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Anti-Theft Alert System for Smart Vehicles

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Abstract: ***In today's world security of vehicle is become matter of concern. The proposed system is used for security of the vehicle and tracking the vehicle if the vehicle get stolen. Hardware contains Arduino microcontroller, USB cable, GPS. Aurdino microcontroller connected with GPS which will be connected with the vehicle. User will be able to get the location via email. Also specific range is set around the vehicle, only if the vehicle gets out of that range it will gives alert to the owner, if not then there is no disturbance of giving random alerts to the user. Another feature which is face recognition used for unlocking the vehicle. User will be able to unlock the vehicle with his face. if the face is not matched with the image which is in the system, microcontroller will click the image of that person & also send alert massage to the owner's email.***
Keywords: Machine Learning, Internet of Things, Hardware; Arduino Uno; Software; Vehicular Security System

I. INTRODUCTION

Vehicle's security is of utmost importance in today's world & thefting of vehicle in common parking places has become a matter of concern. To overcome this problem we have an idea. There is system which is based on both Hardware & Software part. Hardware is used to send the location of vehicle to the user. Also user can set a range for the vehicle. If the vehicle cross this range user will get alert message. System using Arduino microcontroller where GPS is connected. Another feature which is face recognition function works for unlocking vehicle by comparing captured imaged to the original data image, means if the unknown person detected to the system, the image of that person sent to the owner.

II. RELATED WORK

Mithileysh Sathiyanarayanan Srishtibiz (R&D London, UK), Santosh Mahendra Srishtibiz (R&D New Jersey, USA) and Rajesh Babu Vasu Srishtibiz (R&D New Jersey, USA). A smart vehicle security system using IOT, has turned a Customary Vehicle Security Systems to a Smart Vehicle Security Systems which access and controls vehicles remotely using a Smart mobile-phone. The IOT based system employs the integration of Radio Frequency Identification, Global Positioning System, Global System for Mobile communication, wireless communication, cloud networking Manyi Qian, Hailin Gao, Weihong Liu (School of Electronic and Information Engineering, Beijing Jiaotong University, Beijing, China). A novel vehicle anti-theft alarm and tracking system based on Android OS has developed. The system works on latitudes and longitudes of the car received by the mobile-phone's mobile-phone and are combined with a Google map or a Baidu map so the location could be displayed on the map to track more easily. The proposed vehicle anti-theft alarm and tracking system uses the existing communication network and Internet through a kind of instant communication software called Huanxin Instant Messaging Cloud.

Deepali Virmani, Anshika Agarwal (Department of Computer Science, Bhagwan Parshuram Institute of Technology, New Delhi, India) Devrish Mahajan (Amity Institute of Space Science and Technology,

Amity University, Noida, UP, India). An inaccessible and advanced security system that senses vehicle movement, alerts the mobile-phone, accepts mobile- phone's commands and also responds automatically to a security threat has created. The system is easy to use and learn due to its simple message and call alert feature.

B.G. Nagaraja, Ravi Rayappa, M Mahesh (Lecturers, Electronics& Communications Eng.

Dept., East West Institute of Technology, Bangalore- 91, India), Chandrasekhar M Patil (Research Scholar, Electronics & Communications Eng. Dept., Jayachamarajedra college of Eng., Mysore91), Dr.

T.C. Manjunath (Professor & Head, ECE Dept., New Horizon College of Eng., Bangalore-87, India.). The system tracks the vehicle at a higher degree of accuracy by using GSM Technology, Assembly language is used to write Microcontroller codes to control the theft of the vehicle. Samir Rana (Assistant Professor, Department of Computer Science & Engineering, Lovely Professional University), Ritu Mewari (Assistant Professor, Department of Computer Science & Engineering, Baba Farid Institute of Technology, Dehradun, India), Lata Nautiyal (Assistant Professor, Department of Computer Science & Engineering. The developed mobile application has the functions of the vehicle, ensure the locking of the accelerator, so that the vehicle will not move.

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A Raspberry pi board B+ model, a jaw or a gripper and other hardware devices are used. ADT, SDK tools and UI design tools for rapid prototyping are used for designing applications owner's interface. Application is developed in JAVA programming language using Android. Python I used to do coding on the GPIO pins of the Raspberry pi board B+ model.

III. PROPOSED WORK

In this system we are going to design software and hardware device for the security of vehicles mainly we have features like :

1) Face Recognition to Unlock the vehicles
2) GPS Tracking
3) Specific range set for alert

In this system we are using arduino microcontroller, GPS, Connecting wires, USB cables as a hardware devices, PYcharm IDE, Arduino IDE as a software, Internet of Things (IOT) & one of the Machine Learning application which is face recognition.

