Review Article

Survey Paper on Vehicle Security using Facial Recognition & Password

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Abstract - *The frequency of thefts in today's globe and fraud cases has drastically increased. So, to reduce the number of theft and fraud cases, an accurate, updated face recognition system is the need of the hour. Consequently, the proposed work is to design a security system based on a face recognition system that recognizes and identifies the human face and only allows authorized persons to use it. Access is denied for unauthorized persons. It helps achieve high efficiency and accuracy compared to existing security systems like Keys and alarms.*

Keywords - *Open cv, Face recognition, Raspberry pi, Servo motor.*

1. Introduction

In this modern era of technology, improvements are necessary for every field. Various techniques are introduced, like sensors, automatic locking, etc. Even after implementing all these techniques, the theft of vehicles remains high. So, there is a need to implement a security system that is robust, efficient, and highly reliable. According to the reported crime in India, as of 2021 senses, there were 35,019 vehicle theft cases in India.
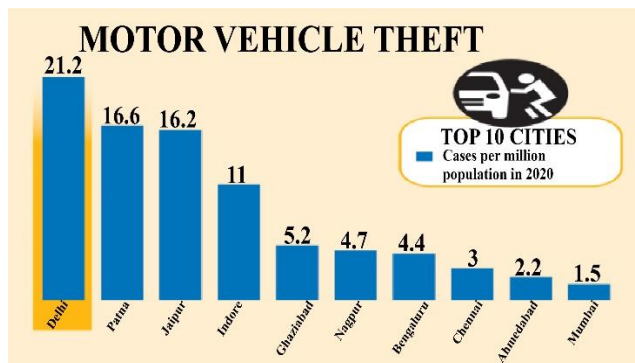

Fig. 1 Vehicle Thefts in Various cities of India in 2020

The crime rate in the year 2020 was 23.1, also the highest among states and union territories in Delhi and followed by Uttar Pradesh, as shown in Fig 1. Cars and two-wheelers are the most common items stolen across the city after mobile phones. Hence there should be a security system involving face detection using Raspberry PI and other algorithms with the database, which is made up of pictures that the vehicle's owner has uploaded. The

The system will stop immediately if the recently scanned image does not match the previously submitted image to the database. The Raspberry PI is in charge of running everything here. In today's systems, various sensors are used, such as doors, lights, engines, etc., where the door sensors are used for locking and unlocking the car doors through suitable keys.

- The sensors will alert if someone tries to unlock the vehicle using duplicate keys.
- But if the key is made precisely as the original one, the sensor might be unable to differentiate the changes.

The other technique used is a surveillance pad to monitor the vehicle. It consists of an RF receiver, processing unit alarm, and display. But the drawback here is surveillance pad must be carried by the user everywhere. The engine and door sensors here are not reliable.

The vehicle will have an alarm system, which makes a sound as soon as someone enters it, but once they steal the vehicle, they cannot get it back. The alarm sometimes gets unnoticed, which is also a major drawback of the existing system. So, the face recognition system is easier to use, and people can be identified without their knowledge. Some of the advantages of the face recognition method for vehicle security are:

- It is convenient, efficient, and senses as soon as one is seated.
- It can be used in addition to the existing methods and is low-cost.
- Requires minimal user input to access this security method.

2. Literature Review

[1] Vishal Vitthal Dhamdhere and Professor Nanda have proposed a paper where they present an anti-theft monitoring system for vehicles based on IoT. It lets owners know the location of their vehicles in real time. Even though vehicles today are intelligent, unfortunately, vehicles are facing a great many crimes. This paper outlines the proposal for building vehicle security and warning device using an IoT-based authentication system. The proposed IoT framework offers only full access for the authorized drivers based on the Raspberry PI model 3B development board, USB Camera, and smartphone interface. Therefore, here the proposed device identifies the unauthorized person inside the vehicle. The device will inform the car's owner where the car is and where it is going.

