

FINGERPRINT BASED VEHICLE SECURITY AND LOCATION TRACKING SYSTEM USING IOT

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Abstract - Automobiles and IOT technologies are creating a new level of security services in vehicles. Modern vehicle tracking uses active vehicle tracking and GPS technology. The primary objective of this paper is to shield the vehicle from any unapproved get to, utilizing quick, simple to-utilize, clear, dependable and efficient unique finger impression acknowledgement strategy. With this system, when someone is trying to steal the bike, it alerts the owner when he is at nearest distance as well as when he is far away from the bike. But with this alarm it is not possible to alert the owner who is unable to hear that alarm. So, in that case, we can use IOT web server network to send the text message to the owner at his phone. This vehicle security framework insinuates the status of the vehicle to the legitimate individual utilizing the internet of things correspondence innovation. The concept of the wireless vehicle security system (WVSS) using IOT we are used in this project. This is a framework that uses PC's, mobiles and smart phones to control vehicles smartly, intelligent and automatically through internet from anyplace around the globe to enhance security systems in vehicles. Among many IOT applications smart security system play an important role in realizing vehicles across the globe.

1. INTRODUCTION

In today world vehicle thefting are taking place around the world. Especially thefting of two Wheelers can be done easily and are happening more in general. It is better to take some precautions to safeguard our vehicles rather than filing a complaint after the vehicle has been thefted to achieve this there are some existing sensors such as fingerprint sensors, face recognition sensor and voice recognition sensor that provides security to the vehicle in a way that only authorized persons alone can access the vehicle. But most of these sensors are expensive and also spoofing of these sensors is possible. So, we need some additional modules to enhance security in our vehicle. For this we can incorporated sensor along with GPS for location

tracking and monitoring. Also designing and implementation of MINUTIAE algorithm-based vehicle security with anti-theft detection, locking and location finding system for accessing the vehicle in smartest ways internet of things (IOT) and GSM technology are used and for monitoring and security an automated AI system using finger print authenticated key is implemented. Hence this overall module provides an adequate security to our vehicle.

2. RELATED WORK

2.1 Working Explanation:

This fingerprint sensor is the work of the vehicle locking system. In our project, we used a relay switch that is open when the finger is stored in the finger print module. First, the user must register the finger with the help of push buttons / keys. To do this, press the ENROLL key and then check that the finger is a shop. So now the user has to enter the ID (Location) using the UP / DOWN keys. Select the location / ID user and press the OK key (DEL key). Now the LCD will ask you to place the finger over the finger print block. Now the user has to place his finger over the finger print block. The LCD will then remove the finger from the finger print module and tell you to place the finger again. Now the user has to put his finger back on top of the finger print block. Now the finger print module takes a picture and converts it into templates and stores it in the memory of the finger print module with the selected ID. Now the user can open the gate with the same finger on the computer he / she has added or added, then press the MATCH key (UP / Down key). By the same method, the user can also add more fingerprints.

Now if the user wants to delete or delete the saved ID, he / she has to press the Dell key and after pressing the Dell key, the LCD will ask for the selected location, i.e. select the ID to be deleted. Now you have to select the user ID and press the OK key (same DEL key). The LCD will now tell you that the finger has been successfully removed. Now the user can check whether it has been deleted by pressing the MATCH

key (UP / Down key) with one finger over the finger print block. The green LED will flash for five seconds while the placed finger is valid, while the gate will open. After 5 seconds the gate will automatically close. The user can customize the gate / door opening and closing as per their requirement. The servo motor is responsible for opening and closing the gate.

2.2 Circuit Explanation:

The circuitry of this Arduino fingerprint security system is very simple; it includes the Arduino which controls the entire process, the push button, the buzzer and the LCD. Arduino controls the entire process. The push button is connected directly to the ground with the Arduino's pin D14 (ENROLL), D15 (DEL), D16 (UP) and D17 (DOWN). The Arduino's digital pin is connected to the D7 for ground through the yellow LED 1K resistor and the green LED is connected to the Arduino's D6 with the same method. The Rx and Tx of the finger print module is directly connected to the software serial or digital pin D2 and the Arduino's D3. The 5v supply is used to power the finger print module taken from the Arduino board, and the servo motor is connected to the Arduino's PWM pin D5.

