

Fingerprint and Raspberri Pi Based Vehicle Authentication and Secured Tracking System

Rajeshwar Rao Arabelli, Keerthana Revuri

Abstract— Generally, keys are the only tools used to operate (start/stop) the vehicle. Key based vehicle access will be provides security to protect from thefts. As per the previous security drawbacks and according to present standards in India we were proposed a high level security to vehicle. The authorized person can able to use the vehicle using finger print authentication system. A person can operate the vehicle by placing his thumb on the finger print scanner which is in turn interfaced to Raspberri Pi with the serial mode interfacing. Unique finger impression can be checked by accessible fingerprints in the Digital flag controller joined to Scanner.Digital signal controller compares with the available data. If data matched with available data then send the information raspberri Pi. Processor allows only the authorized users to operate the vehicle. In case an unauthorized operator tries to start the vehicle, then security alarm will be on by using the commands given. We can trace the vehicle by using GPS when emergency. The information can be updated to webserver in the form of a link of Google map. The information can also useful to identify when theft was occurred unfortunately. We can also stop the vehicle by sending the commands through IOT to and it will not start once it is stopped.

Index Terms— Raspberri Pi, Security, Tracking, fingerprint scanning and IOT.

I. INTRODUCTION

Vehicle theft or attempting to steal is also a motor vehicle one of the criminal act of stealing. As per the statistics given by Indian Police Nationwide in 2017, there were an estimated 700,000 motor vehicle thefts happened and for every 100,000 people approximately 300 motor vehicles were stolen and the most of thefts happening in metropolitan cities. The loss due to motor vehicle theft in 2017 will be 430 crores. Every year, the count of stolen vehicles is increasing. A senior IPS officer said that “Vehicle thefts are on the rise in India, with at least three vehicles being stolen daily in each metropolitan city,” he said reported by Hindustan time’s article. Statistics of thefts and recovered vehicles were given in the table 1. Even though recovery process in done but officers were not able to find 25 percent of the vehicles. The major reasons for theft are due to less parking space at work and residence, residents used to park the vehicles on roads. “A car thief need a small set of instruments like screw driver and a socket to start the ignition. With these the system can be unlocked in 2 to 3 minutes,” said a police officer, who worked with the

anti-motor vehicle theft unit. The police people concentrating on the people who are regularly theft the vehicles but those people will be dismantling the vehicle and selling spare parts useful in market. Due to this we are unable to recover even though person caught. Prevention of such incidents is our priority. Physical methods have been welcomed by everyone compared to rational techniques [1]. Typically, to anticipate robbery, a physical kind counter measure is utilized, for example, latch, plate break bolt and other more which is a preventive activity yet it isn't sufficient safe. The objective is to generate a controllable system with secured authentication i.e., unique mark based in light of the fact that everybody has exceptional unique finger impression and Global position framework (GPS) based route of vehicle. Wireless transmission system will be required to detect a theft attempt. The systems need to be designed with precise calculation of accurate location.

Driver Assistance and Safety System for Car was also proposed by many researchers but the systems giving the helping hand in passing the information about faults [2].

STOLEN AND RARELY FOUND

CITY	TWO WHEELERS		MOTORCARS/JEeps		BUSES		TRUCKS		OTHERS		TOTAL	
	STOLEN (S)	RECOVERED (R)	S	R	S	R	S	R	S	R	S	R
DELHI	8,171	1,938	4,538	709	20	14	71	0	422	88	13,216	2,738
MUMBAI	2,460	720	1,307	248	0	0	57	15	251	151	4,075	1,134
KOLKATA	518	82	116	68	2	2	22	15	1	0	659	157
CHENNAI	168	152	60	37	0	0	10	10	25	25	263	224
BANGALORE	4,616	1142	383	139	6	1	17	8	68	62	5,090	1,352
HYDERABAD	1,183	300	121	23	0	0	0	0	66	27	1,370	350

Table1. Statistics of vehicles stolen and recovered statistics in India (HindustanTimes)



Figure1. View of vehicles on road in India in Metropolitan cities

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II. EXISTING SYSTEM

The system has already been designed by linking a micro controller in between GPS and GSM, here in this the registered person need to send a SMS to start/ stop the vehicle. We could also get the longitude and latitudes through SMS. Here in this system only one registered person can access the system and others are not able to access the vehicle. The present system will be used only for the purpose of giving assistance to driver if any fault occur in vehicles [2]. This could also be done based on telephonic conversation made between driver and call center services section. In India most of the families using one vehicle for all family members[3]. The system can also be used to control an actuator. Automation process will not be there.

III. PROPOSED SYSTEM

This framework projects on to oversee the armada, police vehicles movement and automated robbery alerts by employing GSM and GPS technique. The framework utilizes Global Positioning Satellites for evaluating geographical position and time data [4]. Present existing system can able to find the vehicle where it is located but it can't avoid the theft of vehicles [5]. A coordinated GPS-GPRS and Wi-Fi based framework has been suggested to tract vehicles utilizing maps implemented by Google [5]. The GPS module was set in the moving vehicle to perceive its current position, and to be traded by using web related through Wi-Fi auto's data port as a revive to a recipient station.

