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ADVANCED VEHICLE SECURITY SYSTEM USING BIOMETRIC VISUALS

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Abstract

Vehicle Anti-Theft Face Recognition is an advanced system that can be utilized in many cars. Today, it is not difficult to make duplicates of vehicle keys and using such keys increases the risk of robbery. For such problems, we hereby propose an efficient and reliable solution. Our system uses a face recognition system to identify the authorized users of the vehicles and only authorized users are allowed to use the vehicle. This allows for a fast easy to use the authentication system. The system uses a Raspberry Pi circuit; it also consists of a camera. When we turn on the system authority provided by 3 options that are registration, start, and clear data, while registering, it first scans the owner's face. After successful registration, the owner can start the vehicle. If an unauthorized user tries to use the car, the system scans the person's face and checks whether face matches with the authorized face, if it does not match the system denies. In this way, the system helps to secure such intelligent vehicles.

Keywords: Vehicle Anti-Theft, Face Recognition, LCD Display, DHT-11 Sensor, Raspberry-Pi

I. Introduction

Everywhere in the world, using an automobile has become essential, and keeping it safe from theft is equally necessary. Typically, these security measures are offered by both biometric and non-biometric techniques. However, encryption of decrypted data and password hacking can occasionally cause this system to malfunction. This paper's primary goal is to present a sophisticated car security system that includes an IoT control platform and a facial detection system. Based on an enhanced algorithm, the facial recognition system detects faces in cars, particularly four-wheelers, when no one should be inside and sounds an audible alarm. For example, many kinds of security systems have been designed to prevent thefts. Every advertisement features a closed-circuit television system, or CCTV. Anti-theft solutions abound on the market, ready to be purchased. On the other hand, the cost of such an anti-theft device is not high. In this industry, we verify a working prototype of an actual anticipates antitheft system that car owners worldwide can probably install. GSM services and a microcontroller are used in this system. Technology has also led to the development of the most sophisticated security in the modern world.

II. Literature Survey

Guodong Guo, et.al [1], has talked about how support vector machines for face recognition should be able to handle different alterations in face photos. Because of illustration and our point of view, there are many differences in photos.

Timo Ahonen, et.al [2], has covered "Face Description with Local Binary Patterns—Applicability to Face Recognition," which makes use of texture features, face misalignment, and face image representation. Less efficient algorithms are being used.

Mira Kartiwi, et.al [3], has talked about creating a face recognition and face detection algorithm using a Raspberry Pi to improve security in smart home systems. These algorithms will identify faces in images.

K. K. Dube, et.al [4], has talked about face recognition technology for unlocking cars with embedded technology and GSM, the security system's primary goal is to stop car theft and guarantee the safety of the vehicle by obstructing potential points of theft.

III. Proposed Work

This Paper proposes a sophisticated system that will employ facial recognition to determine who the vehicle's authorized user is. When an unauthorized user attempts to operate the vehicle, the system looks at their face to see if it matches the authorized user's face; if not, the system rejects access and sounds a buzzer. The system aids with the security of such intelligent vehicles in this way. The expandable real-time auto security system uses a powerful integrated computer vision unit and high-end microprocessor to secure cars while they are parked. For authentication, face detection and recognition systems employ improved algorithms. Here, we're utilizing the most recent Raspberry Pi3 Model B+, which has 32 RAM and a 64-bit, 1.4GHz quad-core processor. We have set up a Pi camera using the appropriate Raspberry Pi camera interface. The technology will become passively active when someone opens a car door and gets inside. Moreover, the camera will turn on. The camera on the automobile door is immediately activated and records the subject's face. After obtaining the person's image, the algorithm proceeds to attempt to identify the face. The alarm will sound and a message will be sent to the owner automatically if someone unauthorized attempts to start the automobile by damaging the door.

