

Design and Development of Vehicle Theft Detection, Tracking and Accident Identifier System using IoT

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Abstract –Vehicle security is one of the major concerns that the entire world is currently experiencing. People generally own automobiles, yet these automobiles are not always secure. Vehicle theft occurs in parking lots, public places and other unsafe areas. Vehicle's manufacturer does not consider the vehicle security system to be a factor in the overall cost of the vehicle. Nowadays, only a few vehicles come equipped with high-priced security system. Door locking, alarm system, GSM, GPS, and other security features are built into high-end vehicles only. There is a necessity to build low cost security system for vehicles that common people can afford it and the manufacture can built-in the security system in wide range of automobiles. This paper proposed a method for vehicle theft detection, tracking and accident identification using Internet of Things.

Keywords – Vehicle, theft, security, tracking, identification, IoT

I. INTRODUCTION

According to a survey done by the Government of India in 2019, close to 36,000 vehicles worth Rs.115cr were stolen in India in 2019. Only roughly 15,000 have been traced, with numerous missing components. Once a vehicle is robbed, it's almost as if we've lost it; otherwise, it can take months to track down our vehicle, and there's no guarantee that we'll get it back in its former state. If a person's vehicle is robbed in an apartment with a large number of automobiles parked, the person may not even realize it until an alarm sound beeps, because practically all of the vehicles will have the same alarm sound and when he comes to check it out; he will not find his vehicle there. As a result, a vehicle theft control system was created. People who have their own vehicles are more likely to be unprotected. The reason for this is that the system's security is not available due to its high cost. The cost of the security system is so costly that it is out of reach for most people. This is driving the development of a user-friendly and cost-effective vehicle security system.

A Bluetooth module and an alert framework are linked to the controller. It use security system model in which messages are sent over GSM. The structure moreover utilizes a mystery expression through keypad (with a maximum of three prospects) detected, the IR module/sensor detects the intruder or any blockage and sends a signal to the small controller[1]. The developed system employs a GSM-advanced embedded framework. The vehicle is equipped with a well-planned and constructed system. In a similar way, an interface compact is linked to the microcontroller, which is linked to the engine in this case [2]. Inside the vehicle, there is a keypad and an exhibit. We may kill on and switch the vehicle using this method. Furthermore, we can use this GSM modem to track the vehicle. If an inadequate mystery key is input, the GPS module tracks the vehicle's space, and the message is delivered to the vehicle's owner [3]. The theft preparedness limit communicates with the vehicle owner's cell phone via a GSM application developed and delivered via a wireless device embedded in the vehicle [4]. In the scenario the vehicle following and receiving structure, which is installed in the vehicle and allows it to follow the spot and fire the engine motor. The vehicle's location is determined via the Global Positioning System (GPS) and Global System for mobile communication (GSM). Unique requirements were approved to communicate the secret key to the controller in order to restart the vehicle and open the door. This is a more easily obtained, powerful, and insignificant cost [5]. If someone starts the engine, the microcontroller sends an SMS to the owner; if the owner recognizes theft, he simply sends an SMS to keep the vehicle from his flexible; if the owner recognizes theft, the fuel supply system turns off, and the ringer makes a noisy [6]. The entire system is concealed inside the vehicle, until aside from whenever endorsed one comes and giving security code to that structure. A keypad and a show are given inside the vehicle. Also, moreover we can follow the vehicle using this GSM modem. If some unsatisfactory mystery word is entered, the space of the vehicle is trailed by the GPS module and the message will be transport off the owner of the vehicle[7].

II. METHODOLOGY

The solution to vehicle theft detection implemented here is a low cost design which means common people can afford it, and it can be implemented in wide range of automobiles. This application would continuously track the location of the vehicle being driven, collecting data from the GPS tracking unit and storing it while ensuring the information's security. The current topographical directions of the client are recovered by this program. Photographs of the thief are sent. It will also track the vehicle's location on Google Maps in real time. The block diagram of proposed system as shown in Figure 1.

