International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 09 Issue: 04 | Apr 2022 www.irjet.net p-ISSN: 2395-0072

3M Secure Transportation System.

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***Abstract*— Many variables contribute to the security of transportation. Vehicle theft along with product is on the rise these days, and it's a major issue for both the owner of the vehicle and the police. The vehicle is loaded with material on the Material Transportation side, therefore the business owner loses a lot of money. As a result, we devised a system to offer protection for both the vehicle and the merchandise, as well as the security of the person who drives the vehicle. Face recognition, fingerprint verification, tracking with GSM, GPS, QR scanning, and other technologies on the application that we will be constructing for these system purposes are all monitored by our system.**

Keywords **— Security, GSM, GPS, fingerprint verification, facial recognition, QR code .**

1. INTRODUCTION

Now days security is very important thing at any field. in transportation field also require more security. In these days vehicle theft is rises its major issue for vehicle owner, at the transportation place its make huge loss because along with vehicle transportation products are included. That's why we came up with a solution that is 3M secure transportation system. In these 3M the security for Man, Machine and material. This system is basically useful for mid level transportation business. In these 3 types are security first one is face recognition, fingerprint scanning, vehicle tracking and QR scanning for product. And for manipulating all this things we create an application.

Facial acknowledgment is an approach to recognizing a singular's character by utilizing their face. Face acknowledgment is the recognizable proof utilizing gadgets catching human face or recording face picture arrangement, which is an ideal technique for check in brilliant society. Because of wide-spread gadgets like telephone cameras and screens affirming people with their face is somewhat more reachable than some other means for recognizable proof. Face revelation in pictures is a fundamental for surveillance systems and savvy vision-based human-PC interaction[1].Efficient face recognizing confirmation computations are essential to make exible structures that limit in an extent of lighting conditions and run either on cellphones or minimal PCs. To accomplish high revelation precision, appearance-based methodologies are ordinarily used. Skin assortment information is an indispensable fundamental indication of human faces, and further creating face acknowledgment may be used.

A Secure Vehicle global positioning framework joins the design of a gadget to permit the proprietor to screen the vehicle's area even while gathering information, in view of GSM and GPS ,the global positioning frameworks offer better compelling, sensible planning programming based the specific following. Worldwide Positioning Satellite (GPS) information is being utilized to compute the framework's geographic position and time [2]. Albeit most present day autos come furnished with worked in vehicle alerts, it is as yet smart to be educated about new headways and updates. Since talented auto criminals can conquer numerous more seasoned security frameworks, it is basic to further develop your vehicle alert framework [3].

Biometrics is one of the applications in Image dealing with which insinuates headways that used physiological or social characteristics of human. An interesting imprint sensor is an electronic device used to get a mechanized image of the finger impression plan. Finger impression Identification is the method for ID using the impressions made ceaselessly edge improvements or models found on the fingertips. No two people have the very same game plan of edge designs, and the examples of any one individual stay unaltered over the course of life. Fingerprints offer an infalible technique for individual unmistakable evidence. Other individual credits could change, but fingerprints don't.

It like wise includes an easy to understand interface, fast access, and unique mark reworking innovation. Notwithstanding the GPS and GSM frameworks. A QR code is a sort of framework standardized identification or two-layered code that can store information data and intended to be perused by cell phones. QR means "Fast Response" showing that the code items ought to be decoded rapidly at high speed[4].The prototype model for a vehicle security system was created utilising an embedded platform and an Arduino UNO_.We believe that this survey helps to know about the techniques used for the security provided to the vehicle as well as the package being delivered. The remaining paper is organized as follows. The literature studied about the techniques involved such as biometrics ,face detection, GPS and GSM module is discussed in section 2. Section 3 consists of the discussion regarding the survey and conclusion is given in section 4.

