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Raspberry Pi Based Intelligent Car Anti-Theft System Through Face Recognition Using Fingerprint detection

Smart Vehicle Security System using Raspberry Pi

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Abstract — *The serious problem for car owners today is that they are constantly afraid of getting their vehicles robbed from or outside a home, common town & mall parking's. Image processing based on the detection and prevention of vehicle theft system is the ultimate solution to this problem. A program for theft prevention and recovery of cars has been developed in this research in a simplified and faster way. This proposed device has two parts, the software and the hardware. Raspberry Pi processor, Fingerprint module, GPS module, camera, buzzer, mobile app, motor driver, and DC motor are included in the hardware component. Python language is used as a component to the software. In this paper, low cost vehicle anti-theft system is proposed, consisting of a fingerprint detection, face recognition, a GPS (Global Positioning System) module, IoT based android application and a control platform. In this method user first validates his fingerprint to unlock vehicle door lock. After approved access, user enters in car then camera captures image of user & immediately sends an image of that person with warning notification to the owner's Mobile application along with email and concurrently compares the face to the database to verify whether or not it is a valid driver. The owner is made capable of conducting car stopping from his mobile via the call or sms. The GPS sensor in the vehicle monitors the car's location so that the car's owner can continue to track the car's health from a distant location. The car ignition system cannot be started without an Authorized Individual of the Vehicle. Therefore, through this scheme, the thief's identity and the car's location are actually smarter.*

Keywords: *Raspberry PI, Buzzer, GSM, GPS*

I. INTRODUCTION

In this paper we present an anti-theft monitoring system for vehicles based on The Internet of Things (IoT). It lets owners monitor their car's location from any location, in real time. The automobile industries are having one of the popular products nowadays, where Usage of IoT technologies will make vehicles intelligent. Yet unfortunately these are Vehicles are facing a great many crimes. This has therefore become a big obstacle for the IoT to prevent the expert criminals from these crimes. This paper outlines a Proposal for the development of a vehicle guard and warning device using IoT-based biometric authentication. Whereas, the proposed VSS IoT framework only offers complete access for approved vehicle drivers based on the Raspberry Pi Model 3B development board, USB camera and smartphone interface. Therefore, if the proposed device identifies an unauthorized individual inside the car, the device would alert and transmit its picture through the internet to the vehicle owner and its location if the vehicle is stolen or harmed.

II. MOTIVATION

Everyone and every company in this world wants to keep up with the technical progress. In this way too, the car industry is not behind. Almost everyone has a car today. When owning a vehicle is a big expense, people in the automobile industry are very worried with new technology. In terms of automotive health there are several choices available based on the technologies being implemented. Most auto theft detectors and tools are mounted in vehicles, but they have not proved to be a solution to issues with consumers. Some of the potential security options is the GSM-based car / vehicle protection network, which is programmed to locate the location of the car / vehicle when it is stolen. This program essentially makes use of GSM technologies to incorporate different features in a vehicle. By sending a notification or key from smartphone application from user's (specific) mobile to the processor installed in the car, operations such as switching ON and OFF of the car can be performed through this system. Various car operations can be done by sending SMS or notification with defined design.

III. PROBLEM DEFINITION AND OBJECTIVES

Different methods, techniques and algorithms have been developed for vehicle theft detection and recognitions but they are not very useful. We need to find alternative solutions to prevent vehicle theft. We're being inspired from current framework and Objective is to develop a low cost system for smart vehicle anti-theft system which consists of fingerprint

module, face detection module, GPS module & smartphone application. Using Scale Invariant function transform, we need to align user object with database image. We have pre-processing in that system then select extraction feature and compare image with database and get the result. The object detection purpose is to identify and locate (localize) any recognized item within a scene.