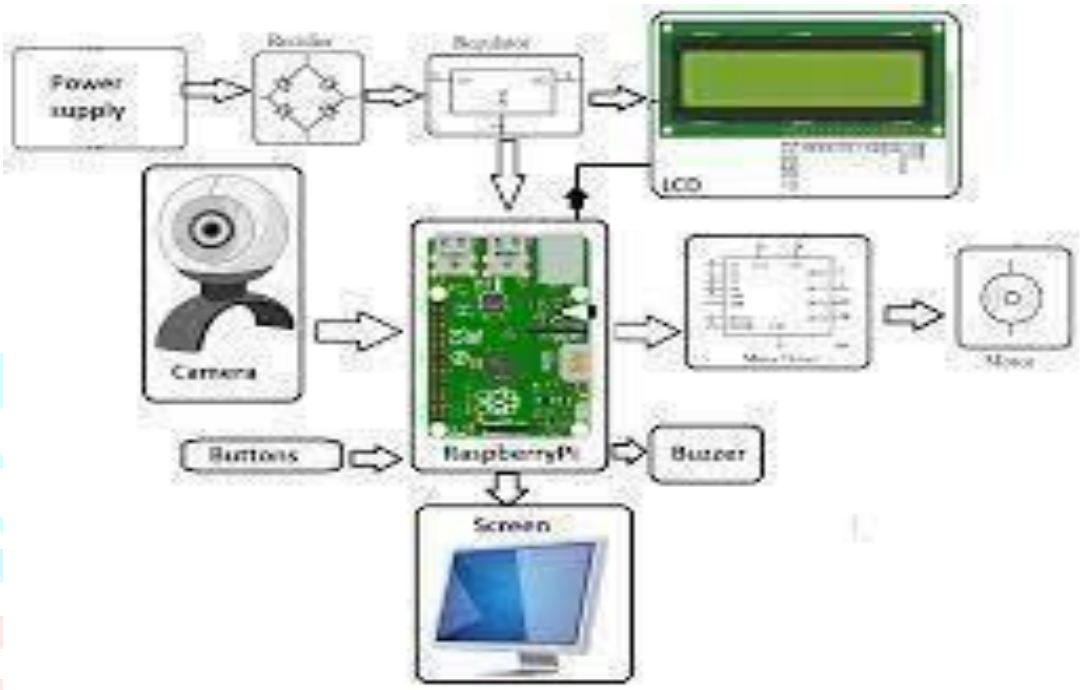


Figure 1: Block Diagram for Vehicle Anti Theft Face Recognition System

IV. Hardware Description

The hardware description module for the Raspberry Pi that we are using is seen in Figure 2 below. With a normal keyboard and mouse, the Raspberry Pi is a low-cost, credit-card-sized computer that can be plugged into a TV or computer monitor. With the help of this useful small device, individuals of all ages may learn about computers and programming languages like Python and Scratch.

The most recent Raspberry Pi version is this one. Unlike before, when we had to use a Wi-Fi dongle in one of its USB ports, this has built-in Bluetooth and WIFI. RPI3 has forty pins in total.26 of the 40 pins are used for GPIO, and the remaining pins are used for power or ground. The diagram on the right side shows many additional items in addition to the four USB ports, one Ethernet slot, one HDMI port, one audio output port, and one micro USB port. Additionally, there is a single micro SD card port that requires the installation of the suggested operating system. You can communicate with your Raspberry Pi in two ways. You have two options for interacting: you can use the HDMI port directly by connecting it to a VGA cable, keyboard, and mouse, or you can utilize Secure Shell to interact from any system.

