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Vehicle Theft Detection and Locking System

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ABSTRACT : Nowadays, automobile thefts and the production of vehicle are increasing in yearly world. So, vehicle theft is a universal problem. To solve this problem, most of the vehicle owners have started using the theft protection systems. The main purpose of this paper is to prevent the vehicle theft and the functionality is achieved by detecting vehicle status in theft mode and by sending an SMS is generated automatically. This SMS is then sent to the owner of the vehicle. The owner can stop the vehicle in order to disable the ignition of the vehicle. Thus in this way crimes can be reduced to a great extent as vehicles today are being stolen in large number. Hence, the vehicles today require high security which can be achieved with the help of this application that how the system works is when a person tries to steal the vehicle, the microcontroller in it is interrupted and the command is sent to the GSM modem to send SMS. On the receipt of the message, the owner sends back the SMS to the GSM modem. This is done in order to stop the engine. This GSM modem is interfaced to the micro controller. This microcontroller on the receipt of the message uses a mechanism that helps to stop engine. Motor is being used to indicate vehicle ON/OFF state.

I. INTRODUCTION

The population of India according to 2018 census stands at 135.26 crores. The total number of registered vehicles in India stood at 30.92 million in the same year. In 2018 about 44,158 cases of vehicle theft was reported and only 19.6 of vehicle theft increases by 10number of vehicles. With this, the risk of vehicle theft has also increased tremendously. Stolen vehicle does not only cause economic loss to the owner, it also may be used in certain criminal activities. This might put the owner of the vehicle in danger and unwelcome situations. Thus, having a functional and efficient anti-theft tracking and detecting system has become a necessity. This project "An IoT based vehicle theft detection and remote engine locking system" helps the user to track the location (with latitude and longitude) of vehicle at any given point of time with the help of an android app that will be installed in their phones. It makes use of GPS trackers that are installed in the vehicle to detect the location of the vehicle. Vehicle can be accessed either by ignition key or by the android application. Usually user makes use of the android app to start, stop and lock the vehicle. Only if the mobile is not working or any other emergency, he makes use of the ignition key. When the user is using the ignition key, alert message will be sent to the user as well as the guardian as the vehicle is started using the ignition key. User has to inform prior to the guardian that, he is the one using the vehicle. Or else guardian will lock the engine using the android application. People will have a way of stopping the crime from happening instead of reporting the crime after it has already taken place, as the chances of solving such cases are really low at present time.

II. RELATED WORK

Some people uses the GPS system only to the vehicle to trace the vehicle location like the latitude, longitude and speed of the vehicle but not useful for controlling the vehicle. Some people uses only GSM for controlling the vehicle but not useful to trace the vehicle, some researchers uses GSM, GPS system to control the vehicle as well as to trace its location. The literature review of the work is as follows.
• Literature review reveals that many people worked for the security system of vehicle to avoid theft. Present day technological developments have been studied and tabulated in table below. It was found that people worked for GPRS, GSM, GPS, IOTs web etc. along with biometric sensing system. All such anti-theft modules are even available in hi-end vehicles. Here us approach is to design a cost-effective anti-theft system for low range vehicles.
• Intelligent anti-theft and tracking system for automobiles. In this paper author proposed a productive car security framework is executed for hostile to robbery utilizing an installed framework involved with a Global Positioning System (GPS) and a global system of mobile (GSM). By utilizing Google Earth, the customer connects through this

framework with vehicles and decides their present areas and status. The position of focused vehicles can be followed by client on Google Earth.

- Kaushik et al [1] developed an anti-burglary vehicle security system, which uses thumb impression to start the vehicle. The authorized persons thumb impressions are stored in the database of the system. The vehicle is started if the finger print of the database is matched. If anyone accessed the vehicle by chance then the fuel tank will be emptied through the relay bolt fitted to the tank at the same time it gives alarm that the vehicle is theft so that the unauthorized person cannot refill the emptied fuel tank.
- S S Pethakar et al [2] uses GSM, GPS RFID security system for taxi like vehicles. For starting the vehicle the worker must use the RFID card in which the identification number is provided such that the identification numbers already preloaded in to the database of the system, If the number is matched, GPS and GSM comes in to play and sends SMS to the vehicle owner the location like latitude and longitude of the vehicle. If the owner detected theft by chance then he sends the SMS to the GSM such that it will lock the doors of the vehicle.
- Nagaraja et al [3] used GSM system, Microcontroller, and relay switch for the ignition system. It theft is detected the Microcontroller activates the GSM system to send SMS to the owner, If the owner gives reply to the SMS then the relay switch is activated and it deactivate the ignition system.
- Alkheder [4] uses GPS-GSM system that uses Google earth application. The system contains GPS module provided in the vehicle, this GPS module exchanges information with the GSM system to send SMS to the owner. After getting SMS to the owner, he can trace the latitude, longitude and speed of the vehicle using Google earth application.

