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Design And Development Of Antitheft Safety System With MATLAB For Vehicle

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Abstract

The theft security of vehicle has become a matter of concern. An efficient automotive security system is implemented for anti-theft using an embedded system integrated with Global System for Mobile Communication (GSM).This proposed work is an attempt to design and develop a smart anti-theft system that uses GSM system to prevent theft and from non-authorized users by using microcontroller-based system. An efficient automotive security system is implemented for anti-theft using an embedded system. The owner can get SMS of lock or unlock information of vehicle. A microcontroller is programmed using MATLAB, a directional valve is controlled by microcontroller to take the proper valve position to allow the lock and unlock vehicle door..

I. INRODUCTION

For locking and unlocking any device with the help of password is most widely used technique for providing secured access. Only the authorized person - who knows the password, can lock or unlock the system. Once device is locked, if any other person tries to unlock it and enters wrong password then system gives ALERT message or warning. Following is representation of one time password circuit (OTP) used in system.

II. OPERATING DETAILS AND WORKING

ISSN: 2347-1697
International Journal of Informative & Futuristic Research (IJIFR)
Volume - 5, Issue -4, December 2017
Page No. : 8993-9000

a. Working circuit for one time password:

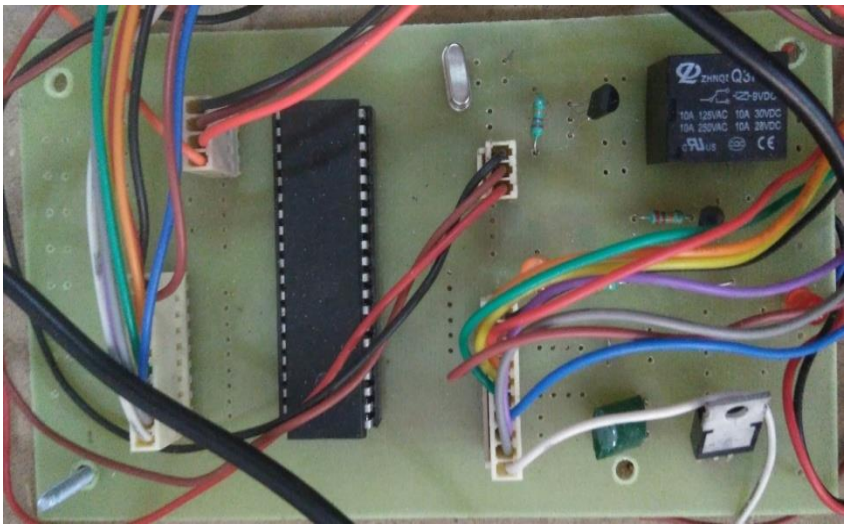

Figure 2.1 OTP circuit used for locking and unlocking vehicle door

The operation for password lock system is:

i] To lock the system by entering correct password, it can be unlocked by entering correct password.

ii] If wrong password is entered then system will not be locked or unlocked and system shows warning.

iii] If anyone tries to enter wrong password again and again, system becomes inactive so that further attempts to enter password can be prohibited.

b. Door Lock/Unlock Actuator

Power door locks (also known as electric door locks or central locking) allow the driver or front passenger to simultaneously lock or unlock all the doors of an automobile or truck, by pressing a button or flipping switch.

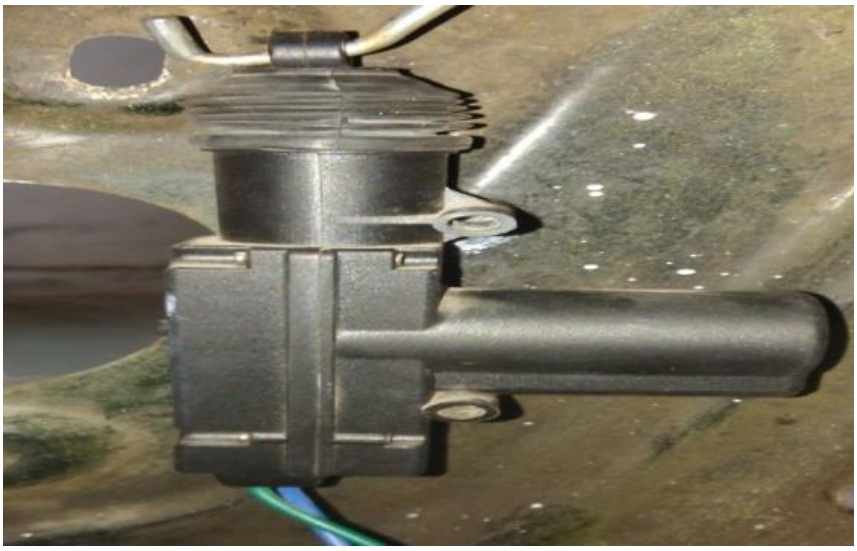

Figure 2.2 Power door lock/unlock actuator

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International Journal of Informative & Futuristic Research (IJIFR)
Volume - 5, Issue -4, December 2017
Page No. : 8993-9000

The systems locked and unlocked only the car doors. Many cars feature systems which can unlock such things as the luggage compartment or fuel filler cap door. It is common on modern cars for the locks to activate automatically when the car is put into gear or reaches a certain speed [2].

