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Anti Theft Vehicle Security System with Facial Recognition

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ABSTRACT - A motor vehicle is the most likely and preferred way of travel for the majority of the people all over the world for an interstate or an intrastate transportation. So most of the people buy motor vehicles for this purpose, but what if there is a burglary. So the first concern that comes to mind is the security of the vehicle. There are a lot of ways to compromise the security of the vehicle, but if there is a way in, there is always a way to track that and handle the situation. So we tend to add a security which allows us to be the sole controller of our privatevehicle.

I. INTRODUCTION

Motor vehicles are the most important means for transportation. But the ratio of vehicle theft is increasing day by day rapidly as vehicle theft is a universal problem so this will lead to an increase in the vehicle insurance premium which has to be paid by consumers. Therefore we can say that the security systems installed by the vehicle manufacturer are not effective enough[6]. Lock & Key is the first phase of security against vehicle theft. But it is easily breakable, so we tend to increase the security with electronics. In 2018, around 143,000 stolen motor vehicles were identified worldwide, thanks to the SMV database which helped countries to carry out more than 256 million searches. Safety and security of any vehicle is one of the most primary concerns. The increasing risk of stolen vehicles and new ways to burglary have made it crucial to enhancesafety.

Usually, biometric and non - biometric methods are used to provide security. In non–biometric methods, password and personal ID are used to identify the authorized person, but still the possibility of theft remains. But in biometric methods no such possibilities are involved, because they employ techniques such as voice recognition, fingerprint recognition, signature recognition, eye retina recognition, iris recognition and face recognition. Among these, face recognition and detection systems are more sophisticated[5].

II. EXISTINGSYSTEM

A smart entry system is an electronic lock that provides access to control the vehicle without actually using a mechanical key. Keyless entry system was originally meant to control the lock by a keypad located near the driver's door , which is required to enter a self-programmed numeric code. Such systems have a hidden touch-activated keypad, and are still available on certain models. The Remote keyless system refers to a lock that uses an electronic remote control, as a key ,which is activated by a handheld device or automatically by proximity. Widely used in automobiles, as Remote Keyless System performs, the functions of a standard car key, without physical contact. When a person with the electronic key comes within a few yards of the car, pressing a button on the remote , can lock/unlock the doors, and may perform other functions which are available in the remote. A remote keyless system can include, both a RKE system, which unlocks the doors, and the RKI, which starts theengine[1].

III. PROPOSEDSYSTEM

To increase the security of the vehicle and prevent burglary we use facial recognition to authorize the use of the vehicle in all circumstances. The facial recognition matches the people inside the vehicle with the whitelisted persons in the database to allow or deny theauthorization[3].

If no one matches the whitelist then a request will be sent to the mobile application for the owner to allow or deny the request. This request will have the images ofallthepeopleinsidethevehicle,Incaseofdenialit will be considered as burglary if the owner wishes to block the people who are trying to take over the vehicle, If not they just can't start the vehicle. In case of emergencies we provide a deactivate switch which will not run facial recognition or wait for the response from the owner's mobile application, but it will activate the GPS and it will transmit the location to the owner's mobile application[2,7]. If a person tries to break into the vehicle and hard wirethe

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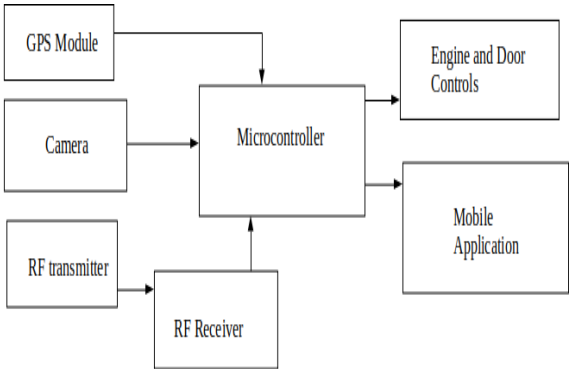
circuit to start the engine they will be locked inside the vehicle and the mobile application will get an alert of this situation. Since all the people who try to steal or have access to the vehicle will be logged with their facial image, it is easy to find the person(s) responsible for the vehicle in notime.

IV. COMPARISON

The existing system can be cracked by capturing the frequency in which the key operates and to hijack that connection[4]. But adding a second factor for security reduces the theft by 90%. And since it logs thepeopleprofilestocheckforaccesstheownercan also make a quick judgement on when and where thevehicleisstolen,whostoleitandwhereitisnow, reducing a lot of work for thepolice.