IV. METHEDOLOGY

A. Face Recognition to Unlock the Vehicles

Using this system, User will be able to unlock his vehicle using his face. Firstly user have to set his face in system. If someone comes in front of the camera, system will compare the face with the image stored in the system, if it is compared vehicle will be unlocked, it is not It will give alert to the user mail id.

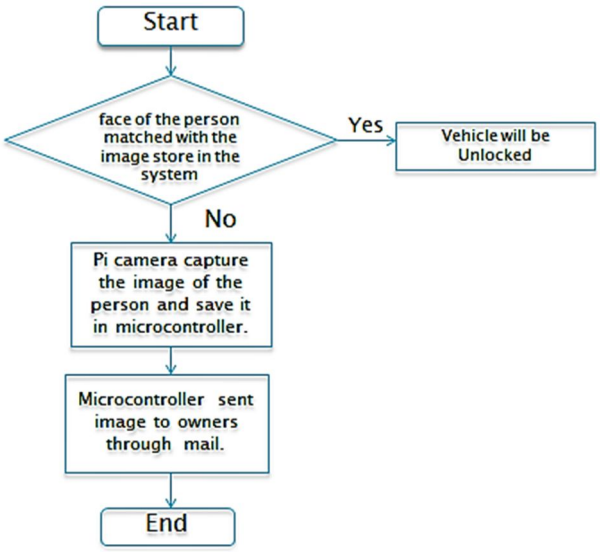


Fig. 1 Flowchart for face recognition to unlock the vehicle



Fig. 2 Images stored in dataset folder

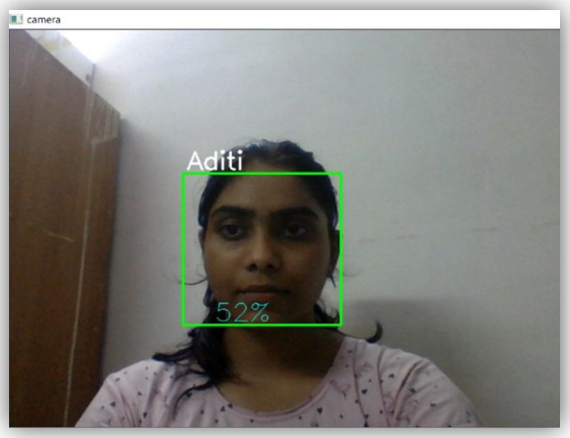


Fig.3 Comparing images & showing accuracy

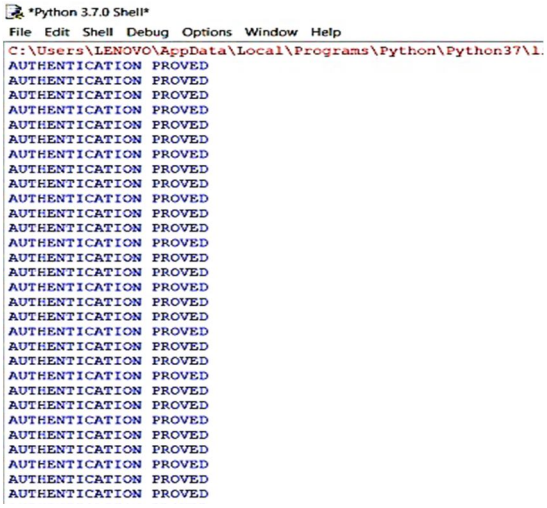


Fig. 4 If image is matched, it will show
"Authentication Proved"

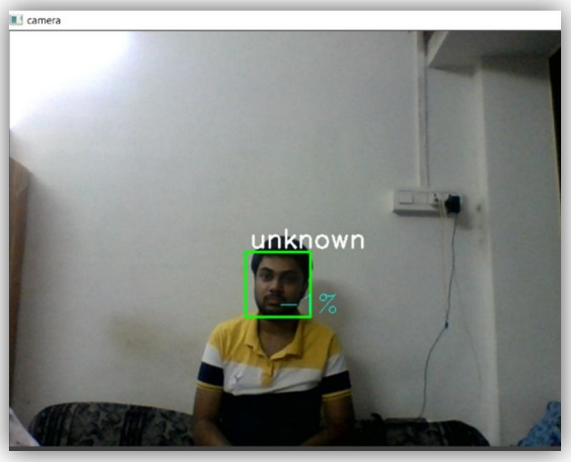


Fig. 5 Unknwon face detected

```
mail.sent
AUTHENTICATION PROVED
mail.sent
AUTHENTICATION PROVED
mail.sent
AUTHENTICATION PROVED
mail.sent
AUTHENTICATION PROVED
AUTHENTICATION PROVED
mail.sent
AUTHENTICATION PROVED
mail.sent
```

Fig. 6 Mail sent to the user if unknown face is detected

B. GPS Tracking

GPS System is connected with Arduino.If an unknown person is detected it will give the location of the vehicle on the user's email.