II. LITERATURE REVIEW

In [1], Ramesh et. al explored and involved GSM and GPS procedures in their exploration. Its only design is to forestall robbery by using biometric innovation that permits just approved people to enter the vehicle. Moreover, GPS as well as GSM are used to follow the vehicle

by educating the proprietor regarding its area organizes. Therefore, different kinds of innovation are viewed as to offer the vehicle with complete security. The vehicle can be ended by fusing a motor securing framework in which the proprietor can make an impression on the GSM connected to the vehicle saying "Motor OFF," which will incapacitate the association between the motor and start framework. The main Drawback was the generalization or the execution was troublesome

In [2], Mrinmoy et. al concentrated on explicitly about Fingerprint Scanner. In their review, they found that a vehicle's position can be followed and that it very well may be safeguarded against burglary through unique finger impression confirmation for a minimal price in a semi ongoing way. Finger impression innovation is an exceptionally sufficient security the board innovation that additionally comes at a sensible expense to forestall vehicle robbery. Later on, a cell phone (Android, Windows) application might be created, and a specific PDA put in the vehicle could be connected with a unique mark gadget to give real vehicle following intuitive planning.

In [4]. Bahadur.R. et. al made a framework utilizing Arduino UNO. This vehicle checking framework's entire capacity is parted into two parts:1. Monitoring the vehicle's whereabouts.

2. To guarantee the wellbeing of the vehicle

The objective of the task is to make an enemy of burglary contraption with ongoing following and client control. GPS and GSM advances are utilized. By involving biometrics as fingerprints, the drive adds an additional a level of assurance. To get passage to the vehicle, finger impression acknowledgment is utilized. A vehicle burglary anticipation framework is utilized to forestall a wide range of vehicle robbery. The idea likewise incorporates a sensor that identifies when a vehicle is being pulled.

In [6], Savitha R.et. al gave considerably more security and selectiveness than that a standard lock and key can give. Since every individual's finger impression is remarkable and empowers just specific clients to enter the vehicle, the anticipated result of applying this framework on the auto is that main certain clients can get to the vehicle. The car must be begun by an approved person. The car is have the option to be begun by anyone with a key. The information of the singular will be coordinated with that of the organization. The vehicle will begin provided that there is a match. On the off chance that not, no. Accordingly, by trying this extremely straightforward strategy, On a vehicle, one can utilize a basic and economical framework.

In [13], Ketan J. et. al. utilized face acknowledgment calculation along with MATLAB and Raspberry Pi the innovation empowers faster facial recognition and recognizable proof. After proprietor recognizable proof, start is provided right away for turning over the vehicle motor. Each of the discovery's sensors work commendably and offer adequate data to the framework to screen, as well as exact data about the vehicle's state to proprietor and the family. This demonstrates that the framework accomplishes the ideal results in general and is valuable to the client.

In [16], Indira K, et. al. dealt with QR based brilliant participation framework. The significant focal point of this paper is on the most proficient method to utilize QR codes for different purposes. It utilizes the QR code and gets the data set administration system. It is easy to monitor the understudies'

attendance. Reports on participation and a speedy way to deal with spot people who aren't making an appearance .Students who don't consent to the compulsory participation strategy and a straightforward way to deal with monitor undergrads who don't have them. Minimum school or school participation is required..

In [17], Rohini. N et. al dealt with QR Code based participation stamping framework. Exploiting versatile innovations to benefit from the time designated for a show. Teachers' time spent gauging participation may be viewed as exercise in futility, particularly when courses are enormous. Accordingly, we've fostered a strategy for robotizing this method by using the understudies' devices instead of the educator's. The educator doesn't have to do anything extra during the illustration other than demonstrate the understudies the slide of the subjects to be instructed.