III. PROPOSED METHOD

The main purpose of this project is to prevent vehicle theft. This functionality is achieved by detecting vehicle status in theft mode and by sending an SMS which is generated automatically. This SMS is then sent to the owner of the vehicle. The owner can then send back the SMS tin order to disable the ignition of the vehicle. Thus in this way crimes can be reduced to a great extent as vehicles today are being stolen in large number. Hence, vehicles today require high security which can be achieved with the help of this application. How the system works is when a person tries to steal the vehicle, the microcontroller is interrupted and the command is sent to the GSM modem to send SMS. On the receipt of the message, the owner sends back the SMS to the GSM modem. This is done in order to stop the engine. This GSM modem is interfaced to the microcontroller. This microcontroller on the receipt of the message uses a mechanism that helps to stop the engine. Motor is being used in this project in order to indicate vehicle ON/OFF state. Further enhancement can be done to this project by using a GPS system that helps to find out the exact position of the vehicle with the help of its latitude and longitude which then can be sent to the owner of the vehicle via SMS. This data can be then entered by the owner on Google map to find out the exact location of the vehicle.
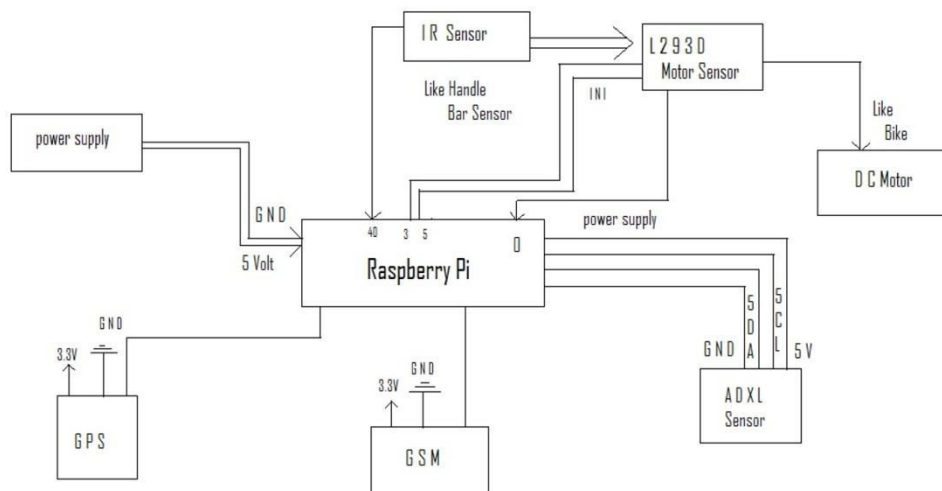

Figure 1: System design

In the system architecture of the proposed system the entire system architecture is divided into 3 parts owner, theft detection and Vehicle tilt detection.

- **Owner:** Owner can starts the vehicle using the authenticated password. and also he has the Application consists of a "Vehicle OFF" and "VEHICLE ON" options. If the vehicle turned on with unauthorized access, the GSM module sends an SMS to the registered mobile number notifying the owner that the location of the vehicle using GPS. Owner chooses "Vehicle OFF" to stop the vehicle.
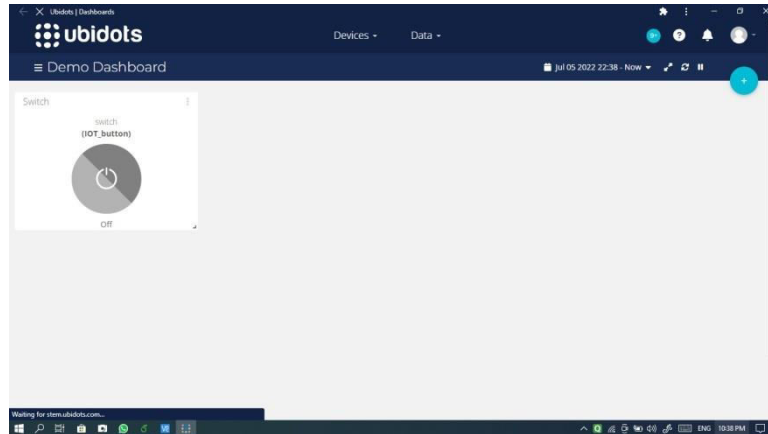

