following tasks were to be implemented:

1. Design and develop the hardware of the proposed system.
2. Develop a control program of the proposed system.
3. Design and develop camera based car security alarm system.
4. Conduct appropriate tests for the proposed system.
5. To be able to access the vehicle subsystems from a remote/distant location where there is a GSM coverage;
6. To initiate some control actions on the vehicle from a mobile phone;
7. To monitor the state or condition of the vehicle after it has been stolen;
8. To give the vehicle sub-units some level of intelligence.

IV. Technology Stack

HARDWARE:
1)   Raspberry Pi
2)   GSM 900A Module
3)   Web Camera
4)   Laser
5)   Leds
6)   LDR
7)   NodeMCU
8)   OBD(On Board Diagnostic) Port

SOFTWARE:
1)   Rasbian
2)   Firebase Realtime Database
3)   Arduino IDE
4)   PICOCOM
5)   Android Studio
6)   CAN Protocol used for OBD Port
7)   PuTTY

V.Implementation

The anti-theft car security system gets alert as soon as a intruder is detected through any car stealing parameters. Taking one of the cases of car stealing in our project, like using laser for unauthorised access to the car by the intruder. Microcontroller (Rpi) will detect the laser light with help o of LDR and inform the owner by sending notification through message on owner's mobile which is implemented using GSM and alert the surroundings by turning on the alarm. At the same time, by using image processing, the identity of intruder will be captured through the camera and will be sent as real-time data to the owner on their mobile application. Mobile application is developed using Android studio. Firebase is used for real time data processing, using which the user can check the ignition and door status and lock all the doors (represented by LED) and cut-off ignition mechanism. The change in their values can be directly monitored on firebase.
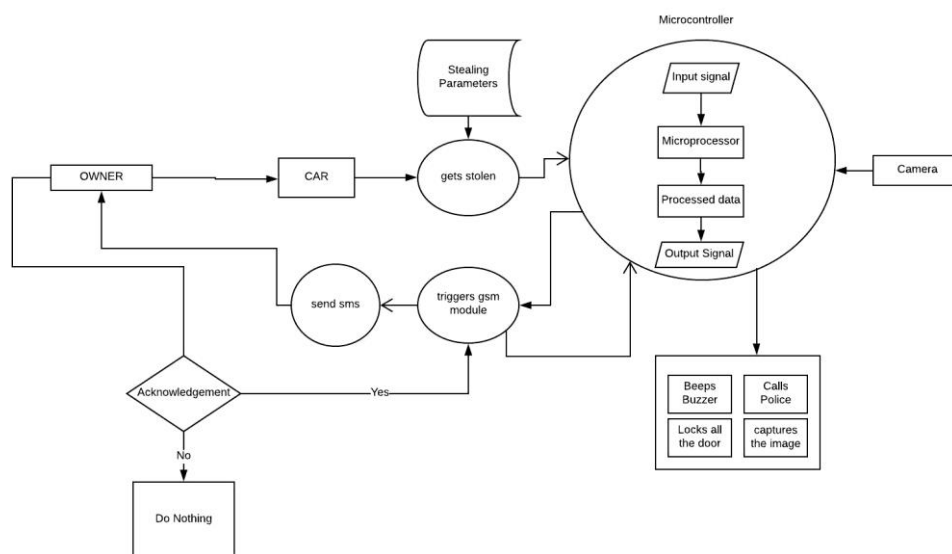
Figure 1. BLOCK DIAGRAM

VI.Results and Discussion

We have developed an Anti-theft car security system prototype using microprocessor (Raspberry Pi) which cuts off the ignition and locks the door on detection when the laser light is interfered. When this happens, the LDR's value drops and after it reaches a specific value, the doors are locked indicating that there has been an intrusion. A notification is sent to the cellphone using GSM and the owner gets notified and can lock the door using the mobile application. The mobile application is developed using Android Studio. Further all the data from application, Raspberry Pi and NodeMCU is stored in Firebase which is a realtime database and locking of doors represented by LEDs. At the same time with the help of Image Processing the camera captures the face of the intruder. These images which are captured are stored in real time in the memory in Firebase for future reference.
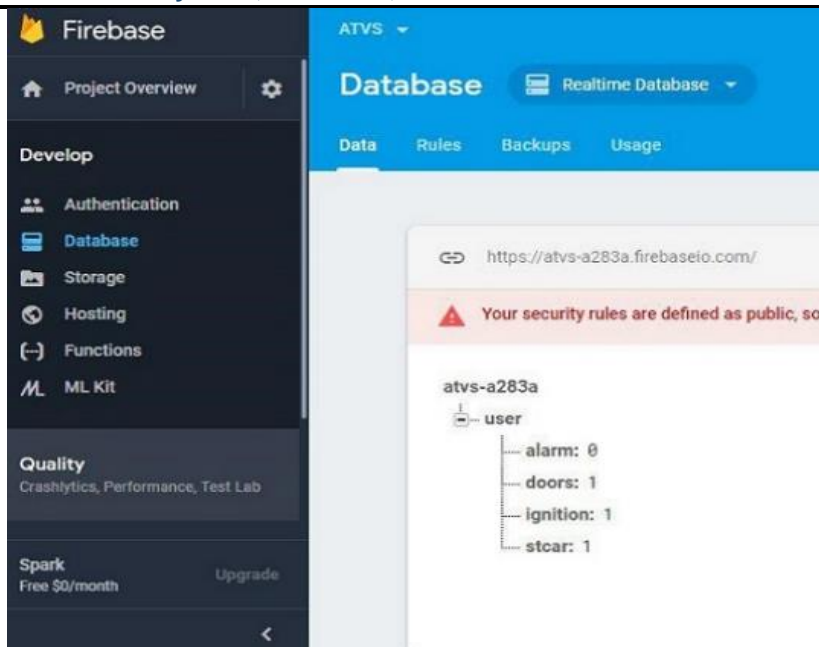
Figure 5.1 Firebase Console

The above figure 5.1 depicts the firebase console wherein the data from different mechanisms are captured and real time changes in the system are reflected on this console.

Figure 5.7: PUTTY SOFTWARE

PuTTY is an SSH and telnet client, developed originally by Simon Tatham for the Windows platform. PuTTY is open source software that is available with source code and is developed and supported by a group of volunteers. In our project, puTTY software is used for running raspbian software.

REFERENCES

[1] The Times of India, Nov 11 2015

[2] Kiruthiga, N., & Latha, L. "A Study of Biometric Approach for Vehicle Security System Using Fingerprint Recognition", International Journal of Advanced Research Trends in Engineering and Technology (IJARTET) Vol. 1, Issue 2, October 2014.

[3] Jayendra, G., Kumarawadu, S., & Meegahapola, L. "RFID-Based Antitheft Auto Security System with an Immobilizer", Second International Conference on Industrial and Information Systems, ICIIS 2007, 8 11 August 2007, Sri Lanka.

[4] Muhammad, T.Q., Syed, S.Q., Rafia, K., & Khan, M.Y. "Automated Profile Vehicle Using GSM Modem, GPS and Media Processor DM642" Department of Electronic Engineering, Sir Syed University of Engineering & Technology, Karachi, Pakistan, 2009 International Conference on Computer Engineering and Applications IPCSIT vol.2 (2011) (2011) IACSIT Press, Singapore.