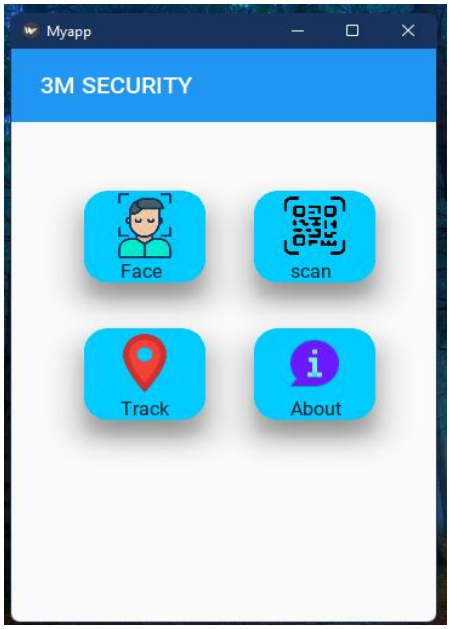
Author and Year	Technique Used
M. Ramesh, S et. al 2019[1]	GPS,GSM and Biometrics
M. Dey et. al [3],2017	GSM & GPS with fingerprint verification
Akinwole Bukola, [5] 2020	GPS and GSM Technology with Biometric
Savitha R et. al 2017[6]	Biometric finger print using GSM
Z. Mahmood et.al 2015 [8]	Vehicle detection and face detection.
V. Balajee et. Al 2013[10]	Face detection and GPS,GSM Module
Akila V et. Al 2021[12]	Face Recognition
Ketan J. et. Al 2018[13]	Face Detection,MATLAB and Raspberry Pi.
Indira K, et. Al [16]	QR Code
Rohini.N et. al 2019 [17]	QR Code

Table1.Secure Trasnportation Techniques Comparison

III. METHODOLOGY

The system contains application base face recognition, fingerprint based vehicle on, Tracking of vehicle and QR based product scanning. To manage all the of these a windows Application developed based on python language along with kivymd library. Kivymd is a python library its similar like css, to giving widgets and color to application. Kivymd requires object orient programming. For each screen require sperate class. In this application four section is there and they each section have different function. First one is Face recognition. If face recognition is done then the next step is Fingerprint verification which is based on biometric. After successfully completion of this step the next step is tracking system which is already started after fingerprint verification, and the last step of system are QR code based on Reed–Solomon error correction method.

In the face acknowledgment technique, perceive the face that is as of now in our information. Face acknowledgment is finished by profound learning strategies and brain network procedures. Assuming making information requires faces, first glance at the identification of appearances from a picture. Face identification is generally the initial move towards many face-related advances. There are different face identification calculations, however the Viola-Jones Algorithm is utilized in this task.



(Fig.1 App Interface)

The Viola Jones calculation was named by two PC vision specialists who proposed the strategy in 2001. Vila Jones is very strong. It's somewhat delayed to prepare faces, however it recognizes faces continuously with amazing pace. This strategy basically comprises of choosing Haar-like elements, making essential pictures, running AdaBoost preparing, and making classifier overflows. The picture is taken through a webcam. For this, utilization an open-cv library for camera access. Presently we know the specific area and directions of the face. We remove these countenances for additional handling. After we edited the faces out of the pictures, we use face implanting to extricate highlights from the face. A brain network takes a picture of an individual's face as information and results a vector which addresses the main highlights of that face. This AI vector is called face installing. While preparing the brain organization, the organization figures out how to yield comparative vectors for faces that seem to be comparable. For instance, assuming I have various pictures of countenances inside an alternate stretch of time, obviously, a portion of the elements of my face could change, yet not to an extraordinary. So in this case, the vectors associated with the faces are similar, or in short, they are very close in the vector space. Now that the network has now been trained, it learns to generate vectors that are similar to one another (similar) for the same person's faces (looking similar). Every face in our data saved in a file has a face . embedding

$$f\left(\;\raisebox{-0.3em}{  }\;\right) = \begin{pmatrix} 0.112 \\ 0.067 \\ 0.091 \\ 0.129 \\ 0.002 \\ 0.012 \\ 0.175 \\ \vdots \\ 0.023 \end{pmatrix}$$

fig.2(Image to Matrix Conversion)

The following stage is to scan our information for a new face. So the initial step is to figure the picture's face installing involving a similar organization as in the past, and afterward contrast it with the remainder of the embeddings. On the off chance that the created installing is adequately close to

Or like some other inserting, to perceive the face.

