
Design & Development of Vehicle Theft Detection System

Geervani Bandi, Shiva Prasanna Kumar Pillalamarri, Krishna Chaithanya Janapati

Vardhaman College of Engineering, Affiliated to JNTU, Hyderabad, India

*geervani463@gmail.com, shivaprasannakumar321@gmail.com,
j.krishnachaitanya@vardhaman.org*

Abstract

Nowadays, it is not difficult to duplicate vehicle keys and the use of such keys increases the risk of theft. We hereby suggest an efficient and reliable solution to such problems. Our system uses a facial recognition system to identify the authorized users of the vehicles. This allows for a fast and easy-to-use authentication system. The system uses a ESP32Cam for facial recognition. Whenever the registered user tries to unlock the vehicle, the motor starts. When an unauthorized user tries to use the car, the system scans the person's face and checks if the face matches the authorized face, if it does not match, the system sends a notification to the registered user using Blynk app and GSM. The registered user can control the motor based on the person who is trying to unlock it. In this way the system helps to protect the vehicles.

Keywords: Speech Recognition, Speech to text, Automatic Speech Recognition, Interpretation

1. INTRODUCTION

According to the 2013 Car Theft and Robbery Census, car theft has increased by almost 8.47% in India. On average, in this situation, vehicle anti-theft technology, microcontrollers also need to be increased. Real-time vehicle theft detection and prevention systems provide a solution to this problem. Global system Mobile (GSM) communication is the globally recognized standard for cellular communication. The owner of the vehicle inserts Subscriber Identification Module (SIM) into the GSM module to send messages. A system that is a part of an anti-theft system is installed in a vehicle. This system is used by everyone Cheap for vehicles such as buses, bicycles and cars.

The main aim of the system is to send alert messages to the owner whenever an unauthorized person tries to start the engine. This project includes a GSM modem, ESP32 Cam module, relay module and blynk app to send notifications whenever theft is about to happen.

2. RELATED WORK

Kaushik [1] has developed a security vehicle security system that starts with fingerprints vehicle. The thumbprints of authorized persons are stored in the system's database. The vehicle will start If the database fingerprints match. If someone tries to access the vehicle, the system has relay module connected to fuel, the alarm that the vehicle was stolen is also emptied at the same time. Unauthorized person cannot refill empty fuel tank.

S S Pethakar [2] uses GSM, GPS & RFID security system for taxi like a car. To launch a vehicle, workers need to use an RFID card with an identification number. Numbers are

provided such that they have already been biased in the system database. FITS, GPS, GSM will be submitted to send SMS in locations like the owner, latitude and longitude of the vehicle. If the owner recognizes his feet, he sends SMS to GSM to lock the doors of the vehicles.

Nagaraja [3] used a GSM module, a microcontroller, and a relay module for the ignition system. Theft when detected, the microcontroller activates the GSM system and sends SMS to the owner when the owner responds. SMS then activates the relay switch and deactivates the ignition system.

Alkheder [4] uses GPS ,GSM module, the Google Earth application. This system includes an in-vehicle GPS module that replaces this GPS module Information about the GSM system for sending SMS to the owner. After receiving the SMS, the owner can know the latitude, longitude and speed using the Google Earth application.

3. SYSTEM DESCRIPTION

The components in the system are turned on as soon as the power supply is provided. The vehicle owner would be given an application. The notification about the theft can be sent to a maximum of 5 electronic devices provided that the devices have installed Blynk app and are connected to the same Local Area Network. Firstly, the owner's face is enrolled in ESP32 Cam module for facial recognition. The DC motor requires 12V power supply and ESP32 Cam module requires a power supply of 5V so step down transformer is used to convert AC power supply to two different DC power supplies.

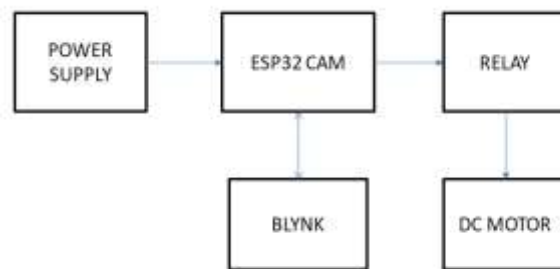


Figure 1. Block Diagram of the project

3.1 ESP32-CAM

ESP32-CAM is a development board module with a size of 27x40mm. It can be integrated into a camera system with an ESP32 module and a camera. ESP32-CAM can be widely used in various IoT applications. Suitable for smart appliances, industrial wireless control, wireless monitoring, wireless QR identification, wireless positioning system signals and other IoT applications. An ideal solution for IoT applications.

