



Face Detection Based Vehicle Ignition System

Siddhesh Deokar, Rakesh Lad and Shailendra More

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Siddhesh Deokar^a, Rakesh Lad^b, Prof. Shailendra More*

^aSiddhesh Deokar, Nutan College of Engineering and Research, 410507, India

^bRakesh Lad, Nutan College OF Engineering and Research, 410507, India

^cProf. Shailendra More, Nutan College OF Engineering and Research, 410507, India

Abstract

The Raspberry Pi will be used in this project to build a facial recognition system for cars access control. This effort includes sophisticated security features for autos of future generations. The Raspberry Pi will act as a command module for the envisioned sophisticated system. Due to the sophisticated security system, only individuals who are registered and authorized may operate the vehicle. A key is typically required to unlock and start a vehicle. However, our study illustrates the use of facial recognition to unlock and start a vehicle. It will lessen auto thefts in addition to being effective. **Keywords- Smart Vehicle, keyless Vehicle, OpenCV, AI, Raspberry pi, Facial recognition**

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1. Introduction

This A smart car features numerous sensors that help the driver analyze different driving conditions, such as topography, weather, and engine temperature. These vehicles also have accelerometers and distance detection sensors for cruise control and obstacle recognition. In addition, cars have buttons for starting the vehicle, operating the power windows and playing music and movies on the heads-up display, to name a few. Vehicles have been made smarter by the impact of AI and ML. Smart cars are now regarded as a need rather than a luxury good. The "success mantra" among automakers is to introduce new features to each edition of their automobiles as a result of the fierce competition among them. As a result, various companies and universities around the globe are working nonstop to introduce new traits. One such feature that has drawn the most attention is one that increases the car's security. Additionally, we have put in place a Raspberry Pi-based system that enables the automobile to start automatically without the need for keys. Facial recognition technology might be used to start the smart automobile. The USB camera is utilized for face detection and records real-time images and video.

2. Literature Review

2.1. Paper Name: FACE RECOGNITION BASED CAR IGNITION SYSTEM

Author: Mr. Chetan Kumar G S*1, Miss. Yogalakshmi R*2

Abstract : Evolution of mankind has witnessed many changes, the changes are socioeconomically and life style changes, revolutions in science and industry has changed many walks of life and provided lot of comforts to humans, these comforts have occupied various stages of life. The changes are witnessed by the transportations too, earlier days of life most of the people were depended on public transports for their travelling purpose, with changes and advancements everyone got the opportunity to have their own vehicle varying from two wheelers to four wheelers, though these options provided better comfort and mode of travel, they have too imposed burden, among them one is providing security to owned vehicle. Though conventional system has option of key and lock facility it consumes some limitations too, one can breach the security with the duplicate key, many incidents have been reported from various parts that vehicles are being stolen with duplicate keys. The technology is trying best to provide solution to this global problem. Facility like alerting the users about its current location via GPS, alerting by means of sounds when some on touches them are there, but they have failed to avoid unauthorized access to them.

Keywords: Ignition, Automotive Electronics, Face Recognition, Computer Vision.

2.2. Paper Name: Face recognition for automatic vehicle ignition based on Raspberry Pi

Author: Alex V. Nuñez1,Liliana N. Nuñez2

Abstract : In this project a facial recognition application for automatic vehicle ignition is developed. This application is built using a Raspberry Pi as the hardware platform and the OpenCV library for computer vision as the software component. In this research the different methods for automobile security are analyzed, as well as, the different methods used to perform face recognition. The main goal of this application is to enhance the security system of the vehicle, allowing to ignite the vehicle only by register users. To achieve this goal three main processes are carried out, face detection, data gathering, and training the system to grant access through face recognition. **KEYWORDS:** facial recognition, Raspberry Pi, OpenCV, vehicle, automatic ignition.