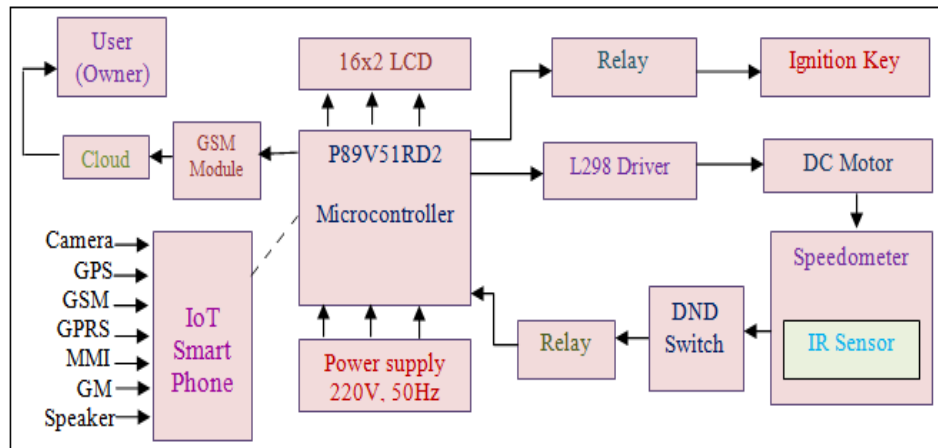


Figure 1. Block diagram of Proposed System

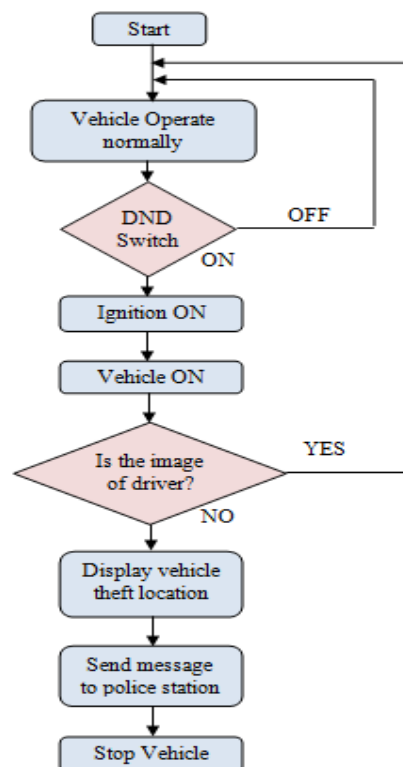


Figure 2. Flow chart of proposed system

The microcontroller P89V51RD2 is the main component which needs 5V for its operation. To supply power to the microcontroller, a voltage regulator 7805 IC is used. A crystal oscillator is used for generating 11.0592MHz frequency. Liquid Crystal Display is used to display the different messages such as WELCOME, VEHICLE ON, and VEHICLE THEFT. Global System for Mobile Communication is used for transmitting and receiving the text SMS message. Relays are used to regulate high voltage circuits by using low voltage signals. L298 Drivers used for DC motor is powered by 12V. The DC motor is used to run the speedometer and control over the speed and it

takes up less space. A speedometer is a device which used to measure and displays a vehicle's current speed (km/H). DND (Do Not Drive) Switch used for ON/OFF. When it is in the OFF mode, the owner is driving and it is in the ON mode, the vehicle is being stolen. If the thief forcibly starts the vehicle and then moves, the IR sensor detects a vehicle distance of 10 km/H and it won't exceed the limit. In this work two smart phones used, one will be placed the within the model and other will be with the owner of vehicle. The smart phone has a camera, GPS, GM, MMI, GSM, Wi-Fi, and other features. It is used for transmit and received the messages, to trace the location, captured the image of thief and voice announcement. Embedded C, flash magic, and Kiel compiler are used to integrate all of the various embedded components, and android studio is used to set up the IOT application for sending information and then providing the appropriate voice announcements. Android Studio used all programming languages, including Java and C++, will be supported by vehicle theft application. In an android mobile phone the developed vehicle theft app is installed. The android app developed has the facility of detecting the location of vehicle theft, capturing thief photo, start vehicle, stop engine, to register the complaint to police station and voice announcement of thief. The owner has the vehicle theft application in his phone as shown in figure 3.

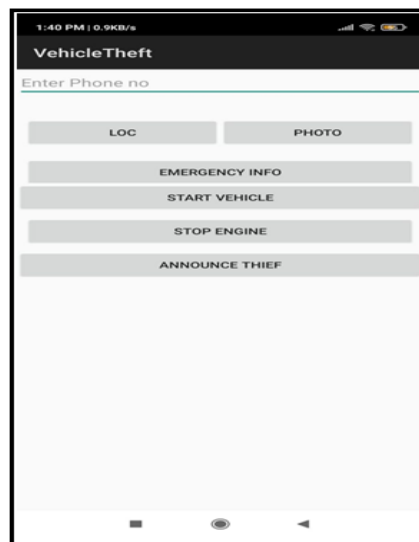


Figure 3. Vehicle theft application

III. RESULTS AND DISCUSSION

As soon as the microcontroller is powered ON, a WELCOME message will be displayed on the Liquid Crystal Display. During normal operation, the owner drives DND(Do Not Drive) switch will be turned off, and the vehicle will run at the speed set by the vehicle. If the vehicle owner has parked his vehicle, he must turn ON the DND switch; then only he received the information about the vehicle theft.