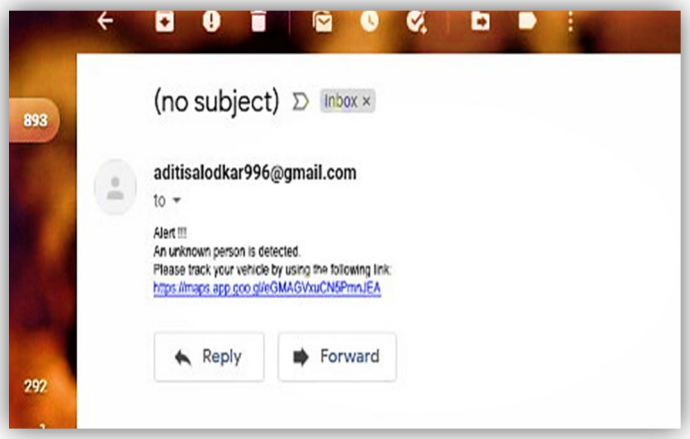


Fig. 7 Location & alert sent to the user

C. Specific Range set for Alert

Firstly, in our system user set a specific range for the parked vehicle. So only if the vehicle goes out of that given set range then only system gives alert to the user. Means it doesn't send continuously alert to user for some random movements of vehicles.

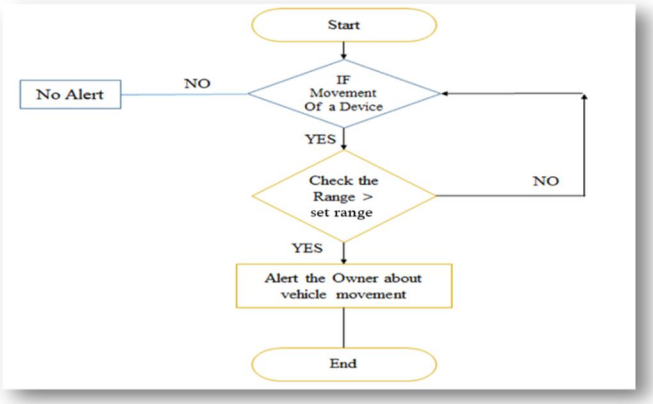


Fig. 8 flowchart for Specific range set

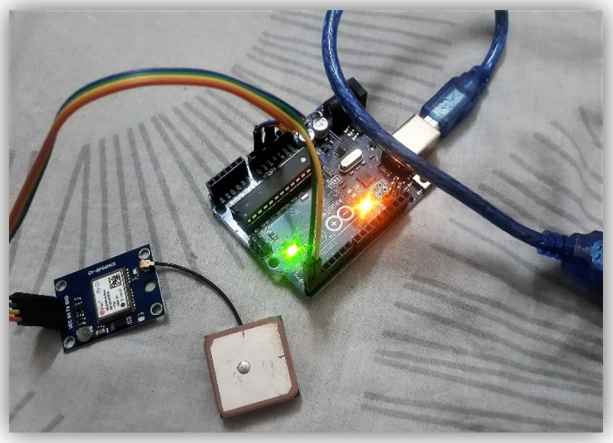


Fig. 9 overall hardware system

V. REQUIREMENTS

A. *Hardware*

1) *Arduino Uno Microcontroller:* The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuit



2) *GPS System:* The global positioning system (GPS) is a space based satellite navigation system that provides location of the vehicle.



3) *USB Cables:* The term USB stands for "Universal Serial Bus". USB cable assemblies are some of the most popular cable types available, used mostly to connect computers to peripheral devices such as cameras, camcorders, printers, scanners, and more.



4) *Connecting Wires:* Connecting wires allows an electrical current to travel from one point on a circuit to another because electricity needs a medium through which it can move.



B. Software

1) *Arduino IDE 1.8.7:* The Arduino IDE is an open-source software, which is used to write and upload code to the Arduino boards. It supports the programming languages C and C++. Here, IDE stands for Integrated Development Environment.
2) *PyCharm IDE:* PyCharm is an integrated development environment (IDE) used in computer programming, specifically for the Python programming language. It provides code analysis, a graphical debugger, an integrated unit tester, integration with version control systems.

C. Languages

1) *Python:* In our project this language is used to write code for Dataset and Face Recognition feature.
2) *Embedded C:* In the system Embedded C language is used to code for Aurdino Uno to send the location of the vehicle.

D. Technologies

1) *Machine Learning (ML):* We are using one of the Machine learning (ML) application i.e. Face Recognition to unlock the vehicle using python language.
2) *Internet of Things (IoT):* In our project the Internet of Things (IoT) is used to exchange data i.e. Alert message & location information through email and connects the device and the system over internet.