[2] Kosalendra Eethamakula, Leema G, and Muni Vara Prasad K have proposed a work to provide a vehicle security system using a facial recognition system and control vehicles from anywhere by giving ignition to the engine. This introduced theft control methods that enhanced intelligent automobile security can use to supply essential functionalities. This project helps reduce the complexity and improves security; this system is also more affordable and intelligent than previous models. According to the anticipated outcomes, it takes around 6 seconds to detect and recognize a JPG image in Raspberry PI. For real-time facial detection, it seems too long. Compared to other systems already in use, the paper provides more solutions with accurate outcomes.

[3] Arihant Kumar Jain, Richa Sharma, and Anima Sharma have proposed a system compared to traditional security systems requiring a key, password, and ID card to access the system. But this system has drawbacks, like it can be forgotten or stolen from other unauthorized persons. As a result, there is a need to develop a system that guarantees higher-level security. So, they develop a face recognition and detection system that is more cost-effective, simple, and has higher accuracy. In this work, they used BCM 2835 processor, commonly known as the Raspberry PI board. It is a RISC processor based on ARM-11. The board has features like a USB camera interface and support for many libraries. Using this system, they have developed a security system that is cost-effective and accurate.

[4] Ishita Gupta and Varsha Patil think the information age is quickly revolutionizing; consequently, a more rapid, effective, and precise vehicle user identification and authentication method are required. Nowadays, Face recognition has become a crucial skill for user identification methods. The project has interfaced an LCD and camera to the Raspberry PI board. They created a real-time program that assesses the scans against the Raspberry PI's recorded data. Where the name of the person who was spotted is shown on the LCD, and whether or not the face is recognized, they will have access.

[5] Anap Sachin Dattatray, Chitte Pankaj Pramod, Bankar Akash Dnyaneshwar, and Bhand Nishigandha Padmakar say that a smart automobile has many sensors that assist the driver in analyzing and helping him drive the vehicle. Distance detection and accelerometer sensors are used in vehicles for obstacle detection and cruise control. Some automobile features are no longer considered luxuries but necessities because of intense rivalry among automotive manufacturers.

Enhancing the car's security is one such feature that has more potential. Implemented a system based on Raspberry PI that allows the car to turn on automatically without using Keys, and this smart car can be turned on using a facial recognition system. The USB camera captures real-time photos and videos used for facial detection. This project also uses an MQ3 alcohol sensor directly connected to Raspberry Pi.

[6] Dr. Khan Sohelrana and Amena Tamkeen proposed a method that uses default program data and faces recognition technology to give automobiles exceptional security and prevent theft. GSM is a specific kind of modem that may use a sim card and function similarly to a cell phone. It is utilized to convey necessary information about the owner and notify them of the longitude and latitude of the vehicle's location. The final system is relatively simple, with more security for car protection at a lower cost compared to other systems since it employs a CPU, Raspberry PI, a camera, and a Wi-Fi controller put in the vehicle.

[7] Ajish T Mohammed Shafeq K, Mr. Rohitram T claims that vehicle security is now considered, and various methods are available depending on the technology. A GSM-based car security system is one of the potential technological solutions. It is produced by multiple groups to locate the position of the vehicle stolen, as the majority of vehicle theft alarms and gadgets installed in vehicles did not show to be a solution to customer difficulties. This system uses GSM technology to add a lot of capabilities to the automobile. Different vehicle operations, such as locking, unlocking, and turning the car ON and OFF, can be completed by simply sending a message from a certain phone number to the car's GSM modem. Therefore, the vehicle security system must be effective, strong, and trustworthy.

[8] Mr. Raj rai, Prof. Dinesh Katole Survey says that everywhere in the world, theft of vehicles is rising daily. By incorporating new technologies to prevent theft, vehicle manufacturers seek to enhance their vehicles' security aspects.

A paper deals with a real-time face recognition system using the FPGA platform. The system can detect and recognize the person who enters the vehicle, and it will check whether they can access the vehicle. When an uninvited individual tries to enter the car, the system's GPS and GSM module communicates with the owner, saying

that some unauthorized person is trying to access your car. If not, it will give access to the owner.