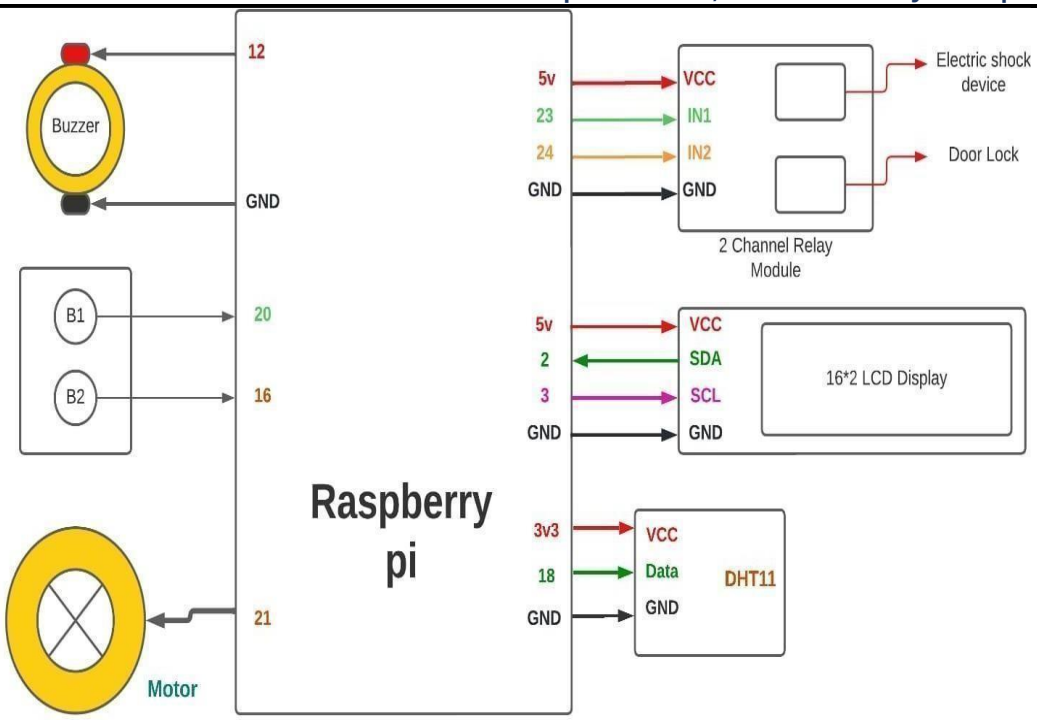


Figure 2: Raspberry Pi- Architecture

V. Raspberry Pi-Camera Module

It is possible to capture still images and high-definition video using the Raspberry Pi camera module. For those who want to learn more, it has a lot to offer sophisticated users, but it's also quite user-friendly for newcomers. Many examples of individuals utilizing it for slow motion, time-lapse, and other creative video effects can be found online. Additionally, you can build effects with the libraries we include with the camera.

Figure 3: Raspberry Pi- Camera Module

VI. GPS & RELAY MODULE

A satellite-based navigation system that gives time and location data is called the Global Positioning System (GPS). Anyone having a GPS receiver and an unhindered line of sight to at least four GPS satellites can freely access the system. By accurately timing the signals supplied by GPS satellites, a GPS receiver determines its position. These days, GPS is widely utilized and a standard component of smartphones. All smartphones have GPS, but with an inexpensive Raspberry Pi GPS module, the Pi can also be turned into a GPS receiver. A major benefit in many outdoor applications is the ability to move precisely.

Figure 4: GPS Module

Relays are electrically operated switches that have the ability to manage low voltages, such as the 5V supplied by the microcontroller board pins, and may be turned on or off, allowing current to flow through or not. As we'll see later, all it takes to control a relay module is a Raspberry Pi board and any other output.

Figure 5: Relay Module

VII. LCD DISPLAY & DHT-11 SENSOR

An 8x2 LCD display is a relatively basic module that is frequently seen in many different kinds of circuits and devices. LCD displays simply characters on the screen and creates a viewable image using a liquid crystal. Super-thin liquid crystal screens are a common feature of laptop computer screens, TV screens, mobile phone screens, and portable video game screens.

Figure 6: LCD Display

The DHT-11 sensor is used to measure humidity and temperature in the atmosphere.It has the following operating voltage and current ranges: 3.5V to 5.5V for measurement, 0.3mA for standby, 20% to 90% for humidity, and ±1°C and ±1% for temperature.

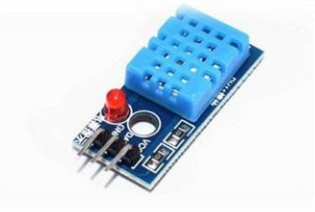


Figure 7: DHT-11 Sensor

VIII. OTHER COMPONENTS

An electric motor and a gearbox are combined to create a gear motor, also known as a geared motor. Geared motors save operating costs because you just need to mount and maintain one system rather than multiple. to display the vehicle's state, such as ON or OFF. File cabinets, storage shelves, vending machines, and other items can be locked with a Solenoid Lock. When the circuit disconnects, the solenoid 12V lock operates, and it instantly unlocks upon powering on. The purpose of the shock system is to scare off the uninvited party. This shock device assists in automatically shocking anyone who tries to start the car without authorization.

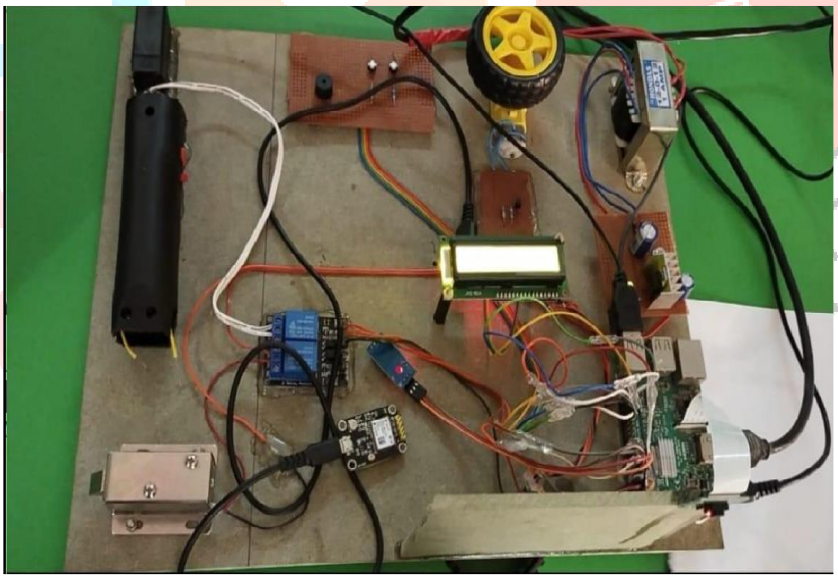
(a)

