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VEHICLE THEFT TRACKING, DETECTING AND LOCKING SYSTEM USING MATLAB AND IOT

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***Abstract*—** The numbers of vehicle owners are increasing and the numbers of crimes related to vehicles are also rapidly increasing. One of which is vehicle theft. This asks for better security systems which can track the vehicles detect the vehicle and also for locking the vehicle. The Objective of the proposed paper is to present the work done by using a computer system, the vehicle can lock or unlocked only if the system recognises the person's face else a security alert will be sent to the registered vehicle owner. Along with locking and unlocking the system will also alert the owner if there are any damages done to the vehicle or if there is an attempt to Anti-theft of Vehicle. The work is an attempt to design an advance vehicle security system that uses Face recognition and iris recognition to prevent theft and to determine the face image of unauthorised person. Finally proposed the methodology for Anti-theft of vehicles among the best approach.

Keywords *—Arduino UNO board, 4x4 Keypad, 16x2 LCD, Servo motor, MatLab- MatLab IDE, Arduino IDE.*

I. INTRODUCTION

These day's vehicle robbery cases are higher than any other time, it has gotten to be fundamental to give a vehicle a superb security with the main solid hostile to burglary gadget. Vehicle focal locking framework guarantees the best ensure to secure your vehicle from various types of

burglary cases. It is a vehicle security gadget that offers fantastic insurance to your vehicle. However this framework couldn't demonstrate to give complete security and openness to the vehicle in the event of burglary. So a more created framework makes utilization of an inserted framework focused around Face and iris recognition of the person is the new innovation.

The *Internet of Things (IoT)* has come out as a popular technology changing the concept of "connecting people" to "connecting things". The IoT provides a network of sensors, actuators, machines, and home appliances. They are embedded with computing devices and software, which enable these things to be connected with each other and exchange data over Internet. A variety of low-cost devices and cloud platforms for the IoT have become available.

In this paper, we propose a very low-cost system for Vehicle Theft tracking which first identifies the face recognition for locking and unlocking of the vehicle and secondly uses the password requirement, for better security of the vehicle.

II. LITERATURE SURVEY

"Vehicle Theft Detection Using Face Recognition" by Prof. P.R. Shahane, Subhashi Gupta, Rajat Shrivastav, Vignesh.S, Sushant Singh in May 2019

Presently a-days number of vehicles can be seen on streets. The vast majority in this cutting edge age like to have somewhere around one vehicle for themselves or their family. With the development of strong stealing tactics, owners are in dread of having their vehicles being taken from normal parking garage or from outside their home. In this paper the face recognition idea based on image processing is proposed in vehicle theft detection. Face Recognition idea is one of the fruitful significant utilizations of picture processing. It's an all-encompassing methodology towards the innovation and has likely applications in different regions like Biometrics, Information society, Smart cards, Access control and so on this idea of facial acknowledgment can be utilized for vehicle security too. The utilization of vehicle is must for everybody. Simultaneously, protection from robbery is additionally very significant. Prevention of vehicle robbery should be possible distantly by an approved individual. This should be possible by recognising the face of the approved individual to open the motors. If there should be an occurrence of any robbery, the framework won't allow the motors to turn over and it will send a solicitation to the proprietor through an application in the pre introduced arrangement of the vehicle which will then, at that point rely upon the proprietor to allow the driver to open the motors by sending back the framework a pass code. The fundamental benefit of the application is the more extensive scope of transmission and gathering over the web which will assist with telling the approved individual being anyplace in the world.