2.3. Paper Name: Facial Recognition for Car Security System using raspberry pi Author:

Description : The project is to build a facial recognition for Car Security System using the raspberry pi. This project offers additional advanced security features for new generation vehicles such as tesla. The raspberry pi will act as a command module for the proposed advanced system. The advanced security system only allows authorized personnel to use the vehicle.

2.4. Paper Name: Machine Learning Trained Face Recognition based Automotive Ignition System

Author: Vamshi Krishna S,Bharath Kumar M,V S Sai Aravind T,Pavan Kumar P,Naresh Babu V

Description : From the past few decades the percentage of individual transportation has increased from 39.2% to 77% globally, which shows a rapid growth in the sales of automotive, this also led to an increased rate of stolen vehicles and road accidents. This project aims to introduce an efficient and feasible methodology by implementing face recognition for improved security. The project incorporates image processing where the

authorized user's facial features are recognized and verified with the database. Implementation of this system can be done on both motor bikes and motor cars with minimal installation cost which prevents the unauthorized use of vehicles. Keeping in mind the future perspectives, face recognition based automotive ignition system can surely provide a highly secure system thereby avoiding theft and ensuring passenger safety. Keywords—Raspberry-pi, Face Recognition, Ignition System, Open CV.

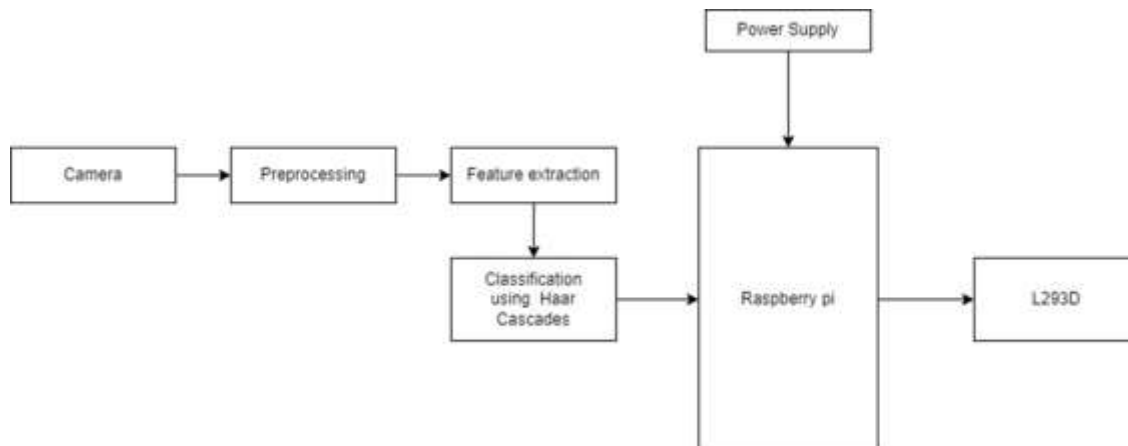
2.5. Paper Name: RASPBERRY PI BASED VEHICLE STARTER ON FACE DETECTION

Author: Anap Sachin Dattatray¹, Chitte Pankaj Pramod², Bankar Akash Dnyaneshwar³, Bhand Nishigandha Padmakar⁴, and Kolse Pooja Ravindra⁵

Abstract: The goal of this project is to use the Raspberry Pi to create a facial recognition system for car access control. For future generation automobiles, this initiative adds sophisticated security measures. For the envisioned advanced system, the Raspberry Pi will serve as a command module. Only authorized and registered people are allowed to operate the car due to the robust security system. Generally a key is used to unlock and start a vehicle. But our project demonstrates the unlocking and starting a vehicle using facial recognition. Which not only is efficient but also will help reduce car thefts. Also, the alcohol detection module will not in any condition allow the car to be started, even if the user is registered.

