VEHICLE AUTHENTICATION AND TRACKING USING RASPBERRY PI

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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 Raspberry 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 raspberry Pi. Processor allows only the authorized users to operate the vehicle. In case an unauthorized operator tries to start the vehicle, then security alarmwill 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.
Keywors: Index Terms-Raspberry Pi, Security, Tracking, fingerprint scanning and IOT.

I. INTRODUCTION

Vehicle theft or attempting to steal is also a motor vehicle one of the criminal acts 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 needs 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 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. 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

1.2 OBJECTIVE

Fingerprints will create profitable growth by assuming a leading position in selected segments, and being recognized as a supplier of solutions with a very high level of security. Fingerprints' strategy is based on defending and building on our strong position in the smartphone segment while diversifying the business into prioritized areas outside the mobile industry. In the mobile industry, the most important strategic priority is to expand the product portfolio to defend and capitalize on the company's strong position. In payments, biometric

smart cards are the application Fingerprints believes has the greatest potential in the years ahead. Fingerprints has a very strong starting point from which to be able to secure undisputed global leadership in this area. Biometrics are expanding in an array of other areas where secure and user-friendly authentication is critical. Outside of the mobile industry and payments, however, the biometrics market is fragmented and Fingerprints has chosen to prioritize PC and access control systems, where potential is deemed to be greatest in the short-term.
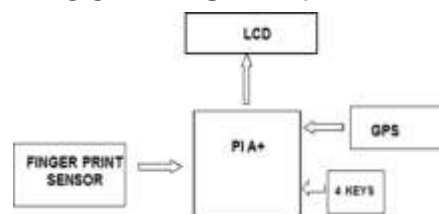
1.3 DIAGRAMS
1.3.1 BLOCK DIAGRAM:

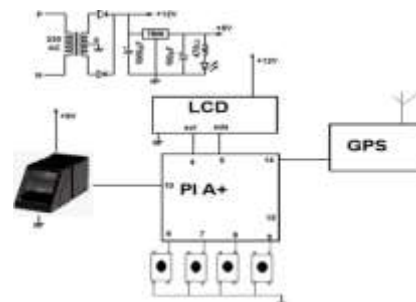
Figure 1. Block Diagram

1.3.2 CIRCUIT DIAGRAM:

Figure .2 : Circuit Diagram

1.4 EXPLANATION OF EACH BLOCK
1.4.1 RASPBERRY PI 3A+

The Raspberry Pi 3 Model A+ has been launched today by the Raspberry Pi foundation. This new Pi model is a smaller variant of the Pi 3 Model B+. Raspberry Pi is a small single board computer. By

connecting peripherals like Keyboard, mouse, display to the Raspberry Pi, it will act as a mini personal computer. Raspberry Pi is popularly used for real time Image/Video Processing, IoT based applications and Robotics applications. Raspberry Pi is slower than laptop or desktop but is still a computer which can provide all the expected features or abilities, at a low power consumption. The Model A boards have traditionally been cut-down versions of the main Model B devices. The Pi 3 Model A+ is no exception. It is basically a Pi 3 B+ with the right-hand side cut off. This makes it smaller, lighter and cheaper but with the loss of the Ethernet socket, USB sockets and some memory. This makes it better suited to some applications and projects.

Figure.3 : Raspberry Pi 3A+

1.4.2 USB TO TTL UART SERIAL CONVERTER MODULE:

This is the CP2102(6-pin) USB 2.0 to TTL UART serial converter module. This is a great little tool for embedded systems that require a serial connection to a computer. The board can simply attach to a USB bus and will appear as a standard COM port. ThisCP2102 doesn't require any external oscillator, it onboard-board voltage regulator, and it even uses a reprogrammable internal EEPROM for the device description. The full hardware UART has flow control for baud rates from 300bps to 921600bps. This breakout also allows you to connect the TX/RX pins of your favorite microcontroller or serial application to the RX/TX pins of the breakout, creating a simple serial cable replacement.

Figure 4. : usb to ttl uart serial converter

1.4.3 FINGERPRINT MODULE:

Fingerprint processing includes two processes: fingerprint registration process and fingerprint matching process (in which fingerprint matching is divided into fingerprint comparison (1:1) and fingerprint search (1:N) two ways). When the fingerprint is registered, two fingerprints are entered for each fingerprint, and the input image is processed twice. The synthesis module is stored in the module. When the fingerprint is matched, the fingerprint sensor is used to input the fingerprint image to be verified and processed, and then it is compared with the fingerprint module in the module (if it is matched with a module specified in the module, it is called fingerprint comparison mode, i.e., 1:1 mode. If matching with multiple modules is called fingerprint search, i.e. 1:N mode, the module gives the matching result (pass or fail). Low power consumption, low cost, small size, excellent performance, Professional optical technology, precise module manufacturing

technics. Good image processing capabilities can successfully capture an image up to resolution 500 dpi Finger detection function.