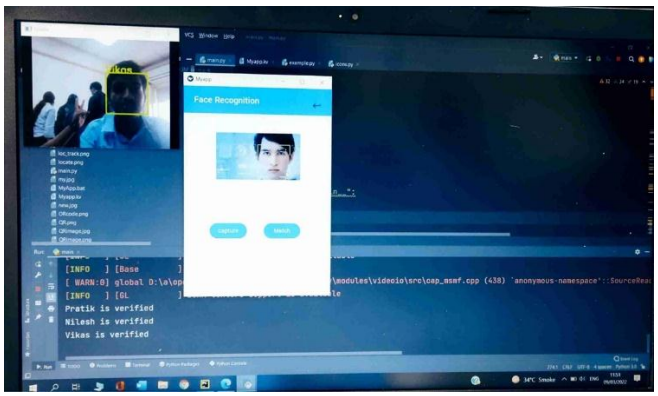


Fig.3 (Face Recognition)

Finger impression Biometric is the much of the time utilized customary strategy which is universally acknowledged as legitimate method to perceive an individual. Unique mark is the impressions of the little edge

(dermal) of the finger. Finger impression edges and valleys are extraordinary and unalterable. Unique finger impression biometric is utilized in various applications that contain different applications like military, policing, instruction, common help, criminology, driver permit enrollment, Mobile Phone access System sign in cycle and like [4]. These days live Fingerprint perusers in view of optical, ultrasonic strategies and so forth are utilized instead of conventional technique for ink to catch Fingerprint. It is a distinguishing proof framework in light of details or area and heading of the edge endings and bifurcations (parts) along an edge way.

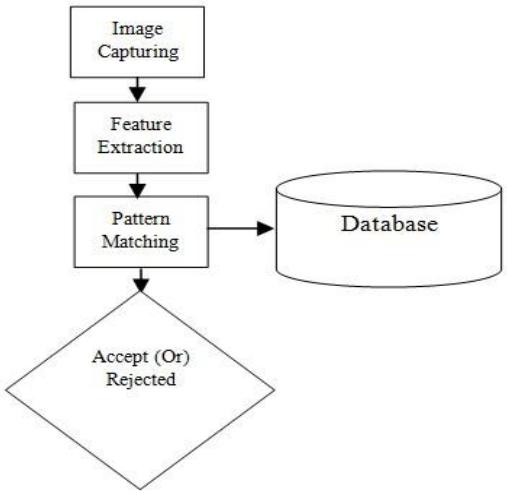


Fig.4 (Flowchart of Fingerprint)

Normally utilized Fingerprint matching strategies are particulars based coordinating and design coordinating. The framework is comprised of a biometric validation unit (for example finger impression scanner) which is utilized to confirm the clients of the vehicle by coordinating the caught finger impression with predefined fingerprints in the data set. Enrollment of clients is finished utilizing the android based UI. Design matching simply details matching depends on particulars focuses for example area and course of each point..

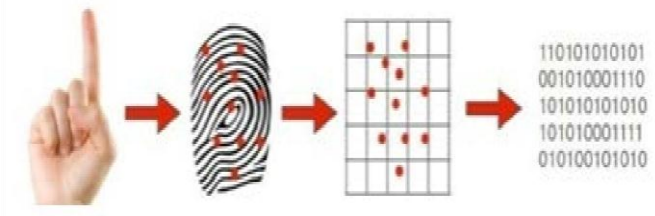


Fig.5 (Image to Binary Conversion)

The Fingerprint can be delegated whorl, right circle, curve, rose curve. To guarantee the presentation of Fingerprint distinguishing proof, upgrade calculations are expected to further develop clearness of information finger impression pictures. The typical Fingerprint designs are displayed in Fig.5and Fig. 6

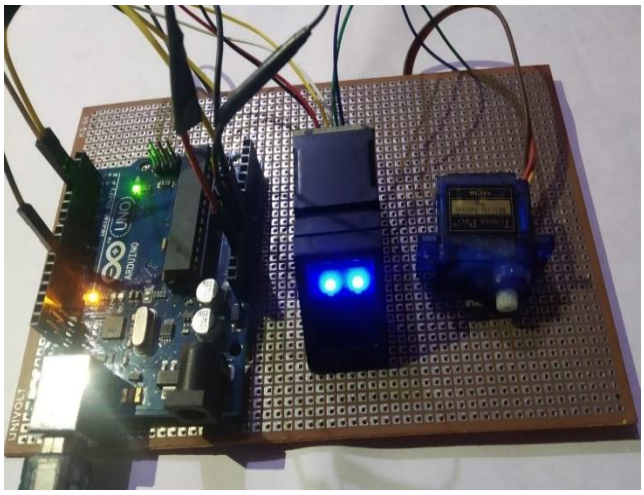


Fig.6 (Implementation of Fingerprint)