"A Novel Approach for Vehicle Anti-Theft System" by Anusuya, Karthikeyan M, Hari Prabhu M in Nov 2014

The implementation of a security framework for vehicles through face acknowledgment is to lessen the theft. The point of the proposed framework is to give the security to vehicles from burglaries or thefts utilizing PIC microcontroller. The framework works at the standard of face acknowledgment of the driver who starts the vehicle. Images of the people who are totally connected with to drive the vehicle are put away in the PC. Driver goes into the vehicle web camera inside the vehicle will catch the driver's picture. It will check the picture with recently put away one. The microcontroller is modified so that assuming the comparing result is true; it creates a sign to run the motor in request to start the vehicle automatically. Assuming the outcome isn't bona fide, it creates a sign to advise the vehicle owner that unapproved access with the assistance of GSM through SMS. Vehicle robbery can be decreased by utilizing face acknowledgment strategy. The pictures of the individual who are thinking about as a perceived are store in the PC. Test pictures are confirmed with the put away one and it will deliver the comparing result. The vehicle begins exclusively by the approved client. Face acknowledgment is finished by the MATLAB coding and different sensor yields are dissected utilizing Proteus software device. Both are combined with the assistance of sequential correspondence port RS232. When unapproved client need to begin the vehicle then the regulator send the data to versatile through GSM by sequential correspondence port.

"Real Time Vehicle Tracking System using GSM and GPS Technology- An Anti-theft Tracking System" by Kunal Maurya, Neelu Jain, Mandeep Singh

In this paper authors have used IoT tools to implement the proposed system approach. As the count of vehicles is increasing day by day the robberies also increasing in that way and it becomes more challenging to provide security measures. In the article the author proposed a system which utilizes the global positioning system applications with the help of GSM and GPS modules. Using GPS the vehicle can be tracked easily so that if the vehicle is robbed by the if it can be tracked where it is and GSM model is used to send an alert to the owner in case of unauthorised access to vehicle by sending the position of the robbed vehicle. So that owner can easily get alert in case of theft. For accomplishing this task a microcontroller is used which is AT89C51 interfaced with the GSM and GPS models. Using GPS we can easily get the longitude and latitude of the vehicle. But the problem here is the message sending process and location fetching process is depends on the

network. If network is not available properly then it

"IoT based Antitheft Vehicle Tracking And Control System" by Ahmed Sabeeh Ali , Hussein Atiyah Lafta Ali Hussein in April 2020

This paper presents a minimal expense and dependable Anti-Theft Vehicle global positioning framework dependent on IoT administrations with microcontrollers for tracking vehicles continuously, controls it if there should be an occurrence of burglary and advise the close by police headquarters in a brief period. Minimal expense, compelling and dependable modules and advancements are utilized in the execution of the proposed framework. The framework comprises of two sections, the installed framework, and web application. The inserted framework incorporates GPS, GSM and microcontroller, it set inside the vehicle in a secret spot with the goal that hoodlum can't have a clue about its area. The web application with Google map is intended for following vehicles progressively also, the host worker communicate information between the implanted framework and web application. *Haver sine Formula* is carried out to decide the closest police headquarters by considering difference of coordinate of vehicle with directions of police headquarters. The microcontroller deals with the activity of inserted framework, GPS get current area of the vehicle; GSM/GPRS Module used to send information to the host worker to screen the vehicle area by Google map inserted with web application and can handle the installed framework distantly by sending SMS to stop vehicle fuel line by hand-off. The framework is outfitted with battery-powered batteries to guarantee constant activity while separating the vehicle battery.

III. EXISTING SYSTEM

Avoiding Vehicle Theft is making buzzer in present automobile industry. The owner sends the message to the mobile which is embedded in the vehicle which has stolen which in turn controls the vehicles engine by locking the working of the engine immediately. The developed system accept the message and broadcasted to the Vehicle Network through CAN Bus. The engine can be unlocked only by the owner of the vehicle by sending the message again. The goal behind the design is to develop security for vehicles and embedded system to communicate with engine of the vehicle.

IV. Proposed System

In this paper, a computer system is used for recognising, the person is attempting to use the vehicle that is registered or not with the help of a face recognizing. The face image of the attempting person is compared with the trained images, if it doesn't belong then the vehicle remains locked else the owner or the registered fellow of the vehicle user gets the access to the vehicle.

