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Employment of Fingerprint Recognition System for Automobile (FPRS)

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Abstract — **A wide range of applications for Finger Print Recognition System is discussed in this paper. Finger Print identification is the measurement of Finger Print features for identifying the user. Finger Print is universal, easy to capture and does not varies with time. The whole concept works under the principle that finger print is a parameter associated with biometrics that is very common as well as distinct. Its foremost application is at the automobile industry in the under developed and third world nations where the best facilities are not available. This system can be applied in the cars for identification of the access person. Till date there has been no specialized system adopted for this purpose. It can be accessed only by person who owns that object. The finger Print Recognition System will overcome all the defects of any biometrics when applied here. Since the key, which is used to open the car door is very delicate it can be easily screwed with a hairpin or a normal steel wire. The Finger Print Recognition system can also be implemented in the ignition of the car engine where more cases that the theft car is ignited by short sparking which is often reported. These applications of FPRS are discussed in this paper.**

Index Terms— Fingerprint; Car; Ignition; Automobile industry; Theft security.

I. INTRODUCTION

With the rapid growth in population around the world there is a need for more and more unique identification techniques. It can be defined as a stream which deals with the identification of individuals through their physical characteristics or traits. This biometric authentication is used as a form of access control or identification. They are used in surveillance of groups. The concept of Biometric authentication has evolved at a very high pace starting a few years back. However the basis for this concept dates back to

   the 14th century when the Chinese had used this for differentiating people. This term has today become a synonym of security since access of any area, range or data by individuals can be allowed or restricted with this.

   Some of the already existing biometric authentication types are Finger Print Recognition, Face Recognition, Hand geometry, Iris Recognition, Voice Scan, Signature, and Retina Scan.

These are several biometric patterns that are being used at various places today but still there is something that these patterns lack. This causes security breach and inconveniences at places where the concern members will have to wait in large

Queues to follow a certain procedure for the biometrics to validate. Hence we come forth with this new biometric authentication of finger print recognition system. The working pattern and style might be similar to any other biometric means but this system has its own salient applications.

   This Finger Print Recognition system can also be referred to as the one that has come out after rectifying all errors that have been detected in previous biometric methods mentioned above. Salient features of Finger Print Recognition System. The system can be made invisible, as it operates with the finger print, there is no necessity for an individual to operate any device. It is time saving since the user can just open it as every time he does the same. None of the vital organs of the body are being detected or tested electronically and hence is no source of harm to the human body. This has changed and today there are several ways by which the Finger Print Recognition System can be made to work.

   Types of working mechanisms of Finger Print Recognition System

   A. *Physical Contact*- By making a physical contact of the finger print on the touch sensor.
   B. *High efficiency cameras:* By using the high-end cameras to compare the thumb impression of the finger print.
   C. *Ultra Sound Waves*: To detect the finger print using the concept of Sound Reflection and impression Imaging.

Finger print recognition is one such technique which will be of great use in the near future. Basically the finger print recognition works on the idea that the finger print trace on every person's thumbs is distinct as it is on the leg.

   The finger print recognition method might not be able to do the work of foot print recognition but it will have its own salient applications where foot print recognition will also be of apt use.

   This finger print recognition can be done in following two ways,

A. By using high end digital cameras

          In this method high accuracy cameras are used to perform the operation of capturing the print of the finger. Here there is no need for the person to touch the sensor or the door lock.

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B. By using neural sensor wall sensors

The matching method is used to check if the finger print of the person on the wall sensor matches with the ones stored in the server to provide access. The finger print is converted into electronic images and then compared.

II. LITERAL SURVEY

Hnin Pwint Hanad Hla Myo Tun have proposed the [1] design for advanced car security system using GSM. It works using the mobile communication networks and telecommunication. It gives a SMS alert to owner of the vehicle ,if the car is illegally operated, then the car is vibrated and gives an alarm to the phone immediately and automatically. It consists of both hardware and software components such as vibrating sensors, PIC microcontrollers, GSM modules and buzzers. so, that the vehicle can be safe anytime anywhere.

G**.** Divya et.al have designed [2] smart anti-theft system which uses GPS and GSM system. It is used to prevent theft and to determine the exact location of vehicle. The preventive measures like engine ignition cutoff, fuel supply cutoff, electric shock system (installed on steering wheel) and paint spray system are installed in the vehicle which is controlled using user or owner GSM mobile.