- Input Voltage: 3.3V /5V
- Digital I/O Pins (DIO): 10
- Input Voltage: 3.3V /5V
- Digital I/O Pins (DIO): 10



Figure 2. ESP32-CAM

3.2 GSM Module

A GSM module is an electronic hardware device that uses GSM mobile phone technology to provide a data connection to a remote network. From a cellular network point of view, it is same as a regular cell phone, but we need to insert a SIM card.



Figure 3. GSM Module

3.3 FTDI Programmer

The FTDI USB to TTL serial converter module is used for common serial applications. It is generally used to communicate with microcontroller development boards such as the ESP32Cam and Arduino Micros, which do not have a USB interface.



Figure 4. FTDI Programmer

3.4 Relay Module

A Relay module is an electric switch operated by an electromagnet that is activated by low power signal from the microcontroller like ESP32 Cam. When the electromagnet is activated, it is pulled to open and close the circuit.



Figure 5. Relay Module

Other components like DC motor, connectors, breadboard, step down transformer are also required.

4. EXECUTION FLOW

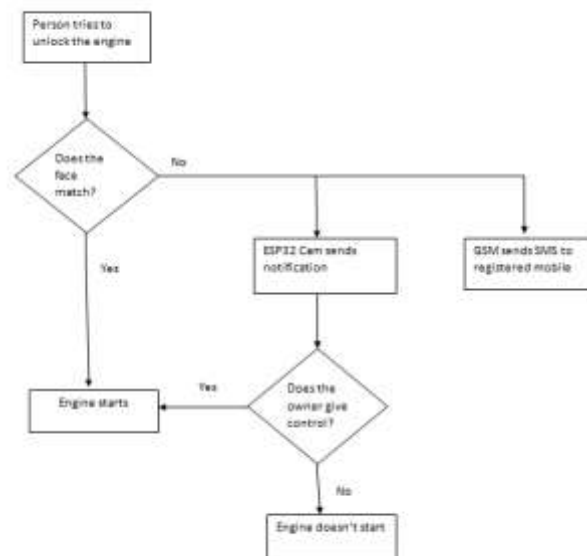


Figure 6. Execution Flow

The system can send notification up to 5 electronic devices provided that the devices are installed with Blynk app and are connected to the same Local Area Network. The GSM module included in the system sends an SMS to the registered mobile. The system would

turn on as soon as it is provided with power supply. Firstly, owner's face is enrolled in ESP32-Cam module with the inbuilt feature for facial recognition. So if any one tries to unlock the engine it compares with the enrolled face. If the face matches then the engine starts.

If the face doesn't match with the enrolled face, then ESP32-Cam module sends notification via Blynk app and the owner can control the engine with the help of Blynk app. The SMS notification is also sent by GSM module to the registered mobile number.

4.1 Data Push on ESP32-Cam

For pushing data into the ESP32-Cam module we use FTDI programmer because we there is no inbuilt USB interface available for ESP32-Cam module. We write code in Arduino IDE software and with the help of FTDI programmer we push data into ESP32-Cam module.

4.2. Software Implementation

In this project, Arduino IDE is used to program and deploy the code in to ESP32-Cam board. Blynk is used as the platform for sending notification and controlling DC motor, which is a free source for building apps.

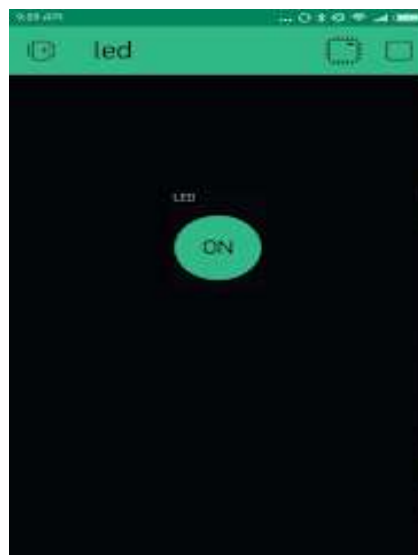


Figure 7. Blynk platform for controlling DC motor

5. RESULTS AND DISCUSSIONS

As soon as the device is plugged on the step down transformer supplies ESP32-Cam board with 5V and DC motor with 12V power supply.