If there is an attempt to theft that is, if the image sent to the system which doesn't match with the trained images then the vehicle owner can get the image which is stored in the computer system.

If the owner is trying to access the vehicle the proposed system will first prompt for face recognition and once it matches with the trained image dataset. The system prompts for second security check which is security code. Only after both requirements match then only the vehicle will be unlocked.

V. Architecture of the Proposed System

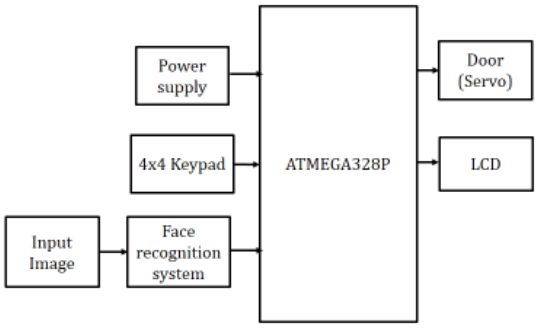

Fig 1: System Block Diagram

In this system the input is an image which is captured using a camera which captures the face of the person trying to unlock the vehicle. This image will be compared with the dataset and preferred action will be performed.

Personal computer: The image captured will be compared with the dataset provided by the programmer. If the image matches with the dataset then the user will be prompted to enter a password.

Keypad: The password entered should match with the actual password only then the user will get to unlock the vehicle. A keypad is used for typing the password.

Lcd display: is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers. It can be used to display the message.

Servo Motor: This can be used opening and closing of the Door, when the face recognition and password entry is correct then only the door will open otherwise the door will be closed.

Power Supply: The power supply which is used start the process the Arduino board.

VI. IMPLEMENTATION

Arduino Uno

Fig 2: Arduino Uno Board

Arduino's processor basically uses the Harvard architecture where the program code and program

data have separate memory. It consists of two memories- Program memory and the data memory. The code is stored in the flash program memory, whereas the data is stored in the data memory. The Atmega328 has 32 KB of flash memory for storing code (of which 0.5 KB is used for the bootloader), 2 KB of SRAM and 1 KB of EEPROM and operates with a clock speed of 16MHz.

LCD Display

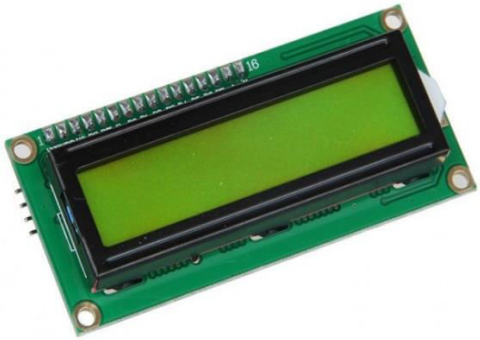

Fig 3: Lcd Display

16×2 LCD is named so because; it has 16 Columns and 2 Rows. There are a lot of combinations available like, 8×1, 8×2, 10×2, 16×1, etc. but the most used one is the 16×2 LCD. So, it will have (16×2=32) 32 characters in total and each character will be made of 5×8 Pixel Dots.

KeyPad:

Fig 4 : 16x16 Keypad

This 16-button keypad provides a useful human interface component for microcontroller projects. Convenient adhesive backing provides a simple way to mount the keypad in a variety of applications.

In order for the microcontroller to determine which button is pressed, it first needs to pull each of the four columns (pins 1-4) either low or high one at a time, and then poll the states of the four rows (pins 5-8). Depending on the states of the columns, the microcontroller can tell which button is pressed. For example, say your program pulls all four columns low and then pulls the first row high. It then reads the input states of each column, and reads pin 1 high. This means that a contact has been made between column 4 and row 1, so button 'A' has been pressed.