In November 2015,[3] have proposed the design for theft security of vehicle in common parking places has become a serious issue. The design has been developed based on using an embedded system integrated with Global Positioning System (GPS) and Global System for Mobile Communication (GSM). It sends SMS to the controller if it is illegally accessed by third person.

Jignesh B Jadav et.al [4]have proposed the research based on Ultra Security to automobile protecting from various thefts. In this project, the following components are used. They are GPS, GSM, RFID, PROXIMITY SENSOR and FINGERPRINT MODULE etc.,. They use ARM CORTEX and PHILIPS P89V51RD2FN to provide multilevel security to the vehicle. The unauthorized person can access the car only when the owner lets an SMS to the car system via GSM

N. Kiruthiga and L. Latha [5] have designed the paper for safeguarding the vehicle from theft. Impediment of automobile theft can be done remotely by a purchased person. An Embedded computing technology is used in developing this module and security is implemented using microcontroller.

Nikunj Shingala et.al [6] have proposed the project to use wireless technology effectively for the automobile environments by using the GSM Modem and it is used in sending SMS in case of theft. The main intention of the paper is to stop the engine automatically when the car is stolen it sends an interrupt to a programmable microcontroller. The control instruction is given to the microcontroller, the output activates a relay driver to trip the relay that disconnects the ignition of the vehicle and results in stopping the vehicle.

In 2013 [7] the authors have designed a paper based on anti-thefting based on GSM and GPS. The place of the vehicle and the location can be detected using GPS(Global Positioning System)and GSM(Global System Mobile Communication).They watch the moving vehicles continuously and report the status only on demand. At the time when the theft is identified, the authorized person sends a SMS to the microcontroller, then it sends the control signals to stop the engine motor. The vehicle immediately stops.

III. PROPOSED SYSTEM

As we know the finger print is considered as a parameter with very accurate trace and not much change even over a really long period. Its application in the automation of automobile doors will substantiate this principle. In this section, we propose this system to be adopted in the automobile industry for the security of automobiles (vehicles). In certain common parking lots, the automobile is kept with all other vehicles without any security. This is where the culprits use their silly techniques to open and access the car door. Hence at that juncture, it is tedious process to check using the CCTV camera and find those culprits to recover the vehicle. Such real time instances have been discussed later in this paper.

The usage of FPRS in the automobile industry is basically to create a dynamic database. Initially a high accuracy Impression of the access person is obtained. Then the pre-processing is performed to get the image of a desired format. Now the specific detailing of the image is obtained under this section of Feature Extraction. In the case of Accessed person we take the detailing (image) of minutia (impression).The unwanted or corrupted details in the image are neglected and the rest is stored in the Database. Parallel to these details about the second access person such as the name, age, blood group, impression are also stored in the database(using cloud technology). This whole record of the database is given an unique identification number which is made secure by the usage of thumb impressions.

The schematic representation of the working of the finger print recognition system (fprs) in theautomobile industry is shown in fig 1.

A. *AUTOMOBILE INDUSTRY*

In general in India and other third world countries with a poor economy the automobile industry have a major disadvantage. These automobile industries do not invest large amount of capital in security of the owned vehicles. Once a vehicle is registered in the name of concern person it is handed over to the person just with the lock and the key. This gives the space for the culprits to cease the vehicle without any notification to the concern owner.
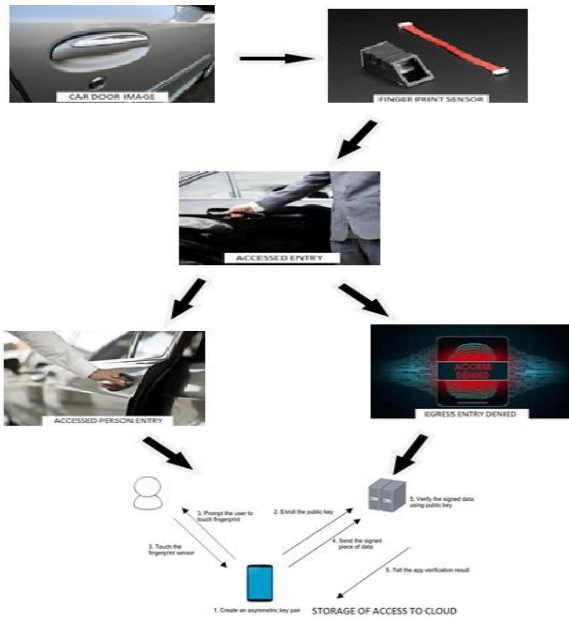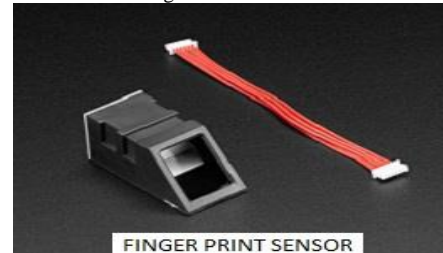
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Fig.1.Schemetric FPRS Architecture