In this research work, we have developed a micro controller system with Finger Print module for the purpose of secured authentication, GPS used to get the information about longitude and latitudes and vehicle location can be updated in web server and the location will be displayed using google maps. Here we are utilizing Raspberri Pi processor which had inbuilt

WIFI for information exchange. A two way communication process is achieved using a WIFI which can able to stop the vehicle if theft was occurred under any other circumstances. Our Project main aim is to avoid the theft of vehicles and information about vehicle location. This paper gives the bio-metric security data arrangement of the vehicle and unique mark confirmation of the driver of the vehicle is utilized to shield the vehicle from hostile to burglary. Unique finger mark validation can be characterized as a strategy for checking fingerprints in a robotized conduct and various sorts of biometrics used to perceive individuals and affirm their character. It is realized that each individual has an extraordinary unique mark picture. Underneath figure demonstrates the square chart of the usage.

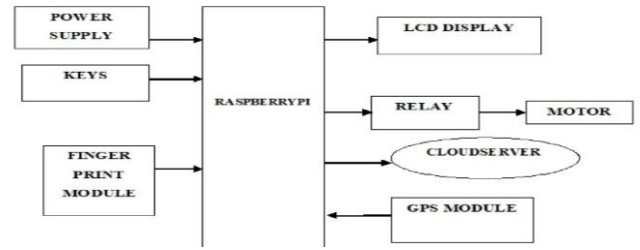


Fig2. Block Diagram for the Proposed system Structure

The security framework has the distinctive components. Unique mark acknowledgment method, installed primary board with different parts and human machine correspondence module. We're produced a coding utilizing Python in IDE of python programming and the framework was planned utilizing Raspbian RTOS to deal with the entire task and to give a result in real time. A vehicle system conglomerates the foundation of an electronic device to outcast to track the vehicle's region and social event data at the same time. Present day Vehicle Tracking framework (VTS) is the innovation used to decide the area of a vehicle utilizing distinctive strategies through satellites and ground based stations.

HARDWARE TOOLS:

a. Raspberri Pi Processor:

The Raspberri Pi 3 Model B+ is the most recent item in the Raspberri Pi 3 territory. The Raspberri Pi is a solitary board PC which will be utilized to plan many installed applications works with Broadcom BCM2837B0, Cortex-A53 (ARMv8) 64-bit SoC @ 1.4GHz. It has a capacity of 1GB LPDDR2 SDRAM. It works with 2.4GHz and 5GHz IEEE 802.11.b/g/n/air conditioning remote LAN, Bluetooth 4.2, and BLE. It has a fast availability of Gigabit Ethernet over USB 2.0 (greatest throughput 300 Mbps) with 4 USB ports. It associated with Full-measure HDMI. It works with 5V/2.5A DC control input and furthermore bolsters Power-over-Ethernet (PoE) bolster (requires separate PoE HAT)[6]. Worked in Wi-Fi accessible for information exchange and we can likewise refresh the programming by associating with the processor anyplace from the world. It tends to be associated with USB Ethernet or Wi-Fi connector. Nonexclusive USB consoles and mice are good with the Raspberri Pi and they fundamentally utilize Linux-piece frameworks.

Fingerprint Recognition System

Biometrics strategy perceives human characteristics by their own intriguing talents. There are distinctive biometrical structures which fuse confront, iris, novel finger impression, DNA, eye retina, palm lines print, ear shapes, voice modulation, signatures, hand shape, creating beat and walk.

For portrayal, palm prints are commonly frayed as voice modulations, signature counterfiets, hand shapes and iris pictures are easily produced. In light of various helping conditions and face-lifts, stand up to affirmation will result in poor precision. Besides, iris and face affirmation are vulnerable to satirizing ambushes [7]. The Fingerprint biometrics is the gifted biometric plan for individual acknowledgment to the extent security and resolute quality. It is difficult to make or take. It is recognized the world over. Live one of a kind stamp perusers reliant on optical, warm and ultrasonic approach are used. The two ordinarily used remarkable finger impression organizing methodology are subtle elements based planning and precedent planning. In precedent organizing system simply the similarity between two pictures are taken a gander at. Subtle elements organizing relies upon particulars centers i.e. territory and heading of each point. The one of a kind check affirmation system contains generally an image getting module, incorporate extraction module and model planning module [8]. Finger impression Scanner is reliant on exceptional Fingerprint[9].

Convention of GPS in Security System:

Worldwide Positioning System can be utilized to give security all through the off state of the vehicle. Indeed, even there is a probability to head out vehicle in turn off condition. Therefore, GPS avoids vehicle lifting and robbery recognition. The working of the framework is portrayed in Fig 5. At first, on stopping the vehicle current area will be put away. The Engine Control Unit (ECU) constantly screens the motor capacity.