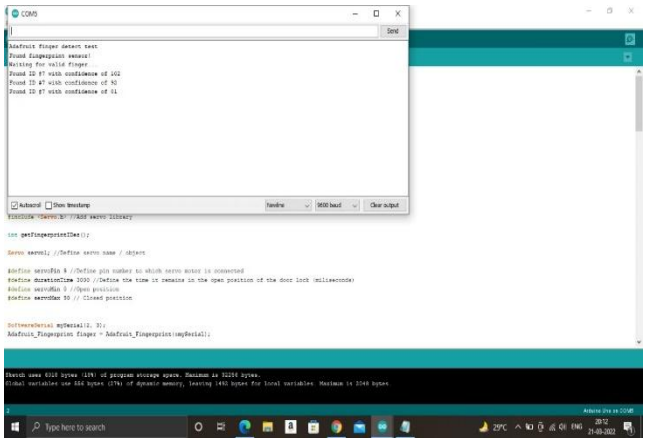


Fig.7 (Verification of Fingerprint)

In vehicle tracking following comprise GPS Neo 6m module, SIM800L module, ESP32 module and power supply. GPS neo 6m module works like, the GPS collector gets a sign from every GPS satellite. The satellites communicate the specific time the signs are sent. By taking away the time, the sign was sent from the time it was gotten, the GPS can perceive how far it is from each satellite. The GPS collector likewise knows the specific situation overhead of the satellites, right now they conveyed their messages. So given the movement season of the GPS signals from three satellites and their careful situation overhead, the GPS collector can decide your situation in three aspects - east, north and height. Envision you are standing some place on Earth with three satellites overhead above you. In the event that you know the distance away you are from satellite A, you realize you should be found some place on the red circle. Assuming you do likewise for satellites B and C, you can work out your area by seeing where the three circles in spite of the fact that it utilizes covering circles as opposed to circles.

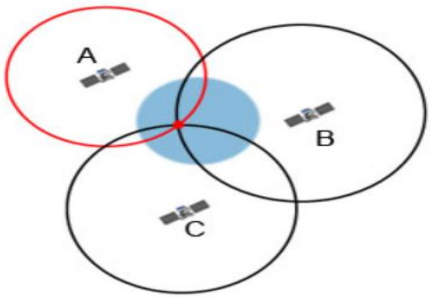


Fig.8 (GPS System)

GPS receiver receives the location data like latitude, altitude and longitude of a vehicle and stores it in the EEPROM of the NodeMcu which can be gotten to remotely through remote exchange convention. This information can be sent to the cell phone or the client through GSM organization or Wi-Fi. Likewise, through the Graphical User Interface (GUI), capacities like control, enlistment of clients and checking of the framework. The GUI interfaces with the framework through a one of a kind Internet Protocol (IP) address which is gotten from the chronic screen of the Node Mcu through program. Aside from significant distance information transmission, the GSM modem is likewise used to remotely ground the framework by sending SMS orders and furthermore get area. The framework is likewise comprised of a biometric confirmation unit (for example unique mark scanner) which is utilized for confirming the clients of the vehicle by coordinating the caught finger impression with predefined fingerprints in the information base. Enlistment of clients is finished utilizing the android based UI. The 4WD twofold layer brilliant vehicle undercarriage is a reason for which the model of the framework will be tried since it gives versatility. The power supply unit gives a reinforcement capacity to the framework in instances of inaccessibility of force because of the exhaustion of the vehicle battery.