Servo Motor

Fig 5 : Servo meter

A new electromagnetic design scheme reduces the cogging torque of the motor, reduces the temperature rise and improves the performance.· The design of motor pole pairs 5 pairs has the characteristics of smooth start, low noise, high power density and high efficiency. · The optimization of magnetic steel and the new structural process design realize the design of small and light weight. The protection level is IP65, greatly improving the environmental resistance. The highest speed is 5000rpm, which can meet the needs of high-speed application. Equipped with a variety of specifications of encoder, up to 24 bit, can achieve high-precision servo control.

Arduino IDE

Fig 6: Arduino IDE

Arduino programs are written in the Arduino Integrated Development Environment (IDE). Arduino IDE is special software running on your system that allows you to write sketches (synonym for program in Arduino language) for different Arduino boards. The Arduino programming language is based on a very simple hardware programming language called processing, which is similar to the C language. For the writing the code the requirement you need to have is the knowledge of C language because the programming language used in Arduino is embedded C, so for coding and controlling any hardware through this software you need to know the C language as the rules, syntax, elements are all used as you use in C language only.

MatLab IDE

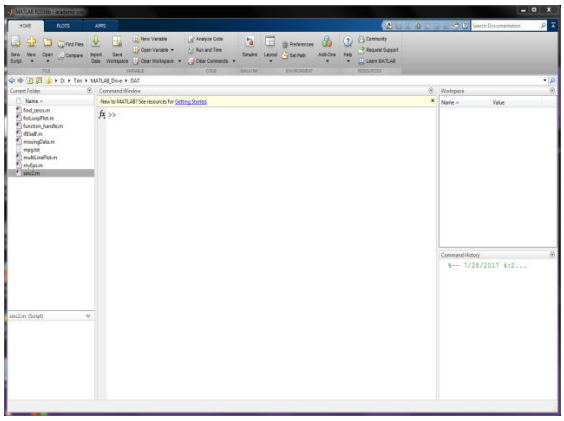

Fig 7: MatLab IDE

MATLAB is a programming language developed by MathWorks. It started out as a matrix programming language where linear algebra programming was simple. It can be run both under interactive sessions and as a batch job. This tutorial gives you aggressively a gentle introduction of MATLAB programming language. It is designed to give students fluency in MATLAB programming language. Problem-based MATLAB examples have been given in simple and easy way to make your learning fast and effective.

VII. Flowchart

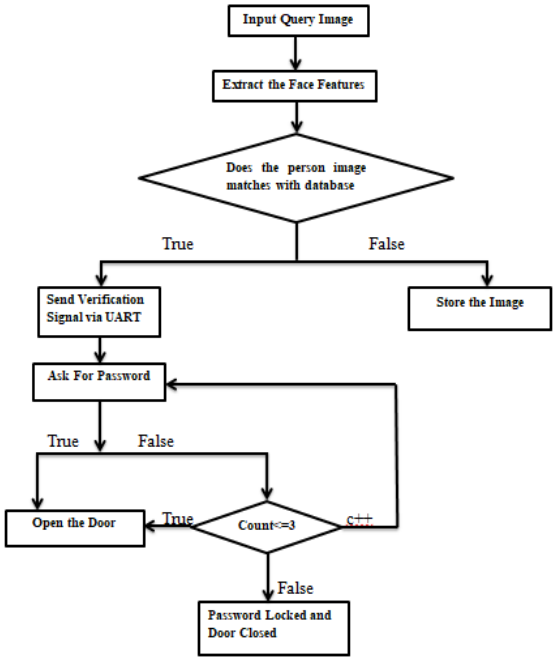

Fig 8: Flowchart of Proposed System

The above flowchart, the input query image is taken throw the webcam or by selecting the stored image. The face image feature is extracted using the viola and johns algorithm then the image is compared with the stored dataset, if the compared image does not matched then it will store the image in the system as the unauthorised image. If the image is matched then send the verification signal via UART to Arduino and the it ask to enter the password, if the password is matched then it will open the door, if the password is wrong it ask to re-enter the password maximum of three attempt provided to enter the password in that any password enter is correct it will open otherwise it lock the system. The password is locked and the door is closed.

