

Smart Vehicle Monitoring System using IoT

M.D. Boomija¹, T.Saranya², S.Suganthi³

¹Assistant Professor, ^{2,3}Final year, Department of CSE,

^{1,2,3}Prathyusha Engineering College

Boomija.it@prathyusha.edu.in¹, tsaranya09@gmail.com², suganthirini99@gmail.com³

Article Info

Volume 83

Page Number: 3022-3024

Publication Issue:

May - June 2020

Article History

Article Received: 19 August 2019

Revised: 27 November 2019

Accepted: 29 January 2020

Publication: 12 May 2020

Abstract

Nowadays people are moving towards innovative techniques in order to find a smarter way to protect and monitor their vehicles. In case of existing technology, vehicle monitoring mainly focus on the indoors or it focus on the outdoor by using different techniques and devices. Several solutions have been proposed to adopt a single location tracking technology that fits in both situations. In our system we have used Internet of Things (IoT) for monitoring the vehicle movements in real time application. At the level of implementation RSSI, micro controller and global system for mobile communication has been used that will help the owner to monitor their vehicles in a safer manner. The proposed system aims at monitoring the vehicle position by using single wireless RSSI (Received Signal Strength Indicator) device.

Keywords: Microcontrollers, RSSI, RFID, gps

1. Introduction

Nowadays vehicle theft cases are higher than any other time, it is a basic need to give a vehicle a good security with the main solid hostile to burglary gadget. Vehicle locking framework guarantee the best ensure to secure your vehicle from various types of threatening illegal cases. It has a security gadget that protects the vehicle. However, this security framework couldn't demonstrate to give complete security and openness to the vehicle in the event of burglary cases. The developed system makes use of an existing framework focused around GSM innovation. For instance, if a person owns more than one vehicle, they can have a Vehicle Tracking System (VTS) to secure their vehicle. We are introducing anti-theft system for vehicle using RSSI technology to ensures that your vehicle is protected from theft. This vehicle monitoring system consists of an electronic device inserted inside the vehicle which help to manage and identify the vehicle if the vehicle was stolen

2. Existing System

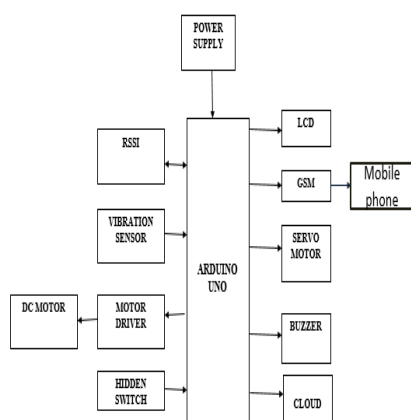
In this system, Electronic key or card-based security systems is used to access the vehicle. These vehicles are accessed by using RFID (Radio frequency identification) tags. The system doesn't have technology to locate the theft person. So, the theft person has a chance to get escaped easily. Also, all software-based system once

stolen, then these apps can be uninstalled by anyone and hence cannot be accessed by owner and all the confidential information get erased. In many applications for tracking the location of vehicle they have implemented the Global Positioning System (GPS) but it seems to be inconvenient, to locate in the wide range of environment.

3. Proposed System

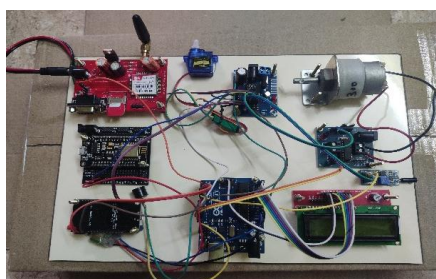
The proposed system uses RSSI (Received signal strength indicator) unit for signal strength measurement. Hence the vehicle theft can be detected within a shorter distance. The RSSI device acts like a receiver that detect the vehicle theft based on the signal strength it receives from the transmitter. A hidden switch is placed inside the vehicle to enhance the security of the vehicle. For the data extraction Node MCU is used which will automatically extract the information and upload it to the cloud server. This cloud server act as a data storage device which can be accessed in faraway places and monitored via the webpage. This will give an absolute visibility to upload the data .It also provides immediate activity report and history information regarding real time application.

4. Architecture Diagram



In our system, we have Arduino UNO microcontroller which acts as a central part of our system; hence, the entire system program is stored in it. Here, we have two units, vehicle unit has one hidden switch only known to owner, if the switch not turns and person access the vehicle means, once the distance between owner's unit and vehicle exceeds certain limit, then the DC motor will stop and shows response as vehicle stopped. Servo motor will actuate vehicle doors to lock. The GSM will send SMS to owner. Vibration sensor is used to detect whether the theft person tries to break the vehicle doors. All these statuses are shown in LCD.