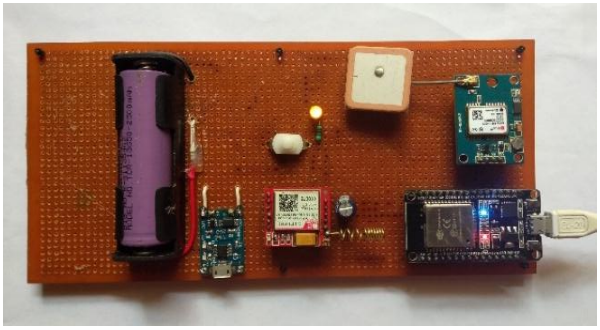


Fig.9(Implementation of GPS/GSM)

Vehicle following purposes a GPS Neo 6m module, a SIM800L module, an ESP32 module, and a power supply. The neo-6m module works as follows: every GPS satellite conveys a message to the GPS recipient. The satellites convey the messages at the specific time they are conveyed. The GPS can work out its separation from each satellite by taking away the time the sign was sent from the time it was gotten. The GPS collector additionally knows the satellites' precise area overhead at the time they convey their signs. The GPS beneficiary can recognize your situation in three aspects - east, north, and elevation - in light of the excursion season of GPS signals from three satellites and their exact situation overhead.

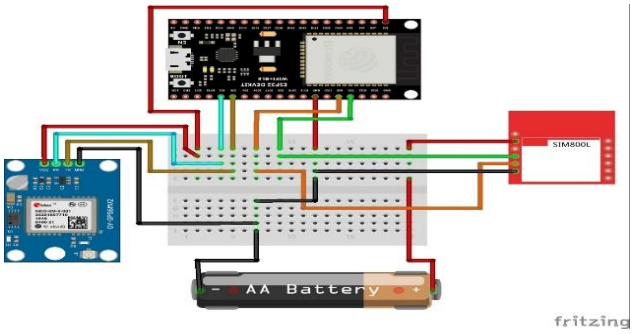


Fig..10 (Circuit Diagram)

Vcc, Rx, Tx, and Gnd are the four pins that make up a GPS module. To transfer data to the 32 module, we only need the Tx pin.The ESP 32 is a gadget with several UART ports. There are 30 pins in total. We need four pins for GPS and two for GSM. The ESP 32 comes with built-in WiFi. gives access to the internet Two libraries are required for tracking system programmes: http client and TinyGPS.The SIM800L is a small cellular module that can send and receive GPRS data, send and receive SMS, and make and receive voice calls. This module's low cost, small footprint, and quad band frequency capabilities make it ideal for any project requiring long-range connectivity.

This module works with voltages going from 3.8 to 4.2 volts. This is the way every one of the modules are associated. The Tx pin of the GPS module is associated with the esp's fourth GPIO, while the Rx pin is appended to the esp's second GPIO. Essentially, the SIM module's RX pin is associated with the esp's Tx pin, and the esp's Tx pin is associated with the RX pin.Espressif ESP32 microcontroller is a minimal expense and low-power framework on a chip (SoC) microcontroller with Wi-Fi and double mode Bluetooth capacities

Date	Latitude	Longitude	Speed	Satellites	Altitude	GPS Time	GPS Date	Tracking Links
2/10/2022	19.211926	72.952588	0.13	6	48.8	6035400	100222	Track
2/10/2022	19.211849	72.952534	0.02	6	38.9	6040100	100222	Track
2/10/2022	19.211842	72.952535	0.07	6	37.8	6040800	100222	Track
2/10/2022	19.211843	72.952538	0.09	6	33.9	6041400	100222	Track
2/11/2022	19.211843	72.952538	0.09	0	33.9	6042050	100222	Tr
2/12/2022	19.211868	72.952532	0.8	6	37.9	6042600	100222	Tr
2/13/2022	19.211849	72.952544	0.06	6	33.1	6043300	100222	Track
2/14/2022	19.2013026	73.0364452	0	6	33	6044000	100222	Track
2/15/2022	19.211853	72.952547	0.2	6	33.6	6044600	100222	Track
2/16/2022	19.2118445	2/13/2022	13.02	4	36.7	6323400	100222	Track
2/10/2022	19.211867	72.9525478	1.24	4	39.8	6324100	100222	Track
2/10/2022	19.2118783	72.9525527	2.24	4	41.3	6324700	100222	Track
2/10/2022	19.2118847	72.9525583	2.19	4	42.3	6325300	100222	Track
2/10/2022	19.2118842	72.9525583	1.85	5	42.3	6325900	100222	Track
2/10/2022	19.2118913	72.9525628	0.15	5	43.1	6330600	100222	Track
2/10/2022	19.2118868	72.9525605	0.33	5	42.6	6331200	100222	Track
2/10/2022	19.2119022	72.9525687	0.11	5	42.7	6331900	100222	Track
2/10/2022	19.2119105	72.952575	0.09	5	43.2	6332500	100222	Track
2/10/2022	19.2119107	72.9525752	0.2	5	44	6333200	100222	Track

google.com/maps

Fig.11(Datasheet of GPS/GSM)