[9] Varsha Goud, V. Padmaja says that any gadget is a theft-deterrent system, or it can be a method used to detect unauthorized access and, in addition to giving the user the highest level of security, it can also carry out accident detection. If an accident occurs, a message will be sent immediately to the hospital or police station closest to the scene.

The vehicle security systems which exist now, like alarms, and flashing light techniques, are used, but the drawbacks of these systems have cost; they may prevent the vehicle from theft, but they cannot trace the vehicle after someone has stolen it. Using the system, the vehicle owner gets information about their vehicle's location with the help of MMS (Multi-media message) by using GSM (Global System for Mobile Communication module. The technology has the advantage of employing face recognition to provide security compared to the current system.

[10] N Kiruthiga1 and L Latha say that the use of vehicles is very required in today's world, and protecting them from theft is also required. Paper deals with developing an advanced security system in automotive based on a face detection system. It has a Wi-Fi module and an IoT-based control platform. The face recognition system has an optimized algorithm and recognizes faces.

They have developed a theft control technique that will provide the required functions by advanced intelligent car security to prevent access by unauthorized users. If the face of the person is detected as unknown, then the system will alert the user, and the ignition system will remain locked. If it's an authorized person, then the ignition system will unlock.

[11] Prof. Kumthekar A.V and Ms. Sayali Owhal believe that the frequency of car thefts and the various methods used to commit them to require vehicle owners to be more cautious in guarding their vehicles. The car security system is still insufficient to give vehicle owners the necessary security.

Therefore, it is anticipated that the suggested approach of applying biometrics technology will be a solution for vehicle security. Facial recognition technology will be used in this biometrics application. This study uses facial recognition in real-time, utilizing the fisher face approach to improve the car's security system when the engine is still on. The results indicate an accuracy of 83.34 percent. The outcome demonstrates that facial recognition utilizing the Fisher Face Method is one of the best ways to increase vehicle security.

[12] Guxiong Li. Kai Huang says that the traditional car key is not only a burden when holding a bundle of

products but also performs poorly in anti-theft. The signals of the new keyless go system could be hacked.

An intelligent vehicle security system built on Face-Recognition technology provides a method for detecting and identifying human faces. The method used in this case is to detect and identify human faces. It describes a nearly functional real-time face recognition system that tracks a person's head and identifies them by comparing their facial features to those of well-known people. This problem has a two-dimensional approach. Projections of faces are made into a feature space that best encodes their variation.

[13] V Akila, K. Sriharshini, and P Sravani say that the advancement of the automotive sector is significantly impacted by technology. Automobile industries are trying to enhance their systems by changing their hardware and software.

GPS is the greatest way to track down vehicles; therefore, the vehicle security system needs to be dependable, strong, efficient and reasonably priced. Through a GSM module, it locates the car and transmits that information to the intended user. The vehicle can carry out various tasks if we use the GSM module and an SMS template. Due to automatic face recognition technologies, security and commercial applications have significantly increased in recent years.

[14] Geetha Shree A, Ashwini S Shivannavar A, proposed that the thefts of vehicles have increased rapidly. To protect users, manufacturers are dumping new technologies into their products. So, use an advanced security access system aimed to exhibit face recognition techniques that could substitute conventional key vehicle ignition systems. A biometric-based system allows the different stages of verification like "who you claim to be" based on "who you are," etc.,

Paper deals with facial recognition based on the PCAR algorithm consisting of CD Euclidean-Norm classifiers are used to generate precise results provided the number of images used in the training phase is precise and distinct.

[15] Viraj Parmar, Rushikesh Shinde, and Mr. Shital Agarwal proposed that in the present era, new technology development is essential to achieve advances in every area, including the project chosen in the field of vehicle security.