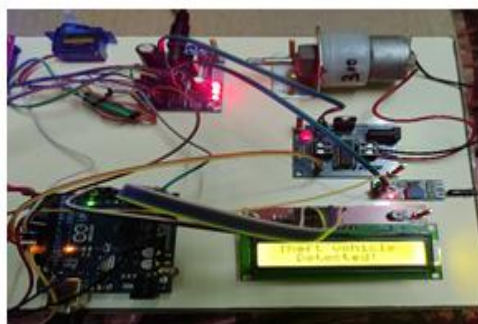
5. Implementation Of The System



Hardware implementation of the system

6. Modules

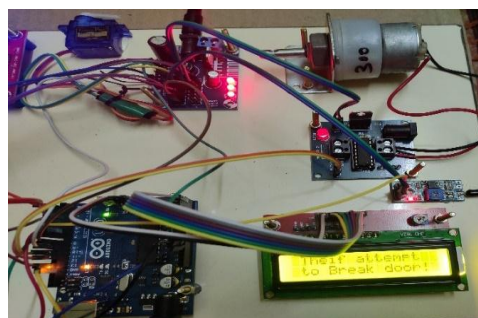
A. Detection based on signal received:



Mobile device acts as Transmitter and transmits signal. This signal is captured by RSSI (Received Signal Strength Indicator) device that acts as receiver. Based on the signals received, RSSI calculate the signal strength. Signal strength scales from 1-100. If the signal strength ranges between 1-40, the message 'CAR IN RANGE' will be displayed in the webpage. If the signal strength ranges between 41-60, the message 'CAR IN MID RANGE ZONE' will be displayed in the webpage. If the signal strength ranges between 61-100, the message 'OUT OF RANGE' will be displayed in the webpage. The vehicle doors are automatically locked and motor stops, an alert message is displayed in LCD.

B. Detection using vibration sensor:

In this module a vibration sensor is fixed to detect whether the theft attempts to break the door. Also, there is a buzzer fixed to give alert sound, so that they can get alert sign that the vehicle has been theft. This detection is invoked when the external force is applied and vibration is detected by vehicle, vibration sensor is invoked and the vehicle doors are automatically locked and then the motor stops, an alert message is displayed in LCD screen and an alert message is sent to user indicating that the theft attempts to break the door.

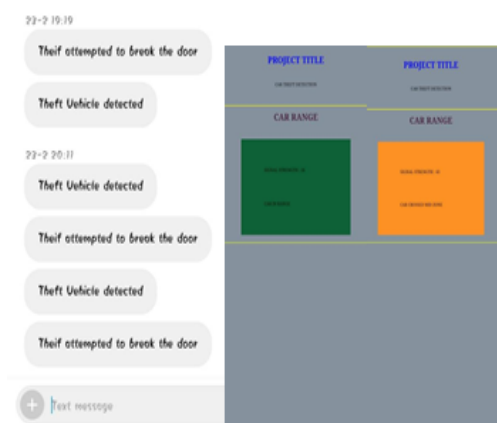


C. Cloud integration module:

Data extraction is done using Node MCU which will automatically extract the information and upload it to the cloud server. This cloud server act as a data storage device which can be accessed in faraway places and monitored via the webpage. The monitoring webpage displays information such as time, date of theft attempts. This will give an absolute visibility to upload the data and give immediate activity report and history information regarding real time application.

7. Results and Discussion

Here we have combined all our modules and experimented the application, and the end results are displayed in the form of screenshots. Figure 1 shows the signal strength indication of the proposed system. Figure 2 shows alert message received by vehicle owner.



8. Future Enhancement

As a future enhancement, there is a scope for improvement. We can send fuel level information and location information to the user as the alert message which will help in providing driver's assistance.

9. Conclusion

This project presents monitoring the vehicle in real time and an alert system that sends SMS to the user-defined mobile numbers. The proposed Vehicle monitoring system can secure the vehicle in an effective manner and sends an SMS alert regarding the vehicle movement. Experimental studies have been carried out cautiously. The insight results have been achieved using this project. RSSI is used to calculate signal strength. This made the project more feasible and definite for vehicle monitoring.

References

- [1] Abhinaya, Shashank Aryasomayajula , Sarabjeet Singh , Rekhith Gupta , Pratap Sawant ,” Anti-Theft Vehicle Tracking with Automatic Police Notifying using Haversine Formula ”, International Journal of Advance Research, Ideas and Innovations in Technology ,ISSN: 2454-132X Volume-4 2018.
- [2] Saw Nang Paing, May Zin Oo, Mazliza Othman and Nobuo Funabiki ,” A Personal Use Vehicle Anti-Theft Tracking System Using IoT Platform”, International Journal of Computer & Software Engineering, ISSN: 2456-4451 Volume-4 April 2019.
- [3] Mohammad Salah Uddin, Md. Mohiuddin Ahmed, Jannat Binta Alam, and Maruf Islam,” Smart Anti-Theft Vehicle Tracking System for Bangladesh based on Internet of Things”, International Conference on Advances in Electrical Engineering, September 2018.
- [4] Real-time GPS + GPRS tracking of vehicles using Arduino. <https://www.cookinghacks.com/projects/arduino-realtime-gps-gprsvehicle-tracking>. 10-01-2017 .
- [5] Pankaj Verma, J.S Bhatia “Design and development of gps-gsm based tracking system with Google map-based monitoring”, International Journal of Computer Science, Engineering and Applications Vol.3, No.3, June 2015.
- [6] ArunSasi, Lakshmi R Nair “Vehicle anti-theft system based on an embedded platform”, International Journal of Research in Engineering and Technology eISSN: 2319-1163 | pISSN: 2321-7308.
- [7] Chaitali N. Surkar, Prof. Amit Welekar “A Review: Raspberry Pi-2 Based Anti-Theft System for Car Logo”, International Journal on Recent and Innovation Trends in Computing and Communication Volume: 3 Issue: 11.
- [8] T Sundari, Dr. G Laxminarayan, G Vijaya Laxmi “Anti-Theft Mechanism Through Face recognition Using FPGA”, International Journal of Advancements in Research & Technology, Volume 1, Issue6, November-2017 ,ISSN 2278-7763.