(b)

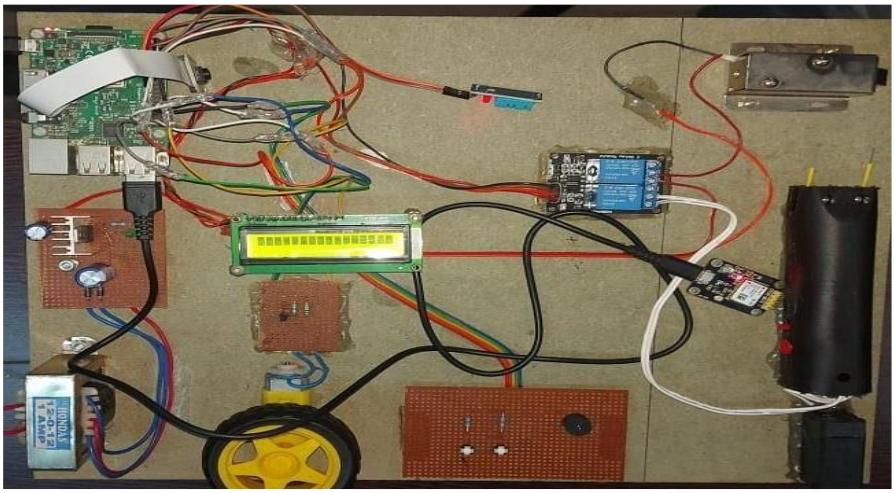
Figure 8: a) Gear Motor b) Solenoid Clock

IX. RESULTS

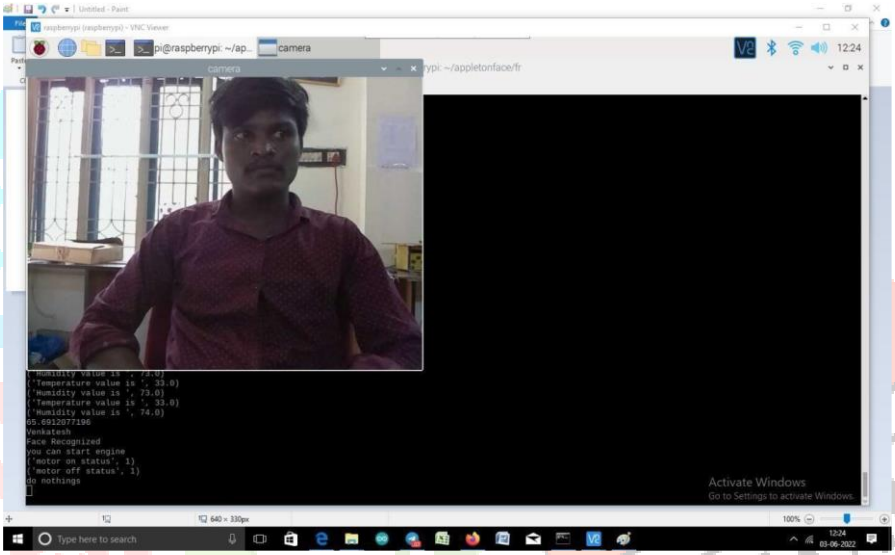
Step 1: Vehicle anti-theft Face Recognition System