This study's subject is the security system that uses facial detection and identification using the Raspberry Pi, FRS algorithm, and a database of photographs submitted by the car owner. The system will shut down instantly if the recently scanned image does not match the previously submitted image to the database. The Raspberry Pi is programmed to control every step of this procedure. The earlier system used simple geometric models, but in this era, face recognition.
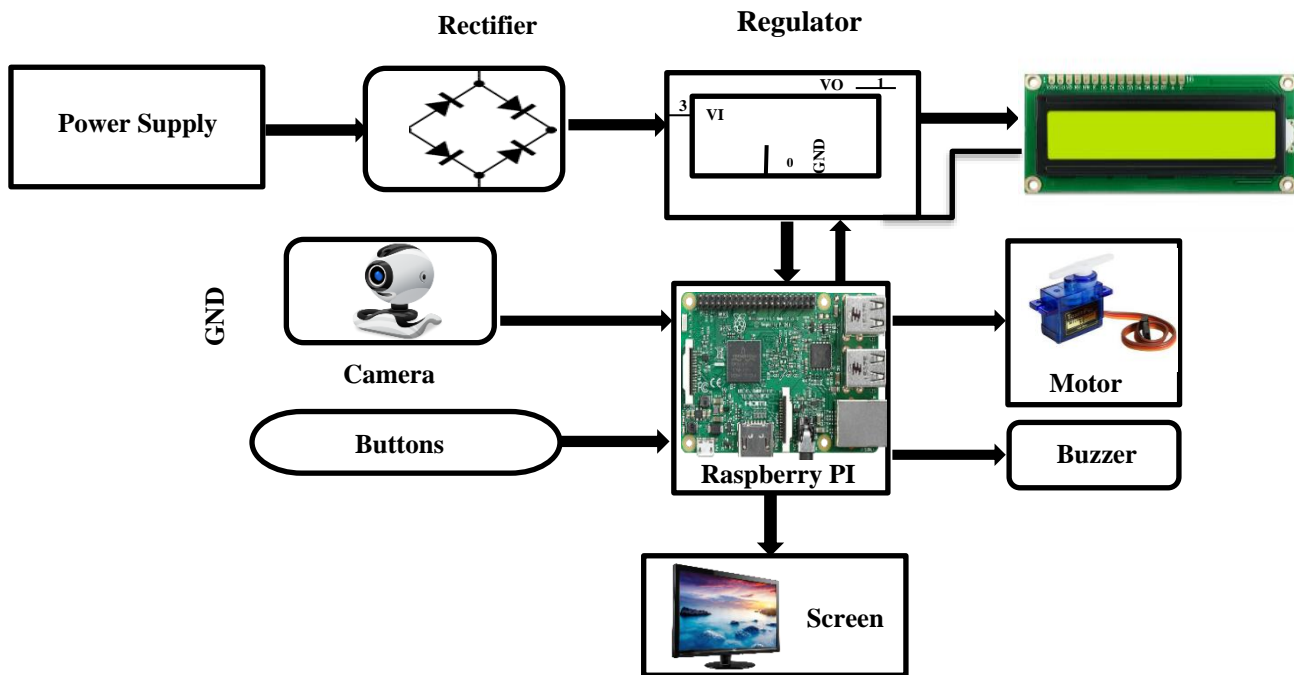
3. Methodology

Fig. 2 Block diagram of methodology

3.1. Description of the Block Diagram

The system consists of a Power supply, Camera, Relay, and, most importantly, Raspberry Pi. The power supply provides the necessary power supply to our system, basically to the Raspberry pi. The camera module is attached to the camera module.

It captures photos of the user who meets it in the car. The captured photos are then sent to raspberry pi, where the photos are analyzed with the stored database of users. The photo captured is compared with the saved user data. If the image match is found, then the user is permitted to turn on the system. If not, then the car doesn't start.

4. Conclusion

The Proposed Face-Recognition system consists of a Raspberry Pi board, a camera, a motor, and a buzzer. It automatically captures a person's face as the car is beginning and checks to see if the person is authenticated by comparing their face to a database. So, if the person is authorized, he can start the car. If not, the pin code to start the vehicle. This approach makes thief identification smarter, cheaper, and more difficult to defeat than conventional ones.

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