In the design of this fingerprint-based vehicle startup system, signals are generated by the arduino for the appropriate volume circuit. The whole system aims to be built into a plastic envelope which improves the heat discharge and the work efficiency of the system. The arduino reads the position of the input buttons to be 1 or 0. The signal from the input button tells the arduino what to do at the time. This project aims to replace the push-button on the vehicle ignition and create a more reliable and safer way to start the ignition only with the fingerprint pattern. The Arduino environment is designed to be easy to use for beginners with no software or electronic experience. With Arduino, you can create objects that are responsive and / or control light, sound, touch and movement. Arduino has been used to create an amazing variety of things, including musical instruments, robots, light sculptures, games, interactive furniture and interactive clothing. Arduino is used in many educational projects around the globe, especially by designers and artists who needed to easily create prototypes, but do not need a deep understanding of the technical details behind their works. Since it is designed for use by non-technical people, the software has plenty of example code to demonstrate how to use the various features of the Arduino board.

When registering, the user must enter the finger twice. The system will process two-time finger images, create a finger

template based on the processing results and save the template. When applicable, the user enters the finger through the optical sensor and computes a template of the computer's finger and compares it to the templates of the finger library. For a 1: 1 fit, the computer will match the direct finger of the specified template in the module; For 1: N matching or searching, the system searches the entire finger library for the applicable finger. In both cases, the system will provide an applicable result, success or failure. All that data is updated with the server side

Algorithm of Fingerprint based Vehicle starting system:

1. Start
2. Press the enter button (up button) with one finger to start the machine
3. If the finger is already stored in the scanner module, start the machine.
4. If not, go to number 1 and give the output.
5. Press ENTER button (lower button) to enter passcode.
6. If the passcode matches the code stored in the chip's EPROM. Open the User Manager, activate the volume to get finger image data, save it and go to number 7.
7. If the entered passcode does not correlate with the value of the chip in the EPROM, refer to the incorrect passcode and go to digit 4.
8. Navigate through the options in the User Manager to edit the passcode and exit the interface.
9. Stop.

3. ALGORITHM

3.1 Minutiae

Minutiae can be defined as the points where the ridge lines end or fork. So, the minutiae points are the local ridge discontinuities and can be of many types. These types are –

1. Ridge ending is the point where the ridge ends suddenly.
2. Ridge bifurcation is the point where a single ridge branches out
3. into two or more ridges.
4. Ridge dots are very small ridges.
5. Ridge islands are slightly longer than dots and occupy a middle
6. Space between two diverging ridges.

7. Ponds or Lakes are the empty space between two diverging ridges.
8. Spurs is a notch protruding from a ridge.
9. Bridges are the small ridges that join two longer adjacent ridges.
10. Crossovers are formed when two ridges cross each other.

3.2 MQTT

MQTT stands for message queue telemetry traffic. As its name suggests, this is a protocol for transporting messages between two points. Of course, we've got Messenger and Skype for that; But what makes MQTT so great is its super lightweight architecture, which is suitable for situations where bandwidth is not optimal. The MQTT high-level architecture is primarily divided into two parts: a broker and a client. Architecture focuses on the skills of both a broker subscriber and publisher. This is the place where all customers can interact. The primary job of a broker is to send and send queues from a publisher to a subscriber customer. However, they may have heavy capabilities (such as SSL certificates, records, database storage, etc.) depending on the requirements, setup and the broker service used. The client area is further divided into publishers and subscribers. They are designed to be very lightweight, with the bulk of the processing of the already lightweight framework being handled by the broker as the actual software components that customers go to edge devices. Therefore, MQTT customers have very specific and simple tasks. Publisher-Client publishes messages with a title and qualification; The subscriber-client subscribes to a topic and quality message, and that is its summary.