Figure 5 : fingerprint module

1.4.4 PUSH BUTTONS

A push-button (also spelled pushbutton) or simply button is a simple switch mechanism to control some aspect of a machine or a process. Buttons are typically made out of hard material, usually plastic or metal. The surface is usually flat or shaped to accommodate the human finger or hand, so as to be easily depressed or pushed. Buttons are most often biased switches, although many un-biased buttons (due to their physical nature) still require a spring to return to their un- pushed state. The "push-button" has been utilized in calculators, push-button telephones, kitchen appliances, and various other mechanical and electronic devices, home and commercial.

Figure 6: Push Buttons

1.4.5 LCD'S

Nowadays, we always use the devices which are made up of LCDs such as CD players, DVD players, digital watches, computers, etc. These are commonly used in the screen industries to replace the utilization of CRTs. Cathode Ray Tubes use huge power when compared with LCDs, and CRTs heavier as well as bigger. These devices are thinner as well power consumption is extremely less. The LCD 16×2 working principle is, it blocks the light rather than dissipate. This article discusses an overview of LCD 16X2, pin configuration and its working.

Figure 7:16*2 LCD

1.4.6 JUMP WIRES

A jump wire (also known as jumper, jumper wire, jumper cable, DuPont wire or cable) is an electrical wire or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a bread board or other prototype or test circuit, internally or with other equipment or components, without soldering. Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment.

1.4.7 GPS MODULE

The Global Positioning System (GPS) is a satellite-based navigation system that provides location and time information. The system is freely accessible to anyone with a GPS receiver and unobstructed line of sight to at least four of GPS satellites. A GPS

receiver calculates its position by precisely timing the signals sent by GPS satellites. GPS is nowadays widely used and also has become an integral part of smart phones. The GTPA010 module is easy to use, having RS232 as well as USB interface. It operates over 3.2 to 5V supply range thus enabling interfacing with microcontrollers with 3.3V as well as 5V. The module outputs GPS data in NMEA0183 format. Each of message string starts with '$' and then the message identifier. Each parameter is separated using a comma so that the message can be parse with the help of the commas.

Figure .8: GPS Module

II. LITERATURE SURVEY
2.1 LITERATURE SURVEY

1. Finger Vein Recognition Based Driver Authentication and Alertness System Using GSM. In this paper author suggested that with the assistance of biometric framework we can secure our car. We need to begin the motor by squeezing their finger in the biometric framework. There are two conceivable outcomes that finger vein match or neglect to coordinate. In the event that the finger vein is match vehicles begin working appropriately. On the off chance that it neglects to match it cautions the auto proprietor by sending the message through GSM system. This framework additionally alarms about the driver liquor admission and sleepiness. This framework depends on the Raspberry pi innovation.

2. Smart Surveillance Monitoring System Using Raspberry PI and PIR Sensor. In this paper author recommended that keen observation using so as to check framework is actualized Raspberry pi and PIR sensor. There is infrared sensor to identify the vicinity of number of persons in the room. Camera is naturally turned on when the vicinity of individual is distinguished. At that point the data is caught and sends it to the advanced mobile phone of approved individual through 3G Dongle.

3. Smart Automobile Security System Using Lab view. This paper manages the outline of the framework, which will give the arrangement on the best way to secure the vehicle with GSM innovation. The framework is utilized to control the outlet of the fuel injector by method for electronic solenoid valve, which will be controlled by the microcontroller through the driver circuit. The secret key is given to the approved individual of the vehicle. The shut solenoid opens and the vehicle begins unless and until secret word will coordinate. In the event that it neglects to coordinate, the framework will send message to the approved individual by means of GSM modem. A caution is likewise joined to the framework. LABVIEW stage can reproduce the framework.

4. Ignition Alert Anti-Theft Security System for Motorbikes with Remote Control. In this paper author recommended that when somebody is attempting to take the motorbike it will stop the ignition of vehicle

and caution the proprietor with alert. It is exceptionally troublesome for the criminal to take the vehicle by utilizing this gadget. Sensors are set on the vehicular body. It will stop the ignition of the vehicle when somebody touches it and when any one is attempting to touches for more than 3 times. Unless and until we deactivate the gadget with remote the ignition of vehicle won't begin.

5. Intelligent Anti-Theft and Tracking System for Automobiles. In this paper author proposed a productive car security framework is executed for hostile to robbery utilizing an installed framework involved with a Global Positioning System (GPS) and a Global System of Mobile (GSM). By utilizing Google Earth, The customer connects through this framework with vehicles and decides their present areas and status. The position of focused vehicles can be followed by client on Google Earth.

6. Microcontroller Based Anti-theft Security System Using GSM Networks with Text Message as Feedback. This paper proposed a framework with Dual Tone Multi Frequency (DTMF) and a GSM to screen and shield an auto. Sensors are set at the auto entryways and boot. The framework gets initiated when any individual is attempting to robbery through auto entryways or boot. At that point it consequently grounds the auto by disengaging the ignition key supply from the auto battery. Additionally send the ready message to the auto proprietor and also begins up an alert.