Keywords— Anti drink and drive car, Smart car, keyless car, OpenCV, AI, Raspberry pi, Facial recognition

3. Block Diagram



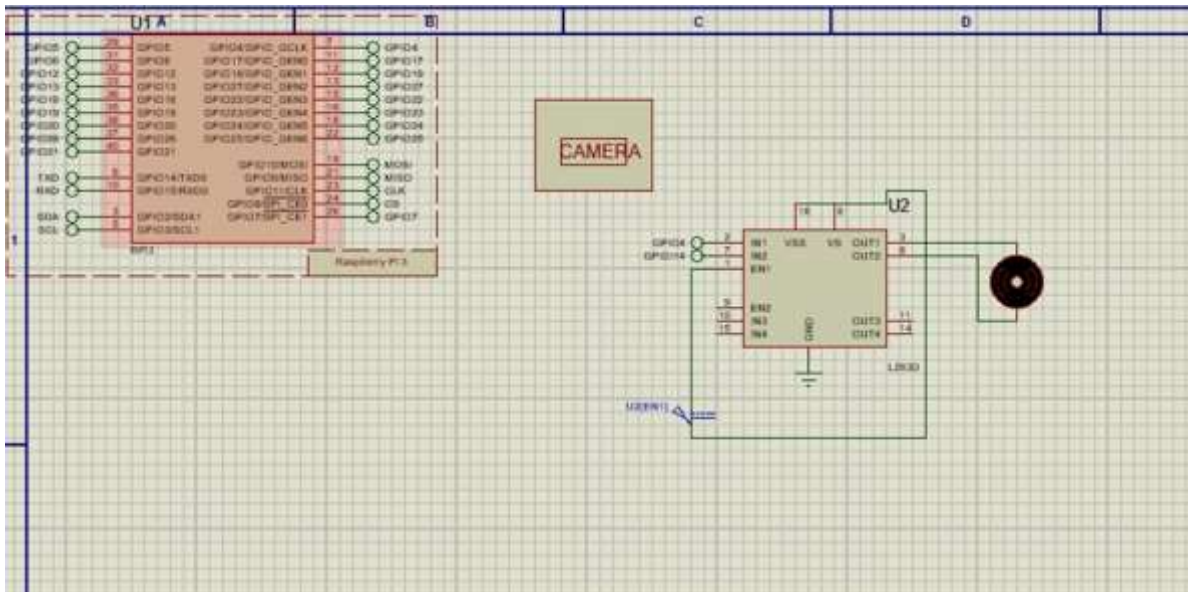
4. Description of Block Diagram

- The Vehicle represents the car or vehicle in which the ignition system is implemented.
- The Camera Module captures the video data of the driver's face.

- The Raspberry Pi serves as the central processing unit, responsible for receiving and processing video data from the camera module.
- The Face Detection and Recognition Algorithm analyzes the video data and detects human faces. It compares the detected faces with a pre-registered database of authorized users for recognition.
- The Motor Control Module interfaces with the Raspberry Pi to control the vehicle's ignition system. It communicates with the ignition mechanism to start or stop the engine based on the face detection and recognition results.
- The Vehicle Ignition represents the ignition system of the vehicle, which is controlled by the motor control module based on the authorized face detection and recognition.

This block diagram illustrates the key components and their interactions in the Face Detection-Based Vehicle Ignition System, highlighting the flow of data and control from the camera module to the Raspberry Pi, face detection and recognition, and the motor control module for controlling the vehicle's ignition.

5. Circuit Diagram Of The System



6. Proposed System

- 5.1 Hardware Elements
- 5.2 Software Elements

5.1 Hardware Elements

5.1.1. Raspberry Pi

The Raspberry Pi is a little computer that is utilised in our research to collect and evaluate data. The Raspberry Pi has 2 GB of built-in RAM, and an SD card can be used to access storage. The SD card also contains the Raspberry Pi operating system. The Raspberry Pi is used to collect data from a camera module and an alcohol sensor, assess it, and transmit it to a mobile app and a car control relay.