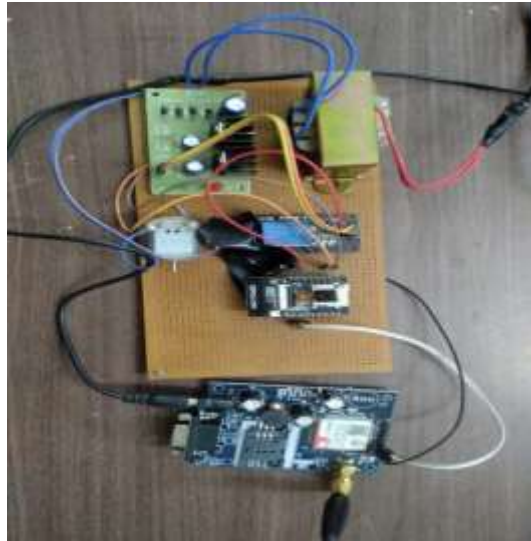


Figure 8. Prototype

VI. ADVANTAGES

- Owner can keep track of the status of the vehicle.
- Upto 5 persons can keep track of the status.
- Inexpensive.
- GSM is also included to send SMS so even if WiFi is not available, he/she can keep track of the status .

6. FUTURE SCOPE AND CONCLUSIONS

The proposed system may be extended in such a way that it can be able to send picture of the person, who is trying to unlock the engine, to the owner so that the owner can be able to give control to the people whom he knows otherwise blocks the engine. The proposed system has been developed and tested effectively. The system is able to enroll faces and starts engine only for authorized users and if unauthorized person is detected it is able to send notifications and also able to control the DC motor.

ACKNOWLEDGEMENT

We sincerely thank, faculty of ECE at Vardhaman College of Engineering, Hyderabad for their guidance in reviewing of the manuscript and suggestions at different levels of the work and also grateful for the management for providing necessary facilities to carry out our project work at Center of Excellence for Intelligent Systems (#3021) in Physical & Remote environment.

REFERENCES

- [1] N. Kaushik, M. Veralkar, Pranab. P, k. Nandkarny, “Anti-theft vehicle security system”, International journal for scientific research and development, vol. 1, no.12, pp. 2845-2848, March 2014.
- [2] S. S. Pethakar, S. D. Suryavanshi, N. Srivastava, “RFID, GPS and GSM based vehicle tracing and employee security system”, International Journal of Advanced Research in Computer Science and Electronics Engineering, vol. 1, no. 10, pp. 91-96, Dec. 2012.
- [3] B. G. Nagaraja, Mahesh. M, R. Rayappa, C. M. Patil, “Design and development of a GSM based vehicle theft control system”, presented at the International Conference on Advanced Computer Control, Singapore, January 2009.
- [4] M. A. Khedher, “Hybrid GPS-GSM localization of automobile tracking system”, International journal of computer science and technology, Vol. 3, no. 6, pp. 75-85, December 2011.
- [5] Pham Hoang DAT, MICHEAL DRIEBERG, Nguyen chi CUONG, “development of vehicle tracking system using GPS and GSM modem”, 2013 IEEE conference on open system (ICOS), December 2-4, 2013, Sarawak , Malaysia.
- [6] Sayma Shammi, Sayeed Islam, Hafiz Abdur Rahman, and Hasan U. Zaman. “An Automated Way of Vehicle Theft Detection in Parking Facilities by Identifying Moving Vehicles in CCTV Video Stream”. In: 2018 International Conference on Communication, Computing and Internet of Things (IC3IoT). 2018, pp. 36–41. doi: 10.1109/IC3IoT.2018.8668135.
- [7] S. Mohanasundaram, V. Krishnan, and V. Madhubala. “Vehicle Theft Tracking, Detecting And Locking System Using Open CV”. In: 2019 5th International Conference on Advanced Computing Communication Systems (ICACCS). 2019, pp. 1075–1078. doi: 10.1109/ICACCS.2019.8728460.
- [8] Syed fasiuddin, Syed Omer, Khan Sohelrana, Amena Tamkeen, and Mohammed Abdul Rasheed. “Real Time Application of Vehicle Anti Theft Detection and Protection with Shock Using Facial Recognition and IoT Notification”. In: 2020 Fourth International Conference on Computing Methodologies and Communication (ICCMC). 2020, pp. 1039–1044. doi: 10.1109/ICCMC48092.2020.ICCMC-000194.
- [9] Hoang Dat Pham, Micheal Drieberg, and Chi Cuong Nguyen. “Development of vehicle tracking system using GPS and GSM modem”. In: 2013 IEEE conference on open systems (ICOS). IEEE. 2013, pp. 89–94.
- [10] A. Hadi Fikri A. Hamid, Kah Weng Chang, Rozeha A. Rashid, Alias Mohd, Mohd. Abdullah, Mohd Adib Sarijari, and Mazlan Abbas. “Smart Vehicle Monitoring and Analysis System with IOT Technology”. In: International Journal of Integrated Engineering (2019).