CASE 1: If a vehicle is stolen and an unknown person tries to start it, the ignition key is switched on. The microcontroller sends message to the owner via GSM, such as vehicle is turned on, that information displayed on the Liquid Crystal Display as shown in figure 4.



Figure 4. LCD display's **VEHICLE ON** message

CASE 2: If a thief forcibly starts the vehicle and moves, an IR sensor detect the distance of 10 km/H, and it won't exceed the limit. Then, the owner can received the VEHICLE THEFT message with voice announcement as shown in figure 5.

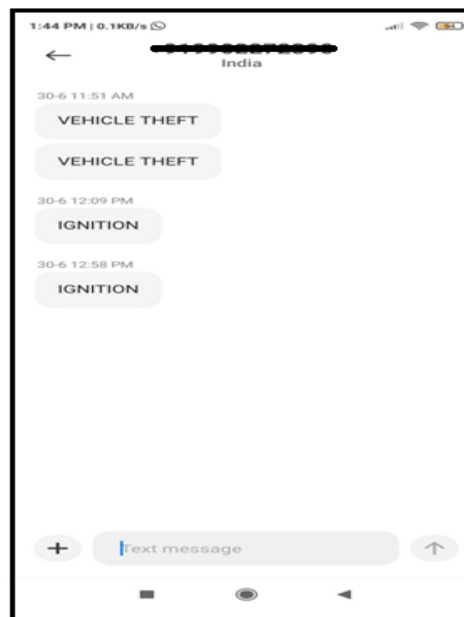


Figure 5. Owner received message is VEHICLE THEFT with voice announcement

CASE 3: In the Vehicle theft App owner by clicking the photo, owner will received the photo link. The owners check whether the known person is trying to drive the vehicle or not. If the unknown person is trying to drive the vehicle then SMS saying stop engine will be sent and automatically vehicle stop working as shown in figure 6 (a) and (b).

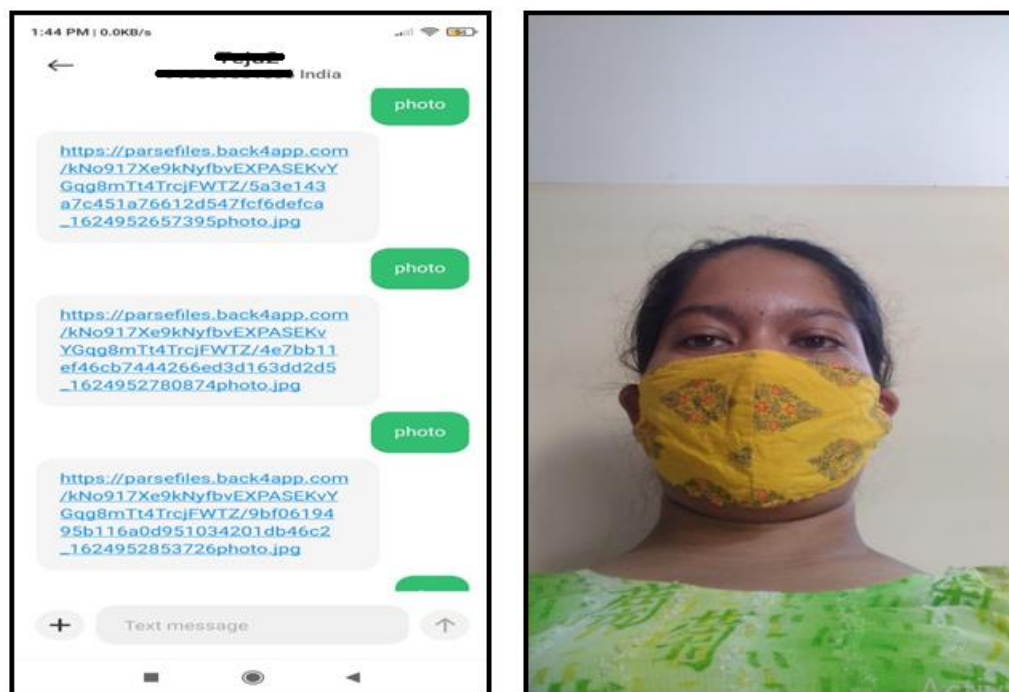


Figure 6 (a) and (b) Owner Phone can received image link and Image of vehicle thief

CASE 4: In the Vehicle theft App owner by clicking the loc, owner will received the location of vehicle theft place, which tracks the vehicle as well as locating the vehicle using Google Maps as shown in figure 7 (a) and (b).