VI. FUTURE SCOPE

In Future, when the prototype system would be commercially implemented as a working system in modern day vehicles. The idea of proposed system is to replace the conventional security system with the Mobile Android Application, where the vehicle's security will be control by that one app. Also there is possibility to add features like finger print sensing in the hardware to give to make more security facility for the vehicles. Also by using app there is possibility to send an alert message to the nearest police stations.

VII. CONCLUSION

The purpose of developing this system is mainly to introduce an inaccessible and advance security system that senses vehicle movement, alert the mobile-phone and also respond automatically to a security threat by using Arduino micro controller. This work is to protect vehicles from the thief. By this work which is presented in the paper it is very easy to track the vehicle at a higher degree of accuracy. This system easy to used and proposed in this system proves to be an effective solution over the existing anti-theft system with a owner -friendly environment, ease of use and more security.

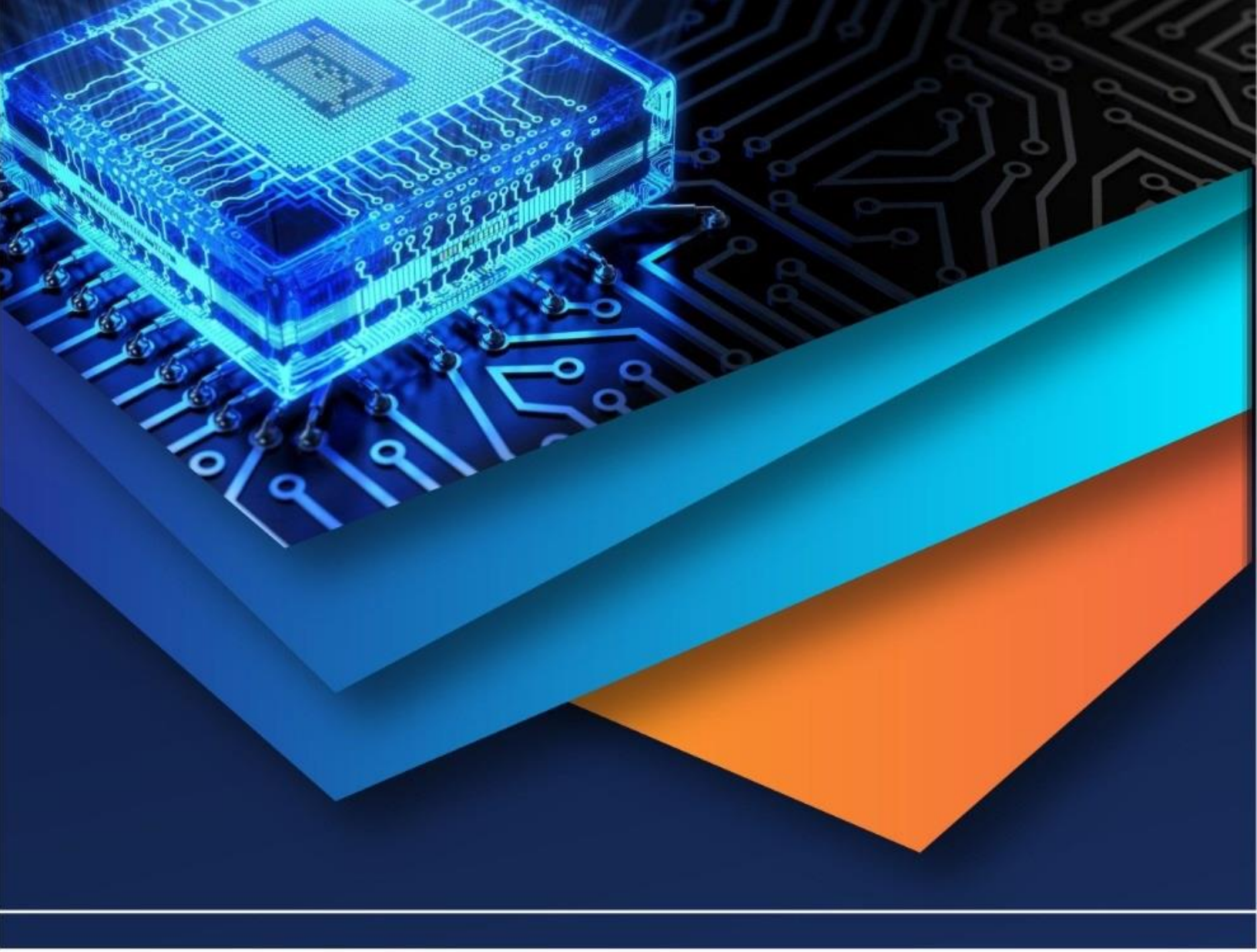
VIII. ACKNOWLEDGEMENT

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