7. GSM Based Car Security System. In this paper author suggested that the point of this framework is to attempt to spare the auto in light of GSM innovation. when somebody attempt to take your auto it cautions the auto proprietor with alert and also send the ready message to the auto proprietor through GSM system. 8. Real Time Vehicle Tracking System using GSM and GPS Technology-An Anti-theft Tracking System. This paper gives the two-route correspondence between the approve individual and introduced framework. More elevated amount of auto security components is given by this framework. At the point when interruption is recognized this framework will send the notice message to the auto proprietor. When the auto proprietor gets the message he has power to control any auto highlight through his PDA. This framework is additionally ready to distinguish the area of the auto by utilizing GSM situating idea.

9. The Design of Mobile Control Car Security System. This paper gives the two-way communication between the authorize person and installed system. Higher level of car security features is provided by this system. When intrusion is detected this system will send the warning message to the car owner. As soon as the car owner receives the message he has authority to control any car feature through his smart phone. This system is also able to detect the location of the car by using GSM positioning concept.

10. Embedded Automobile Engine Locking System, Using GSM Technology. In this paper author suggested that anybody can

keep the robbery of car by utilizing GSM innovation. This framework is introduced in the motor of vehicles with the GSM modem which is likewise associated with the microcontroller. On the off chance that any individual needs to begin the vehicle then he needs to sort the secret word. At the point when the secret word coordinates then and at exactly that point ignition of the vehicle will begin. On the off chance that the secret key

2.2 FLOWCHART:

Figure 3.3 Flow Chart
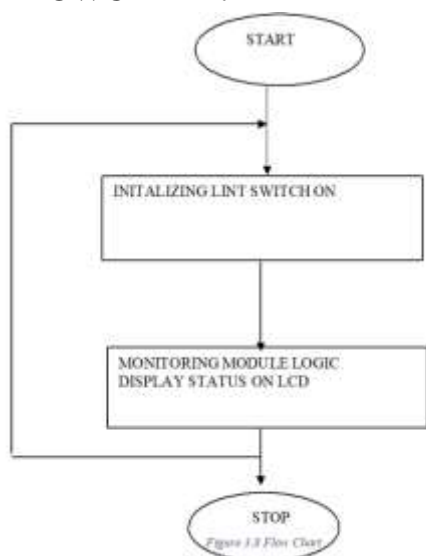
2.3 PROPOSED SYSTEM

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

To tract vehicles utilizing maps implemented by Google . 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 Raspberry 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

III. RASPBERRY PI 3A+
3.1 RESULTS

3.2 APPLICATIONS
- Ambulance Assignment
- Private bus services
- Motorcycle
- Car
- Schools
- Colleges

3.3 ADVANTAGES
- It provides Real Time Data
- Route Mapping
- Speeding
- Fuel Theft and Misuses
- Mileage
- Work Timings
- Sensors

3.4 DISADVANTAGES
- Location Inaccuracy and Drifting
- Poor Signal and Battery Life Concerns
- Incorrect Routes
- Unhappy Employees
- Distracted Driving
- Privacy and Data Concerns
- Over Dependency

IV. CONCLUSION&FUTURE SCOPE

4.1 CONCLUSION

The proposed system hence made good use of Smartphone technology by providing safety and secure traveling to the traveler using wrong path alert mechanism. The proposed system plays an important role in real time tracking and monitoring of vehicle by updating vehicle real time information on the server side after certain interval of time in order to monitored vehicle continuously. Whenever driver drives vehicle on the wrong path or in case of vehicle's accident situation occurs, the proposed system provides the vehicle's current location, speed to the vehicle owner's mobile. Hence this benefits to track the vehicle as early as possible. Student's safety mechanism also gets provided using temperature and LPG gas leakage sensors. In this certain situation, as per student's safety concern, the proposed system also gives alert massage on student parents mobile so that parents also know about their children's safety.

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.

In this examination work, vehicle area can be followed and anticipation of it from robbery with unique mark confirmation is

finished with least cost in semi constant mode. Unique mark innovation is exceptionally successful security check innovation and furthermore in bring down cost to abstain from taking of vehicles. In future, cell phone (i.e. android, windows) application can be made and interfacing a devoted advanced cell introduced in vehicle with unique mark gadget should be possible to get constant vehicle tracking with between dynamic mapping.

4.2 FUTURE SCOPE

In future, the traffic management system will improve by Introducing new Technologies. In this concept, CCTV monitoring is also included in Future. That will help to find the traffic information and also to find the people who are all violating the Traffic rules.

The fingerprint license checking system can Interlink with the authorized person's personal details like voter ID, Aadhar card number, and Educational Certificates. That will result in the smooth operation of traffic management.

A Device and method for accessing a vehicle with electrically activated door locks. The system uses a fingerprint sensor to detect whether the person has right to entry. The device includes means to a selectively open doors, trunks, etc., using different fingers and is used in conjunction With an existing access control and alarm system

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