IV. LITERATURE SURVEY

The achievement of the automobile industry has grown across the world in recent years[1]. Yet there is sadly an unprecedented growth in the criminality of vehicles[2]. Most vehicles are currently regulated via mechanical keys, security cards, and password / pattern. But the vehicle security systems are continuously improving[3] with the development of IoT technologies and many embedded mechanisms. These improvements depend on the requirements of the vehicle owners and police workstations[4]. Whereas, they are obsessed not only with car substance fraud but also with car failure and the vehicle owner's personal protection requirements[5]. Many well-known biometric identification techniques and verification techniques existed. Several surveillance software employed fingerprints, facial recognition, and iris. Face detection is considered a good biometric technique of choice for vehicle protection and warning systems because it is based on information on the human face and can operate under various conditions[6]. Hence, most of the techniques for face recognition were developed to achieve a higher rate of discrimination[7]. Whereas, some complicated algorithms are used in the face recognition process. This project presents a robust VSS based on a low-power processor and IoT devices as a vehicle theft guard[8]. This program transforms the images produced by the mounted USB camera into the Vehicle to gray size images for real-time identification and recognition of objects. Where the combination of AdaBoost algorithm and Haar Cascade classifier increases the speed and quality of the face detection[9]. The proposed program then makes use of the PCA algorithm to identify faces of drivers[10].

V. SYSTEM ARCHITECTURE

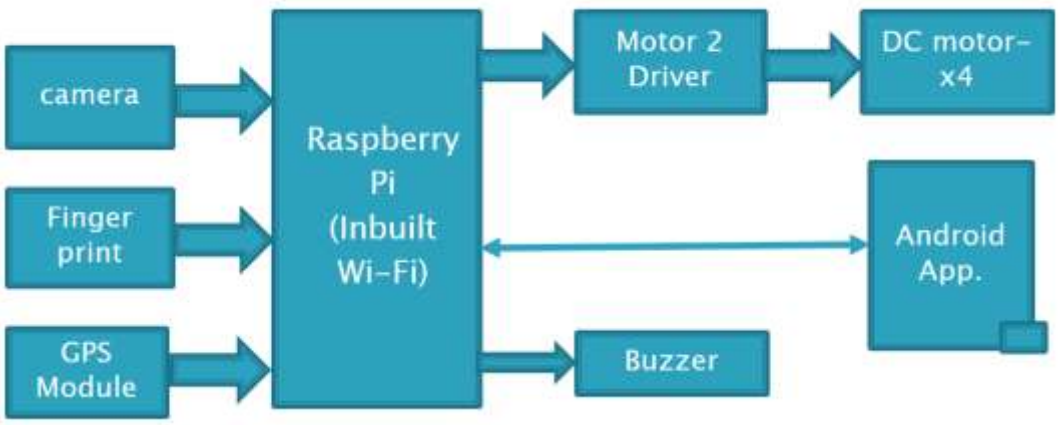

Fig.1: System Architecture

VI. PROPOSED SYSTEM

The concept behind the proposed VSS IoT is defined in this section. Detection and identification of the identities of skilled criminals is part of the suggested program. In addition, our proposed solution offers low cost, improved flexibility and user-friendly is the most essential to incorporate an embedded automotive safety program in real-time. The program must then ascertain the vehicle driver first, then give him an authorization to use his / her vehicle system.
The program proposed includes a mixture of biometric techniques, embedded system devices and IoT technology to develop efficient vehicle security monitoring and warning system. In addition, the device can be implemented effectively by combining two parts: hardware architecture design and computer design software design. In this paper we propose an anti-theft monitoring scheme for vehicles based on The Web of Things (IoT). It lets users track their vehicles' location in from anywhere, in real time.

Advantages of Proposed System:
- Improves health of vehicles
- Continuous car tracking can be performed remotely
- Prevents vandalism of cars
- Time-saving solution
- Equipment to use
- Effective cost

VII. APPLICATION

- GPS Car theft detection can be used in transportation vehicles of Companies, schools, colleges and industries.
- This project can be used in our cars and even in bikes.
- VIP vehicle tracking
- Can also be used for Child or animal tracking
- Vehicle Security Applications
- Ambulance tracking
- Navigation systems

VIII. CONCLUSION

From this we incorporate fraud prevention strategies that can provide the essential functions provided by advanced smart car technology to deter fraud of vehicles and avoid the usage of unauthenticated users. With the picture of the hijackers it is possible to figure out a stable and protected area network for car consumers and even the key points for the investigators. By using this method, we can foresee the crime in our everyday lives. This project will help us reduce uncertainty and enhance health.

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