V. BLOCK DIAGRAM &HARDWARE CONNECTION



VI. PSEUDOCODE

STEP1: IF Emergency Mode is enabled STEP2: ALLOW car start
STEP3: ACCESS car GPR via application STEP4: ELSE
STEP5: CAPTURE user picture STEP6: FETCH white listed images
STEP7: COMPARE user's picture against the white list images
STEP8: IF Image matches any of the white list images
STEP9: ALLOW car start STEP10: ELSE
STEP11:don'tALLOWcarstart STEP12:ENDIF
STEP13:ENDIF

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VI. RESULT

```
pi@raspberrypi:~/car_safety $ python3 manage.py runserver 0.0.0.0:8000
Watching for file changes with StatReloader
Performing system checks...

System check identified no issues (0 silenced).
March 16, 2021 - 08:07:05
Django version 3.1.7, using settings 'car_safety.settings'
Starting development server at http://0.0.0.0:8000/
Quit the server with CONTROL-C.
[16/Mar/2021 08:07:08] "GET /add_person HTTP/1.1" 301 0
[16/Mar/2021 08:07:10] "GET /add_person/ HTTP/1.1" 200 793
[16/Mar/2021 08:07:11] "GET /static/style.css HTTP/1.1" 304 0
[16/Mar/2021 08:07:11] "GET /static/home.webp HTTP/1.1" 304 0
[16/Mar/2021 08:08:00] "POST /add_person/ HTTP/1.1" 200 793
[16/Mar/2021 08:08:03] "GET / HTTP/1.1" 200 652
[16/Mar/2021 08:08:09] "GET /manage_access HTTP/1.1" 301 0
[16/Mar/2021 08:08:11] "GET /manage_access/ HTTP/1.1" 200 764
[16/Mar/2021 08:08:17] "GET / HTTP/1.1" 200 652
[16/Mar/2021 08:08:19] "GET /emergency HTTP/1.1" 301 0
[16/Mar/2021 08:08:19] "GET /emergency/ HTTP/1.1" 200 608
[16/Mar/2021 08:09:05] "POST /emergency/ HTTP/1.1" 200 661
[16/Mar/2021 08:09:12] "POST /emergency/ HTTP/1.1" 200 608
[16/Mar/2021 08:09:15] "GET / HTTP/1.1" 200 652
[16/Mar/2021 08:09:17] "GET /track_vehicle/ HTTP/1.1" 200 601
[16/Mar/2021 08:09:17] "GET /static/script.js HTTP/1.1" 304 0
```

1. SERVER RUNNING IN RASPBERRYPI

This is a micro service that gives the data that is required in the mobile application which are to be displayed

2. FACIAL RECOGNITIONSUCCESS

```
pi@raspberrypi:~ $ python3 carSafety.py
Running...
checking key
capturing
captured
fetching images
comparing
compared
True
START ENGINE
STOP ENGINE
```

The program checks for the vehicle key by using the data through RF module. Then next it is capturing the people inside the vehicle. Then all the white listed people images are retrieved. Those images are compared against the people inside the vehicle. Since there is a match the program allows the engine to start.

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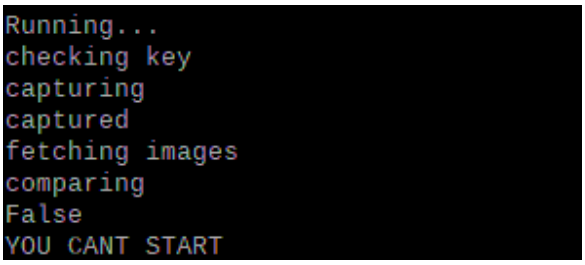
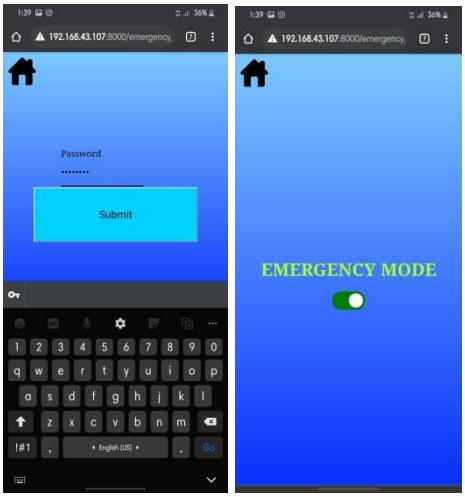
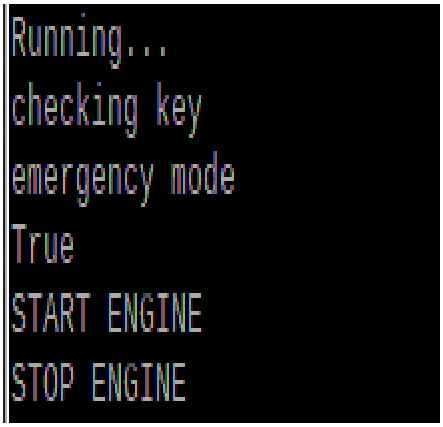
3. FACIAL RECOGNITIONFAILURE