Fig .2 GPS tracking system

Fig.3 registered number plate

Nowadays certain big automobile companies have a GPS TRAKING SYSTEM (Fig.2)to find the theft vehicle, but it does not work all time , anyone can break it. If the tracking system is broken down, no one can find the theft vehicle. Now let us come to vehicles registration number. It is a number which is used to identify the owner and the area in which the vehicle is registered. All the above mentioned register number (Fig.3)and tracking system can be changed or misused. For this reason, individual fingerprints of the purchaser is taken at a time of purchase of the automobile. As personal identity of the proprietor is stored in the database(cloud) from which only the purchaser can access the automobile. Tracking all the sold vehicles is a tedious process and so FPRS can implemented. There have been numerous cases of vehicle theft and automobiles being cracked more is being read in the articles.

Fig.4 stolen vehicle

Fig.5 fingerprint sensor

The main motive behind this is scarcity of money and the reason is sadly the lack of security. From the above incidents lead to numerous problems that causes complexities.The problems that might arise due to the tracking system of vehicle leads to the confusion of which the vehicle belongs to who when the theft happens.(Fig.4). Sometimes the theft of automobile is due to certain business revenges or by thieves for the sake of money.

According to these problems it must be carried out with high authenticity and hence the finger print recognition is implied is generated from which the purchaser complete details are obtained.

In case of lost lock or remote finger print database will be found secure and for theft of vehicles, the sensor is used as displayed in the flowchart (Fig.5). A solution for this problem in automobile industry can be obtained by installing the of finger print recognition system in the automobile doors. This data can be stored onto to the cloud along with the purchaser name and details like blood group so that it will be completely invisible for a stranger to access the vehicle without the finger print examination is being done. There have been cases where such confusion has aroused and it was still not been rectified . But this finger print recognition is a very simple process when compared to GPS tracking and hence it can very well be implemented in automobile industry.

There has also been a case where vehicle is stolen and wasted due to certain personal vegans. Such cases can also be avoided since a stranger will never know why the vehicle is not opening for access. Thus, fingerprint recognition system improves the security system of the automobile industry.

B. SECURITY IN PUBLIC PARKING

The finger print recognition will be of best use for security at the public parking (Fig.6). In all public parking, there will be a range of cars from low to high end cars. There are certain big places like the public mall and railway stations where the diamond class cars which worth more than 30 Crores.

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Fig.6 public parking

Fig.7 stealing the vehicle

The Finger Print Recognition System works in a very simple manner. After it is installed at the opening of the car door the finger print of the authorized persons must be recorded onto it. This system works under the principle of acceptance and rejection. That is if the system recognizes the finger print as one of those initially recorded, it grants access otherwise an alarm is raised. The working of this system is dynamic since the purchaser only knows the sensor is fixed whereas other do not know about it.

Fig.8 displaying accessor data

This gives us an exact idea about the weakness of the security systems at India's parking lots. Hence the application of finger print recognition system is apt for India's parking to improve its security. It also shows the personal data of the authorized person.(Fig.8)

IV. CONCLUSION

The usage of this system in the automobile industry will not require much maintenance. It will be acclaimed as a flawless one. Since this concept of FINGER PRINT RECOGNITION (FPRS) works under the principle of a very confined and simple algorithm ,there is almost zero percent possibility of breaking the system which ensures its use even at a large scale, high and low temperatures and at high risk prone areas.

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