Figure 2: Ubidots Application: OFF button

- **Theft Detection:** When the vehicle is getting stolen by cutting the wire then the buzzer alarm will ring by notifying owner with the message that "Someone is stealing your vehicle" He can track the location and turn off the vehicle through application, so that
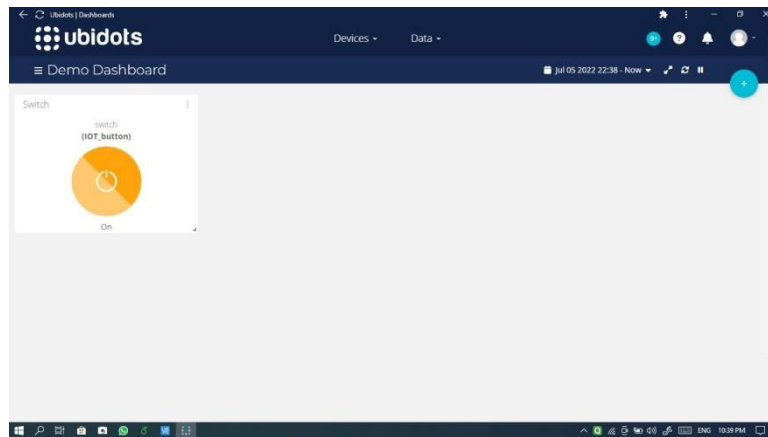the theft can be prevented. The vehicle cannot be restarted using the ignition. key.

Figure 3: Ubidots Application: ON button

- **Vehicle tilt detection:** ADXL sensor can help to detect the Vibration or tilt (it might be accident) in the vehicle, owner will get the message that "Accident happen at this location" with location link using GSM and GPS.

Flow Chart for each modules

- **Module 1:**

In module 1 it comes to owner detection. Before vehicle starts using password,the owner needs to keep his hand on the handle to sense.Once it sense it ask for authentication through password.If the password is valid vehicle STARTS or else once again it ask for password.If the handle is released the vehicle automatically slow and stop. For owner detection we r using IR sensor and if owner hold the handle Ir sensor value is 0 and if he release the handle the value become 1.
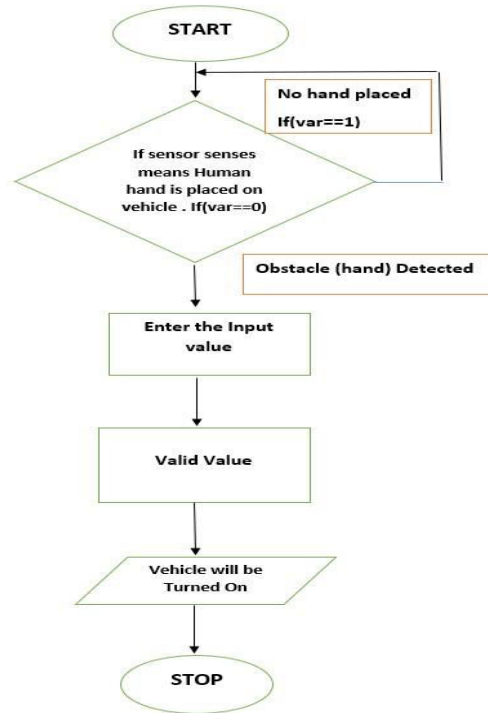
Figure 4: Flow chart for Module 1

- **Module 2:**
In 2 module it come to gps and gsm location tracking.If in case the accident has been happen is shown through tilting of adxl sensor if adxl sensor is straight the we get positive value it indicates x axisvalue and once the adxl sensor tilt value become negative and this value appear like axis direction and once we get negative the link is generated and present location of vehicle and message like accident happens plz visit this location message will be sent to owner mobile.
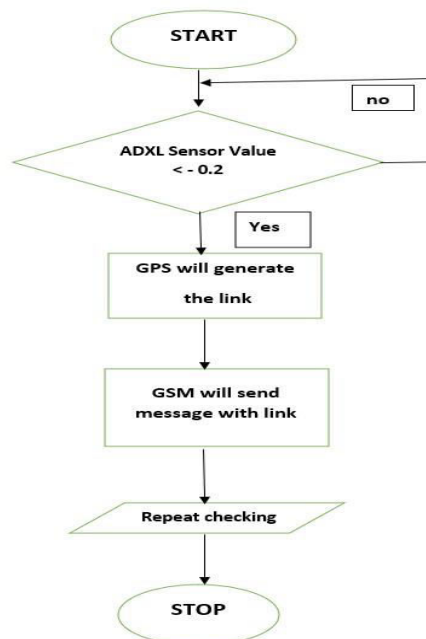