4. EXISTING SYSTEM

- When used in other areas, the Global Positioning System (GPS) and GSM are commonly used as a Global Navigation Satellite System, which is used to detect and stop vehicles if stolen.
- Accuracy is not provided by the previous method. Location information is sent to the vehicle owner in the form of a message with latitude, longitude and speed information.
- Google can also use Google Maps to find the location. There have been many developments in anti-theft systems for vehicles, and some of them are as follows.
- Earth Tracking System depicting an integrated GPS-

GSM architecture for tracking vehicles using the Google Earth app is a hybrid GPS-GSM system. The remote module is fitted with a GPS in the moving vehicle to identify its current position, and the GSM is equipped with different parameters acquired by the car's information port as an SMS to a user station.

4.1 DISADVANTAGES

- Existing an application is used in an existing controller, there is no 24x 7 notification in this setting.
- The number of modules is increased.
- Using the GSM module is not very reliable.
- Authentication systems are restricted to applications only.

5. PROPOSED SYSTEM

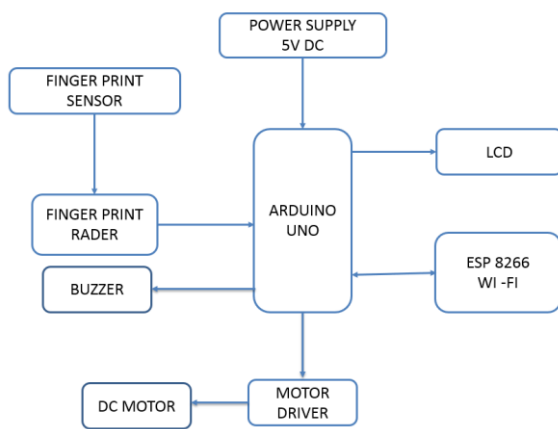
- We made an attempt to develop a system based on Internet of things technology. Here we are using finger print which is works on image-based finger authentication method. When the owner wants to start the bike means he will place the finger and the finger print is compared with the datasets given by the owner. Then the system classifies the user is super user or a normal user, if he is a super user
- Then he can able to start the vehicle. In case the user is a normal user then the vehicle will send the intimation to the IOT web server.
- Then the server will also send the automated SMS to the vehicle owner.
- Then the vehicle asking for an authentication to the owner.
- If the owner wants to authenticate means he will generate the authenticated key from the IOT web server using authenticated button. Then only the normal user able to start the bike.
- Otherwise the vehicle will stop. He is also able decline the request from the normal user itself.
- In case, any thief tries to start the engine means the system will send the alert message to the owner and lock the vehicle immediately.
- In case if the owner feel that his vehicle was theft, he can also track the location of the vehicle and also can shut down the power engine by super user

- Our system will work both online and offline (super user), we can also view location summary in the mobile application.

5.1 ADVANTAGES

- The system specification with its corresponding function limits
- The vehicle situation monitoring easily.
- Able to prevent the future investigation using data analysis

6. BLOCK DIAGRAM



7. MODULES

7.1 MICRO CONTROLLER

Arduino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input / output pins (6 of which can be used as PWM outputs), 6 analog inputs, 16 MHz quartz crystal, USB connection, power jack, ICSP header and reset Button. It has everything needed to support the microcontroller; Connect it to a computer with a USB cable or run it with an AC-to-DC adapter. Arduino Uno has many features to communicate with the computer, another Arduino board or other microcontroller



Fig-1: MICROCONTROLLER

7.2 FINGERPRINT SENSOR

The R305 Fingerprint Module is a fingerprint sensor with TTL UART interface for direct connection to the Microcontroller UART or PC through the MAX232 / USB-Serial Adapter. The user can store fingerprint data in the module and configure it in 1: 1 or 1: N mode to identify the person. The FP module can be directly interfaced with a 3v3 or 5v microcontroller. A status converter (such as MAX232) is required to interface with the PC serial port. The optical biometric fingerprint reader has great features and can be embedded in various end products such as access control, arrival, security deposit box, car door locks



Fig-2: FINGERPRINT SENSOR

7.3 BUZZER

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke. It generates consistent single tone sound just by applying D.C voltage. Using a suitably designed resonant system, this type can be used where large sound volumes are needed



Fig-3: BUZZER

7.4 LCD

It is an LCD display designed for power modules. It is a 16-character, 2-line alphanumeric LCD display coupled to a single 9-way D-type connector. This allows the device to connect to most E-module I / O ports. The LCD display requires data in a sequential format, as described in the User Guide below. The display requires 5 V power supply. Be careful not to exceed 5V, as this can cause damage to the device. 5V is made from the best e-modules multiprogrammer or 5V standard regulated power supply.