It is utilized and modified utilizing PC running on Windows, Linux and macOS. It fuses a solitary 2.4 GHz Wi-Fi-and-Bluetooth combo chip planned with the TSMC super low-power 40 nm innovation. The combination of Bluetooth, Bluetooth LE and Wi-Fi guarantees that a wide scope of utilizations can be focused on, and that the module is future evidence: utilizing Wi-Fi permits an enormous actual reach and direct association with the web through a Wi-Fi switch, while utilizing Bluetooth permits the client to helpfully interface with the telephone or broadcast low energy signals for its identification.

A QR code comprises of dark squares organized in a square network on a white foundation, which can be perused by an imaging gadget like a camera, and handled utilizing "Reed-Solomon error correction" until the picture can be properly deciphered. The expected information is then extricated from designs that are available in both even and vertical parts of the picture.

The QR code framework comprises of a QR code encoder and decoder. The encoder is answerable for encoding information and age of the QR Code, while the decoder deciphers the information from the QR code

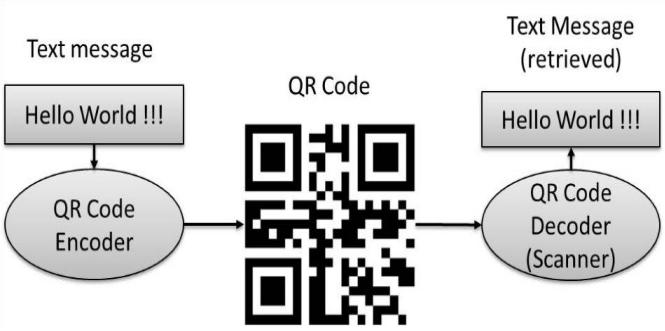


Fig. 12 (Working (overview) of QR Code)

Figure 12 shows the outline of the QR code working. The plain text, URL, or different information are given to the QR code encoder, and it creates the necessary QR code and when we need to get to the information of the QR code, QR code is decoded through QR Code decoder (scanner) which recovers the information of QR code.The form of QR code is relies upon the how much information store for the choose and filtering. If huge measure of information have any desire to

store then the rendition of QRcode is a lot higher. In the wake of examining the QR code the data is consequently refreshed in succeed sheet which is now associated with QR code. This information i.e name, address, portable number,email address, item information,etc can be utilized as future references.

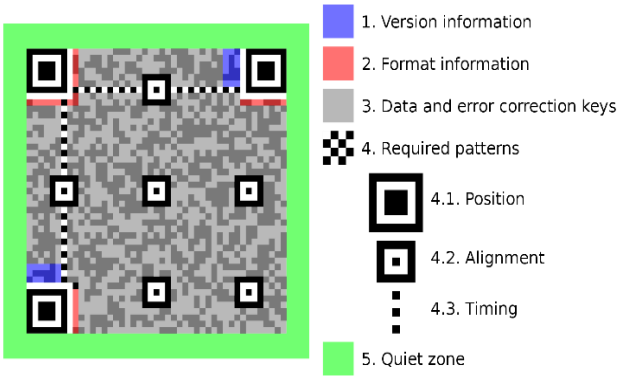


Fig.13(Working principle of QR CODE)

The image renditions of the QR Code range from Version 1 to Version 40. Every form has an alternate module arrangement or number of modules. (The module alludes to the high contrast dabs that make up QR Code.) "Module arrangement" alludes to the quantity of modules contained in an image, starting with Version 1 (21 × 21 modules) up to Version 40 (177 × 177 modules). Figure 2 shows the module arrangement of the essential QR codes.