The program checks for the vehicle key by using the data through RF module. Then next it is capturing the people inside the vehicle. Then all the white listed people images are retrieved. Those images are compared against the people inside the vehicle. Since there is no match the program does not allow the engine to start.

4. EMERGENCYMODE





The program checks for the vehicle key by using the data through RF module. Since the emergency mode is active the

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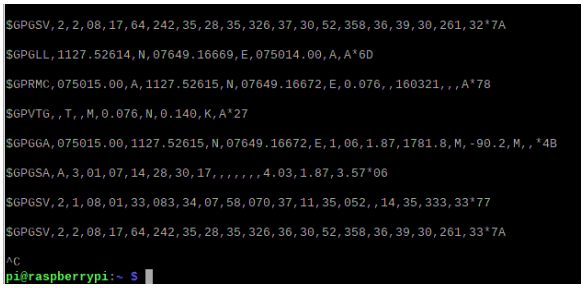
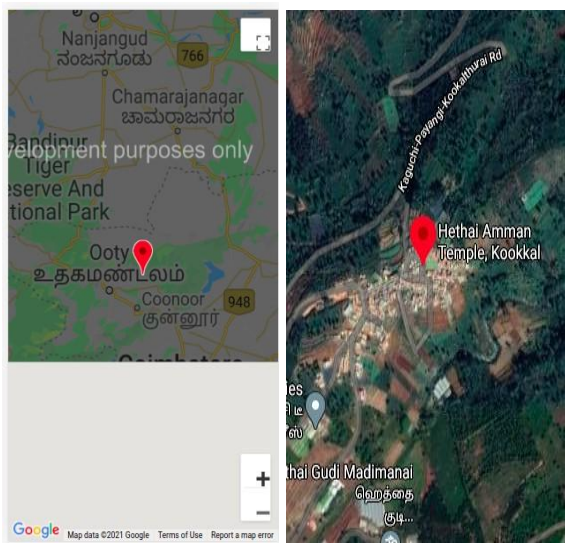
program does allow the engine to start.

5. GPSOUTPUTS





The coordinates are fetched from the GPS and passed to the Googles Maps Api service to plot it in the map.

VII. FUTURESCOPE

Since all the passengers and the driver are logged in the system. If all the datas is stored, it might help us to search for a person in case any one goes missing. Advancing the facial recognition we can also detect the emotional state of a passenger so that we could probably sense any kidnapping activities and hold the persons responsible. Also building a network of all the vehicles which has ATVSS installed can be used to monitor the movement of the vehicles and alert the driver if any other vehicle is approaching it in a blind corner or a cross road, thus avoiding suchaccidents.

VIII. CONCLUSION

In this era taking every precaution to protect your vehicle is a prudent measure. Crime can affect anyone when you expect it the least. ATVSS is a simple device that alerts the owner through the mobile application to the potential theft, that there is a high likelihood that owner will be notified if there is any attempt to penetrate the security of thevehicle.

If the security of a vehicle looks easier to crack, then it will be the most likely choice of any thief. If an alarm is installed, the likelihood of your vehicle being chosen to be stolen is mostly unlikely.

In case of owning an older vehicle, the insurance would not account for the security system, so installing an Anti-theft vehicle security system can result in a reduction in your insurance premium. With the cost of the Anti-theft vehicle security system now being affordable to every driver, the cost of installation is taken care of by the insurance costs over the lifetime of the vehicle. By installing an Anti-theft vehicle security system, you are one step closer to protect your vehicle from getting stolen.

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