Fig-4: LCD

7.5 DRIVER CIRCUIT

The relay is an electrolyte switch that is activated by an electric current. The single relay board arrangement includes the driver circuit, power supply circuit and isolation circuit. A relay is assembled with that circuit. The drive circuit has transistors for switching functions. Transistor is the application to replace the relay. An isolation circuit prevents reverse voltage from the relay, which protects the controller and transistor from damage. The input pulse to replace the transistor is supplied from the microcontroller unit. It can be used to convert four devices



Fig-5: DRIVER CIRCUIT

7.6 DC MOTOR

Designed DC motors can be defined as an extension of DC motors. A designed DC motor has a gear assembly attached to the motor. The speed of the motor is calculated in terms of rotation of the shaft per minute and this is called RPM. Gear assembly helps to increase torque and reduce speed. Using the right combination of gears in the gear motor, you can reduce its speed to any desired figure. Gears reduce vehicle speed, but this concept of increasing its torque is called gear-reduction



Fig-6: DC MOTOR

8. LITERATURE SURVEY

In this paper [1] emerging location-aware mobile technologies are used successfully in cultural contexts. Various technologies, such as RFID and Wi-Fi. Used to allow communication with mobile devices Environment. This paper describes a computer-based in both active and passive RFID Automatic positioning of mobile devices in the art Museums. This program is especially useful Provide location-aware information when needed Users can manually select the desired information They love to see. This project has been done successfully Proven for the location and position of PDAs.

In this the author [2] suggests that reducing high value property loss due to theft if the attempt to dispose of the property is found simultaneously. This paper Read the

design of the anti-theft system based on RFID technology. The RFID tag that links an object is integrated Motion Sensor. The interrupt function is used for the tag automatically detects the movement of an object. Runtime Notice of theft is perceived using multiple communications the principle between tag and reader. Anti-theft system Operating proposal ability and RFCommunication performance in a multistoried building its reliability.

This paper [3] presents a novel radio frequency Automobile immobilization system based on identification (RFID); It has a lower hacking probability when protecting it Passenger safety of a hijacked vehicle. The immobilizer uses active RFID technology where the tag is located Created with relatively large character sets. The receiving unit is intelligently integrated into three controls Circuits in the vehicle, namely ignition circuit, power control Unit and automatic gear shifting system, which operates it Gradually bring the vehicle speed to zero at a safe speed The proposed anti-theft vehicle protection system here Tested and feasible under different weather conditions signal distortion conditions to verify its reliability.

In this [4] thesis we present an anti-theft control Organization for vehicles that attempt to prevent theft of a vehicle. This system uses an embedded chip to trigger Proximity Sensor, which senses the key during insertion and Sending a SMS to the owner's mobile claiming to be the car Accessed. The message is sent to Owner about unauthorized use. More fuel injector the car will crash and the user cannot start any car Means. At the same time a secret lock system is activated the unauthorized user gets into the car, only that the owner of the secret lock system keys can Deactivate the mechanism. This technique helps you pick up fast Steps toward stealing. The design is robust and Simple.

In this the author suggests that [5] GSM based security system is very stable and then a normal security system. Normal settings Based on the concept of sensors. They sound the alarm in detecting movement. This technical system is now lost its appeal as it has become a common sight in metros these alarms go off unnecessarily. We proposed a system GSM technique and a better decision-making process our vehicle was built to be very safe. It is a unique wireless Home / Car Safety Device that provides your instant alerts Mobile phone at the moment a security breach is detected It Wireless mode is designed to alert you with your quick call the burglar alarm system prevents an intrusion. This paper proposed an 8-bit embedded controller Connected to GSM the control

mechanism is based on DTMF tones Generated by the mobile phone when the number keys are pressed