Working procedure of the Designed System

The security system attempts to turn on the vehicle, at that point ready message will be sent to the validated client in framework and vehicle will be moved to OFF condition. In second mode, when the battery supply is cut amid robbery endeavors, approved individual will be validated and given access utilizing GPS and ECU which is installed inside the microcontroller. The primary part (BRAIN) of this framework is Raspberry Pi microcontroller. It is in charge of all observing and producing the information sources and yields separately. The yield of the structure will be appeared on LCD status and setup et cetera. Fitting LCD demonstrate is procured through programming and LCD interface plan.

Working flow of the System

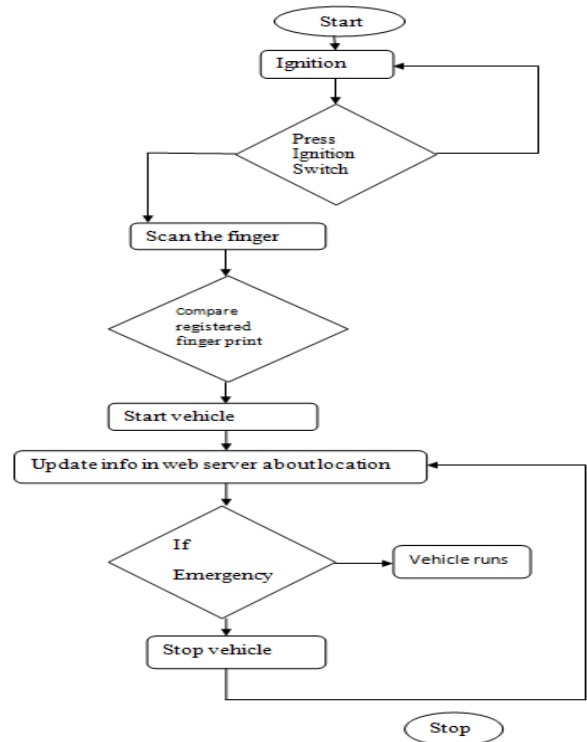


Fig3. Working Flow model of the designed system

SOFTWARE TOOLS:

A. Python:

Python is an extensively used all around valuable, irregular state programming lingo. Its structure rationale emphasizes code intelligibility, and its semantic structure empowers programming architects to express thoughts and supports distinctive programming guidelines, including object organized, essential and utilitarian programming or procedural styles. It is a scripting Language and it's executing the code line by line.

Web Server:

Generally we are using google maps to get the exact location where the vehicle positions itself despite of the various languages used for web design that have been developed over the life time of World Wide Web.. We are using predefined web server thingspeak to update search results about vehicle located. Web server used to display the location of the vehicle. Google map display on web server page shown in fig.4. The information can be updated for every 15 sec[10]. We can control the vehicle i.e on or off by using links given.

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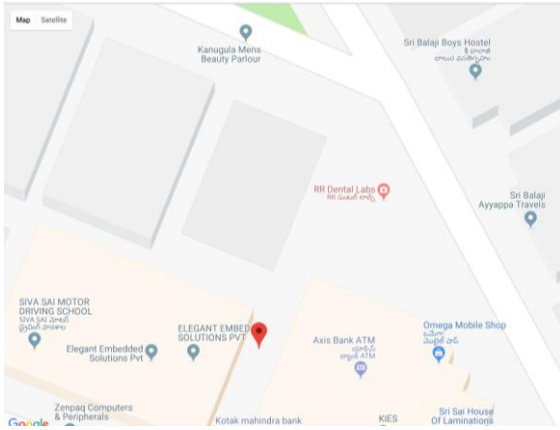


Fig4. VEHICLE LOCATION INFORMATION UPDATE ON GOOGLE MAP

Results & Discussions

In the proposed system, we are giving access through unique secured authentication to start the vehicle and also we are updating the location of the vehicle by getting longitudes and latitudes using GPS and the same will be updating in webserver.

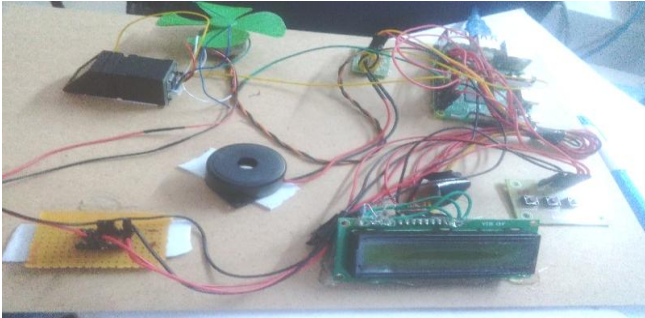


Fig 5: Total system response of the proposed system

IV. CONCLUSION

Security is the fundamental criterion for all practical applications. By improving the level of security for vehicles with unique finger impression is a promising biometric design for distinguishing a man as far as both security and usability. This is a one of a kind technique for scheming and collecting a minimal effort, pressed in burglary control framework for a vehicle which is exceptionally solid. The work displayed shows the underlying period of an installed auto that will be noticeable in not so distant future. Tweaked vehicles won't just give an all the more fascinating drive yet additionally more secure one.

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