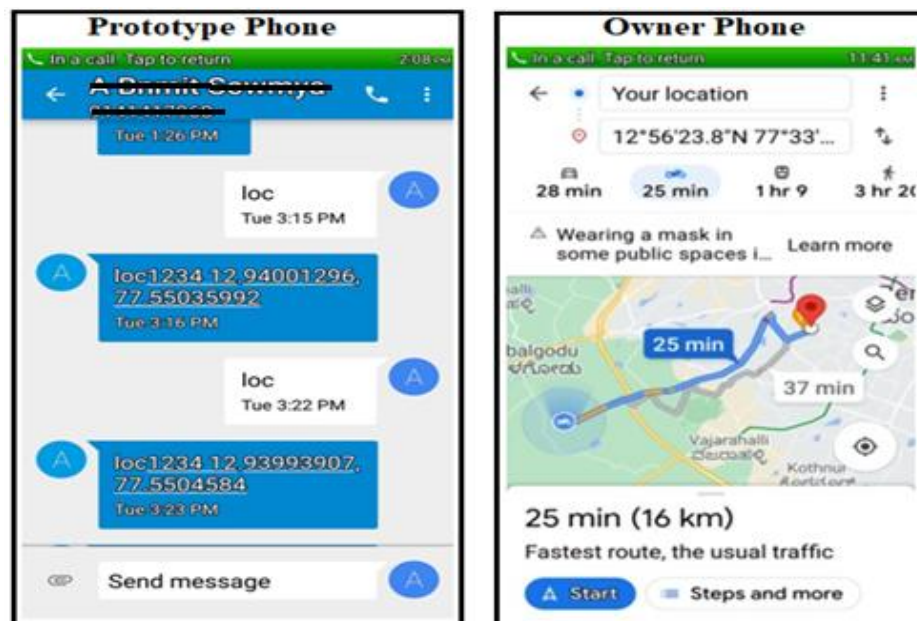


Figure 7 (a) and (b) Ownerphone can received the location of vehicle theft place.

CASE 5: In the Vehicle theft App owner by clicking the emergency info, the vehicle theft information passed to the police station via registered mobile as shown in figure 8.

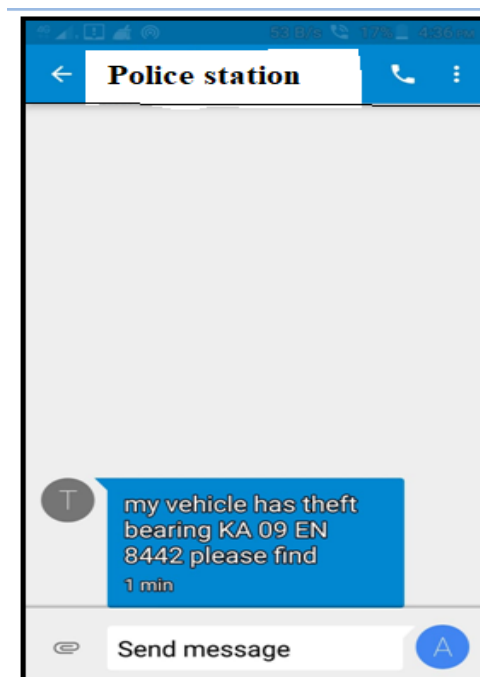


Figure 8. Message received by Police station

IV. CONCLUSION

The proposed method is a low cost security system for vehicles that common people can afford it and the manufacture can built-in the security system in wide range of automobiles. It is simple to detect and track a stolen vehicle in a short period of time and send a message to the owner. The owner can manage the vehicle ON/OFF, received the location it easy to track the location and received thief photo link message and pressed that link owner can see thief photo and also send a message to the local police station to prevent vehicle theft and reduce the accidents.

V. REFERENCES

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