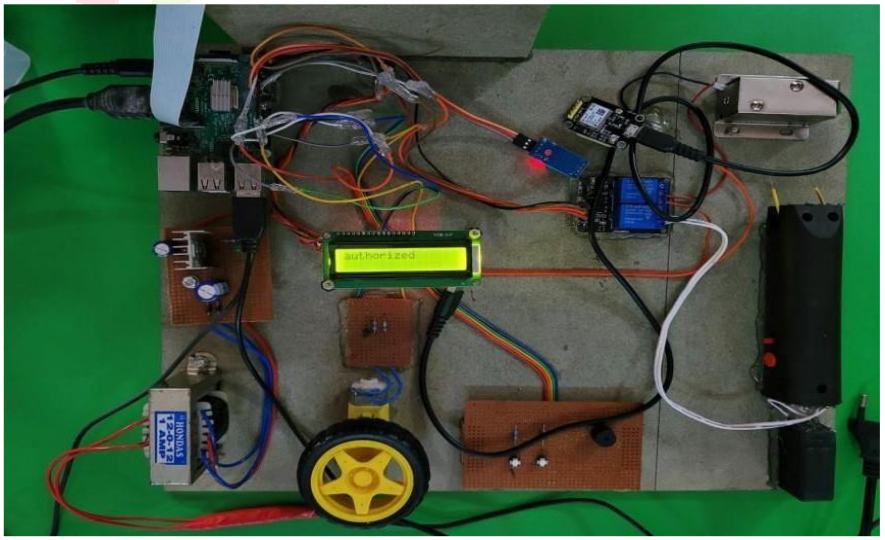
Step 2: After switch on kit



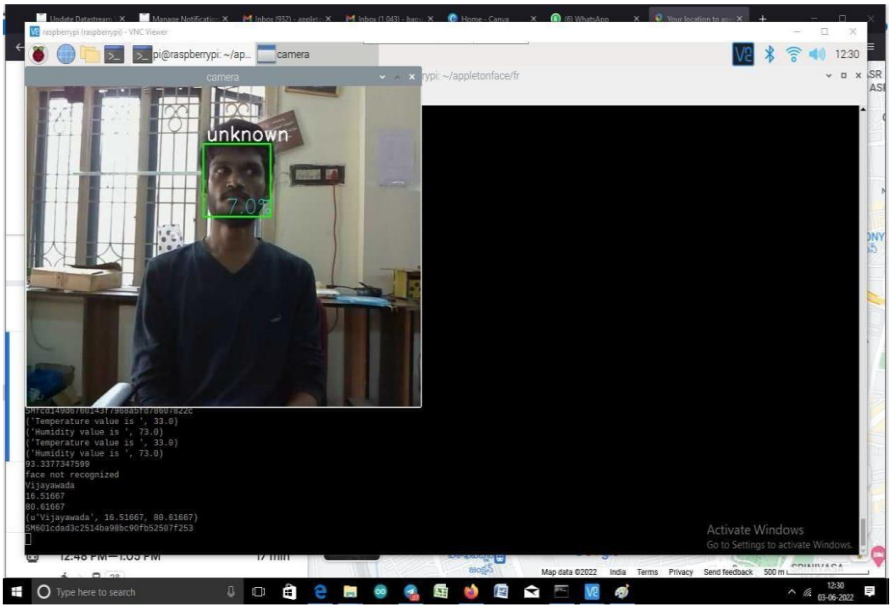
Step 3: Detect the face by camera



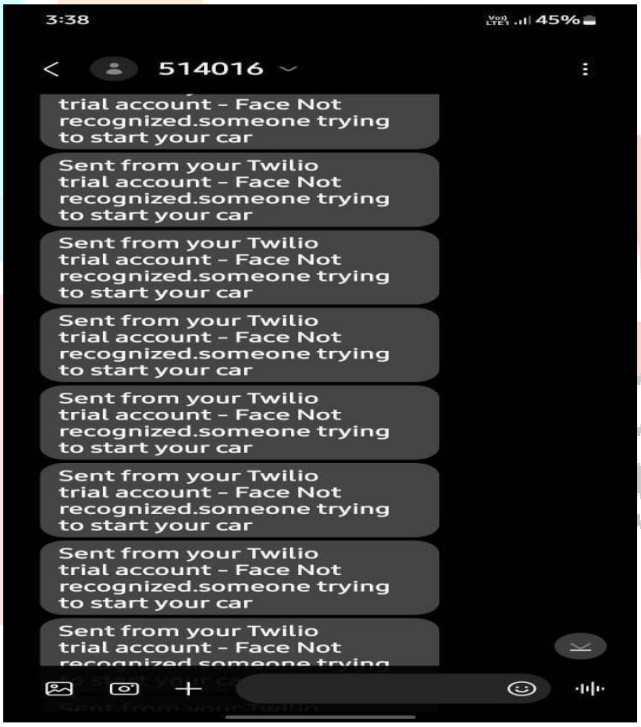
Step 4: Checking that person is Authorized or not



Step 5: Detect face by camera if that person is authorized or not



Step 6: SMS will sent, if any not authorized person start the vehicle



X. CONCLUSION

In this Paper Vehicle Anti-Theft Face Recognition was proposed by using Raspberry-Pi Module. The number of vehicle robberies is rising daily. There are some procedures in place that aid with recovery. However, the victim is still unidentified. This system will aid in the victim's location. We can improve and uphold vehicle safety by utilizing this specific system. The buzzer will sound and the central controller will instantly stop operating if an unauthorized person attempts to use or steal the vehicle. Additionally, a picture of the victim will be taken, and the date, time, and unidentified face will be recorded in a database.

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