This paper [6] addresses privacy leaks in biometrics Confidential Settings. Four systems are explored. The first open Standard Ahsweed-Scissor secret generation system two nodes observe two related sequences. They are the general secret of exchanging public message. This is the message it should contain only a small amount of information. The secret, but here, in addition, we demand that it leak a little information as much as possible about biometric data. In this first case, Basic exchange between secret key and privacy-leak Rates are determined. For the second system, in which the secret is not created, but chosen independently, the basis the secret key and the privacy-leak rate are found. Settings three and four focus on zero-leak systems. The public here the message should contain very little information in both the secret and biometric sequence. To achieve this, a requires a private key, which can only be observed by the dermnals. For both the created-secret and the selected-secret model, Areas of attainable secret-key and private-key rate pairs Determined. For all four systems, the fundamental balance Unconditional and unconditional privacy is determined Leak.

This paper [7] presents a motorcycle safety system prevent thieves from stealing a motorcycle. The system used Designed based on microcontroller and global layout Mobile Contacts. You can install the system on a Motorcycle in hidden place. Act of pressing the paddle or a signal will be sent if the machine is activated without the key for microcontroller. The microcontroller will detect the state. There is a limit switch attached to it and send a message Owner via mobile phone and stop the engine immediately. Power is disconnected. The system will work back to normal after the owner has disabled it. Recommended the system is simpler and more efficient than conventional security System.

In this the author [8] suggests that the development of modern science and technology Making it possible to use biotechnology in everyday life. Fingerprint recognition is a new high technology Enables the fingerprint image to receive its characters Use it in all kinds of fields in terms of physiology Characteristics of the human fingerprint of individuality and Invariance. Designed a fingerprint data acquisition system this paper. Ideal and automatic elements of design the fingerprint recognition system is explained in detail Hardware design and software design, in particular Techniques such as fingerprint, picture

writing and writing Sharing, Expanding, Duplicating, and Specifying. It such properties are practically marked Fingerprint may be unique, persistent, persuasive Used as a basis for correctly identifying the individual position. The includes the proposed automatic fingerprint recognition system Paper can also create a unique authentication system Reasonable, accurate and easy to do.

In this the author [9] suggests that one of the clearest facts in the world is growing Number of cars and other vehicles during the production period as well as theft attempts. Many also make a big effort International and local companies to create car safety Systems, but the result is lower than expected the number of car theft cases continues to rise. Thieves developing their skills and finding the best and strongest Stealing techniques that require more powerful protection Systems. This research project proposes an automobile Monitoring and monitoring model to solve this problem. It introduces a powerful security model that can send SMS and MMS The owner must respond quickly, especially if the car is nearby. The paper focuses on the use of MMS and database technology a picture of the intruder is sent to the user or the police. The database provides the necessary information about the car and the owner, this will enable police or security personnel to track the car using a GPS system that can connect to Google Earth and others Mapping software. Activation and test results show the success of the prototype in sending the MMS to the owner within 40s Seconds and getting approval to the database (police or Security unit) within 3-4 minutes. Time and results Suitable for owner and police to take appropriate action against Intruder.

This paper [10] deals with the design and development of the embedded system, which can be used to prevent / control theft of a vehicle. The developed tool is an embedded system based on GSM technology. The tool is installed on the machine of the vehicle. An interface GSM modem is connected to the microcontroller to send a message to the owner's mobile. The main purpose of this tool is to protect the vehicle from any unauthorized access by entering a protected password Report the status of the same vehicle to the authorized person (owner) using the Global System for Mobile. Contact Technology. This system deals with the concept of network security. The key concept in this design is the introduction of mobile Communications in an embedded system. The entire unit designed is on a single board.

9. CONCLUSION

In this paper survey is done on fingerprint-based vehicle security and location tracking system using IOT. The proposed design not only provides switching functionality, but also provides the exact location of the device. Hence theft of the device can easily be detected. It gives complete knowledge of designing microcontroller-based system and developing embedded software. In the future work cloud computing can be included to this project so that every activity performed on the device can be closely monitored. This reduces the need for storing all the log-in information in the computer storage.

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