Figure 5: Flow chart for Module 2

- **Module 3:**

In use case diagram it comes 3 users one is vehicle user,second is mobile user,3rd is target user .In vehicle user the owner needs to start the vehicle through sensing the handle.Once the hand is kept on vehicle the vehicle starts and it is 1st level of authentication.After the handle is sensed using IR sensor the IR sensor value become 0 and ask to enter the password.if password is incorrect,once again it ask for password. It is the second level of password authentication and then if handle is released the IR sensor value become 1 and then vehicle slow down and stops. it is theregistration management user id. When it come to mobile user 1st step is GPS and GSM location tracking. If in case the accident has been happen is shown through tilting of ADXL sensor if ADXL sensor is straight the we get positive value it indicates x axis value and once the ADXL sensor tilt value become negative and this value appear like axis direction and once we get negative the link is generated and present location of vehicle and message like "accident happens please visit this location" message will be sent to owner mobile.There is some situation where thief will steel the vehicle by cutting the wire of vehicle and in this case once the wire cut happens the vehicle start to sound because of buzzer and thief will become panic and run away.once the wire cut the owner will get the message that someone is stealing your vehicle and present location of vehicle is sent to owner mobile. This all effect will be implemented on target user.
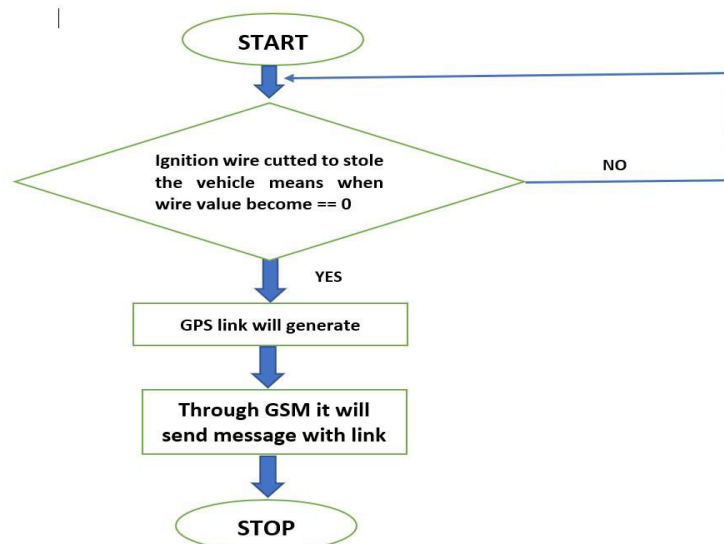

Figure 6: Flow chart for Module 3
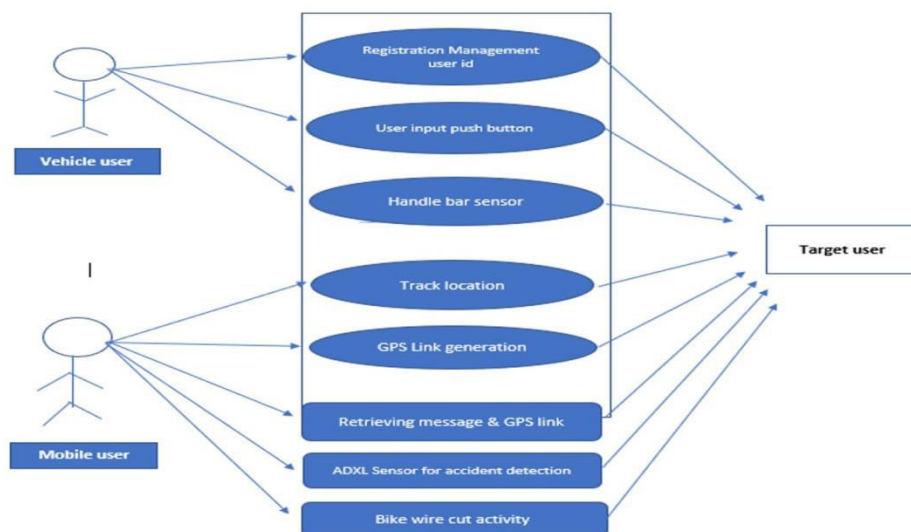
• **Use case diagram:**

Figure 7: Use case diagram

IV. CONCLUSION AND FUTURE WORK

In this paper we have studied and implemented a complete working model using a Microcontroller. Using this project, one can control his vehicle's car engine by means of an SMS. The main purpose of this paper is to prevent vehicle theft. This functionality is achieved by detecting vehicle status in theft mode and by sending an SMS which is generated automatically. This SMS is then sent to the owner of the vehicle .The owner can then sent back the SMS in order to disable the ignition of the vehicle.Thus in this way crimes can be reduced to a great extent as vehicles today are being stolen in large number. Hence, vehicles today require high security which can be achieved with the help of this application.

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