5.1.2. Camera Module

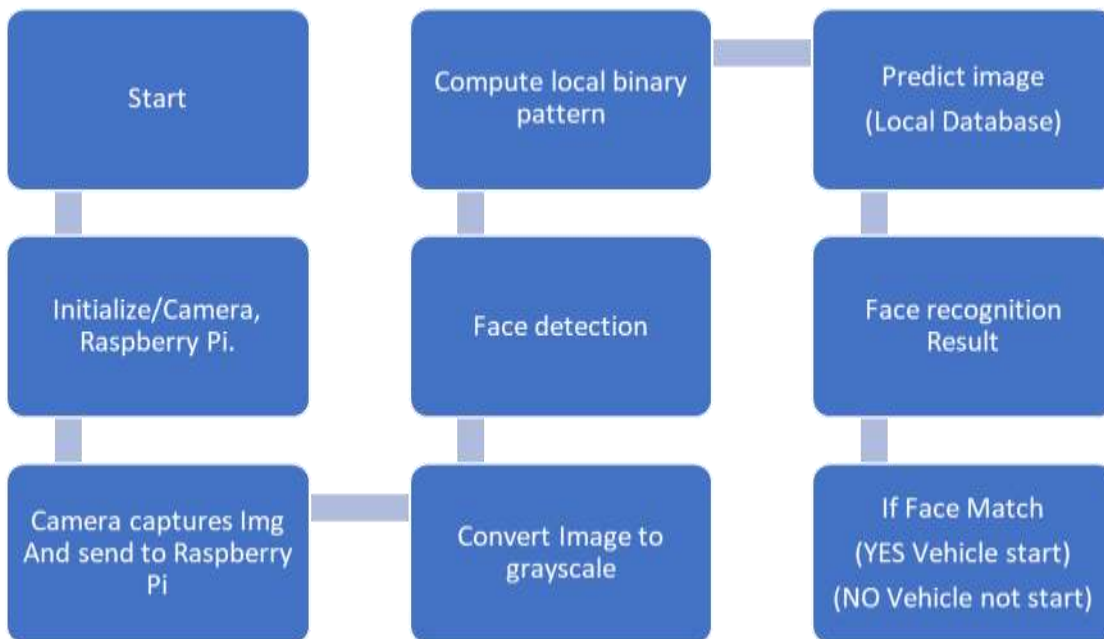
The camera module is a crucial component of our system. When a person comes into contact with the camera, a photo of that person is taken and sent to a Raspberry Pi module for data analysis.

5.2 Software Elements

5.2.1. Thonny :- Thonny is an open source Python IDE that is preinstalled on the Raspbian operating system. As our system relies on facial recognition and OpenCV, it is used for building the code for it.

5.2.2. OpenCV :- Open CV is a shorthand for Open Computer Vision. It is a collection of computer functions designed to address issues with face and picture recognition.

7. System Flowchart



8. Result



The concept has been implemented and tested satisfactorily. The project's goals have been met to a satisfactory degree. Due to the unsafe environment, a sophisticated system is built to safeguard automobiles from theft and other hostile situations. The Python programming language was used to create the facial detection application. The photograph of the individual is captured instantaneously by the camera when this software is performed on the Raspberry Pi. The image is then cut out of this. The identified picture is then contrasted to the owner's previously saved record in the database.

9. Conclusion

The technology can be used in many different settings, such as banks, hospitals, labs, and other highly advanced automated systems, lowering the likelihood of an unauthorised entry dramatically. Evidence can be provided to the security department in the event of a robbery. In comparison to a PC-based system, the Raspberry Pi-based facial recognition system is more portable, lighter, and uses less electricity. Linux's open source code makes it simpler to create apps. The system was developed with Python. Face detection from specified photographs and face detection in real time, or object identification, were both completed. The efficiency of the system was evaluated based on the image processing rate. The investigation's findings showed that the existing method can be used because of its high performance productivity.

10. References

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