XI. Experiment and Result

GUI in MATLAB which asks the user gives the input to verify authorization. If the input image and trained image is same then it will authenticate user. If the verification fails it give verification failed message. If the verification is successful then give the message verification Successful, then it send to Arduino for authentication. Once the input is verified then the connection from MATLAB to Arduino established. After the successful authentication the system asks for the password to unlock the vehicle. If password is correct, it display password is accessed, hence the vehicle is allowed to access and door will Open, and after some seconds it close the door. If password is wrong it asks to reenter the password. After three attempt of wrong password entry, it will be locked out and is closed.

Method	Accuracy
Face Recognition	80%
Face Acknowledgment and GSM	82%
GPS and GSM	75%
GPS, GSM and SMS based.	85%
Face Recognition, ATMEGA383P, Servo Motor, MatLab, ArduinoUno	90%

ADVANTAGES

- As advanced technique is used for authentication vehicle theft is avoided at maximum rate.
- As every one's eyes are different no one can easily access the system and unlock vehicle even if he got the password there is no use.
- Smart vehicle feature is incorporated.
- Less cost for the implementation.
- Efficient and accurate system.
- Since face recognition is used as the input less chances of fault
- Double entry requirement ensures better security.
- Owner will be alerted if there is any attempt to theft.

VIII. CONCLUSION AND FUTURE ENHANCEMENT

In this project, it is expected that as soon as a face is sensed face recognition system, the face recognition algorithm will start working and it will detect and recognize the person's face which is trained to the system. And password security enhances the security of the vehicle additionally. An efficient and cost effective method is proposed for preventing vehicle theft. The system works on double requirements for ensuring better security. The system is trained with the image datasets, which uses face recognition to unlock

the vehicle - only if the password and face matches with the dataset otherwise not.

In future the alert message can be sent to the owner of the vehicle in case of unauthorised access. Vehicle tracking can also be incorporated to the existing system using GPS module and thus improves the smartness of the vehicle.

REFERENCES

[1] C. Nandakumar, G. Muralidaran and N. Tharani "Real Time Vehicle Security System through Face recognition" Division of Mechatronics, Department of Production Technology,Madras Institute of Technology, Anna University, Chennai, INDIA.

[2] A. Pazhampilly Sreedevi, B. Sarath S Nair "Image Processing Based Real Time Vehicle Theft Detection And Prevention System" D. Narendar Singh, K. Tejaswi "Real Time Vehicle Theft Identity and Control System Based on ARM 9" International journal of latest trend in engineering and technology(IJLTET)

[3] Y. Chang.,Chen, H.,Chiang, F., H. Wang,(2010). Toward Real-Time Precise Point Positioning: Differential GPS Based on IGS Ultra Rapid Product,SICE Annual Conference, The Grand Hotel, Taipei, Taiwan August 18-21Asaad.M.J.Al-Hindawi,Ibraheem Talib, "Experimentally Evaluation of GPS/GSM Based System Design", Journal of Electronic Systems Volume 2 Number 2 June 2012.

[4] Mandeep Singh ,Kunal Maurya , Neelu Jain, "Real Time Vehicle Tracking System using GSM and GPS Technology An Anti-theft Tracking System," International Journal of Electronics and Computer Science Engineering.ISSN 22771956/V1N3-1103-1107.

[5] Viswaprakash Babu & Vikram Kulkarni, "embedded smart car security system on face detection', special issue of IJCCT, ISSN(Online):2231-0371, ISSN(Print): 09757449, volume-3, issue-1.

[6] K.Karthick,V.Ramya,B.Palaniappan,"Embed ded Controller for Vehicle In-Front Obstacle Detection andCabin Safety Alert System", International Journal of Computer Science & Information Technology (IJCSIT) Vol 4, No 2, April 2012

[7] Kai-Tai Song, Chih-Chieh Yang, of National Chiao Tung University, Taiwan, "Front Vehicle Tracking Using Scene Analysis", Proceedings of the IEEE International Conference on Mechatronics & Automation 2005.