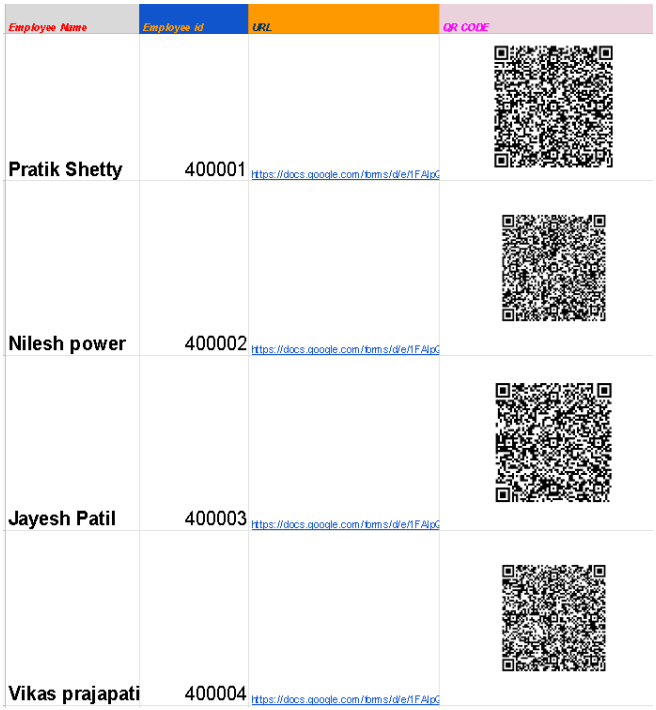


Fig.14(Created QR Code)

Each QR Code image will be worked of square modules organized in an ordinary square exhibit and will comprise of capacity examples and encoding district. What's more, the entire image will be encircled on each of the four sides by a tranquil zone line.

Work designs are the shapes that should be put in unambiguous region of the QR code to guarantee that QR code scanners can accurately distinguish and arrange the

code for deciphering. There are 4 kinds of capacity designs; they are locater design, separator, timing examples, and arrangement designs. Encoding locale contains information, which addresses variant data, design data, information and blunder amendment codewords.

IV. DISCUSSION

The number or burglary cases are increasing these days. So with the help of fingerprint authentication and with facial recognition, a system is designed for a better security to the vehicle as well as tracking system.

First,various copies of each image are detected, then charac teristics are identified and saved in a file.The system's outp ut is

an image folder containing all of the trained pictures, which was created with the OpenCV method.Each picture copy ha s its own unique characteristics.Each picture has its own col lection of characteristics, which are kept in a traziner file in the folder that contains the recognised photos, referred to a s the image database set.Only OpenCV and the Numpy libra ries are used in this project.

V. CONCLUSION AND FUTURESCOPE

The suggested system fulfils the requirements by serving as a cost-effective, dependable, resilient, and secure model. The system are used to reduce the increase in vehicle thefts along with product and allows the owner to identify the intruder thereby having the vehicle under his/her control.

For the Better security and accuracy Facial recognition systems identify the authorized person in real-time and access those registered on the system only. And it's Easy integration with other systems also.With the use of a biometric headgear, this clever anti-theft technology not only controls but also prevents theft by allowing only authorised personnel to enter the vehicle.

In addition to the foregoing, GPS and GSM are utilised to track the vehicle by informing the owner of its position coordinates. As a result, all types of technology are covered in order to ensure comprehensive vehicle security. In addition to the suggested model, an additional feature may be added in the future. It will disable the connectivity between both the engine and igniting system. As a result, the car would be switched off.

The result obtained through the QR code shows that it can be relied upon to ensure safety of product. QR code system which store a large amount of data in the limited space help to record the information of customer for future reference.

In this paper, we reviewed different techniques and algorithm related to security and real time tracking system. We classified these detection techniques based on fingerprint and face detection and verification, GPS and GSM Modules and also QRcode System. Different types of methodologies were discussed in this paper. Limitations and future direction a secure transportation system were discussed. A low-cost yet effective method, for authorizing the user who can drive the vehicle.

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