2.3 Working

The Eye detection circuit and OTP circuit required to 12V power supply without any discontinuity. The system is works on two main circuit: 1. Eye Detection Circuit 2. OTP Circuit [3].

1. Eye Detection Circuit:

In this circuit, use the MATLAB software. It just replace for Microcontroller. In this software two types of coding can be done for requires eye detection system.

1. Module train 2. Module 1.

Module Train:

The coding can be done for the application of saves the eye captured image in various environmental conditions. First of all run the program and captures images automatically in 2 second. After the captured image crops the eye and when it detects of eye picture then the stores in we predefined path, we are coding modified up to 10 authorized persons access the eye detection system .The group of 10 persons we known as “Class”. The all persons are saves eye pictures individually and also access. But all class members are owner defines manually [2].

When first person captures the image they person should be save image on ‘Class 1’and also no. of captured images saves only Class 1. Hence the accuracy improves for access the eye detection system.

MODULE 1

The coding is done for the access of door actuator. The process is done like Module Train but only difference is to actuator operate after the matching eye picture. The process of unlocking door is simple and reliable than other.

In module 1 coding is act as an actuator operator. When the run the program direct open webcam and capture the picture. When the eye picture matches the class (1-10) in saved for Module Train then the software commands eye detection circuit and actuator operates.

2.4 Stages in segmentation

2.4.1 Edge Detection

Edges characterize object boundaries and are therefore a problem of fundamental importance in image processing. Edges in images are areas with strong intensity contrast i.e. a jump in intensity from one pixel to the next. Edges can be defined as a region where intensity function changes abruptly. Edges characterize object boundaries and are useful features for object identification and segmentation in scenes. Edge detection in an image significantly reduces the amount of data and filters out useless information, while preserving the important structural properties in an image.

An edge operator is a neighbourhood operation which determines the extent to which each pixel's neighbourhood can be partitioned by a simple arc passing through the pixel where pixels in the neighbourhood on one side of the arc have one predominant value and pixels in the neighbourhood on the other side of the arc have a different predominant value [3].

Types of Edges in image:

1. Step Discontinuities: These are the discontinuities where the image intensity changes abruptly from one value on one side to a different value on other side.
2. Line Discontinuities: These are the discontinuities where the image intensity abruptly changes value but then returns to the starting value within some short distance.

In segmentation process to detect the iris boundary, it is necessary to create an edge map. The Canny edge detection principle is used to generate an edge map. The canny edge detector first smoothens the image to eliminate noise. It then finds the image gradient to highlight regions with high spatial derivatives. The algorithm then tracks along these regions and suppresses any pixel that is not at the maximum (no maxima suppression). The no maxima array is now further reduced by hysteresis. Hysteresis is used to track along the remaining pixels that have not been suppressed. Hysteresis uses two thresholds, if the magnitude is below lower threshold, it is set to zero. If the magnitude is above higher threshold, it is treated as edge. And if the magnitude is between the two thresholds, then it is set to zero unless there is a path from this pixel to a pixel with a value above lower threshold.[2]

III. MATLAB PROGRAMMING

To analyze and design the systems and products transforming our world MATLAB is in automobile active safety systems, interplanetary spacecraft, health monitoring devices, smart power grids, and LTE cellular networks. It is used for machine learning, signal processing, image processing, computer vision, communications, computational finance, control design, robotics, and much more [4].

MATLAB helps to take ideas beyond the desktop. You can run your analyses on larger data sets and scale up to clusters and clouds. MATLAB code can be integrated with other languages, enabling to deploy algorithms and applications within web, enterprise, and production systems [5].

Program Coding

```
%%input
clc;
clearall;
closeall;
clearcam
s=serial('COM31','BaudRate',9600);%%%%%%%%%%%%%%%%%%%%%%%%%%%%
%%%%%%%%%%  change port name %%%%%%%%%%%%%%%%%
fopen(s)
```

ISSN: 2347-1697
International Journal of Informative & Futuristic Research (IJIFR)
Volume - 5, Issue -4, December 2017
Page No. : 8993-9000

```
cam = webcam
preview(cam)
%%%%%snap shot
pause(2)
img = snapshot(cam);
imshow(img)
image(img)
imwrite(img,'1.jpg')
clear('cam');
eyedetect=vision.CascadeObjectDetector('EyePairBig');
i=imread('1.jpg');
BB=step(eyedetect,i);
figure,
imshow(i);
rectangle('Position',BB,'LineWidth',4,'LineStyle','-','EdgeColor','b');
title('eye');
eyes=imcrop(i,BB);
imwrite(eyes,'1.jpg')
figure,
imshow(eyes);
im=imread('1.jpg');
im=rgb2gray(im);%%%%%seg
imshow(im);
title('test image');
%%check class
Ftest=FeatureStatistical(im);
%%compare with database
loaddb.mat
Ftrain=db(:,1:2);
Ctrain=db(:,3);
for(i=1:size(Ftrain,1))
dist(i,:)=sum(abs(Ftrain(i,:)-Ftest));
end
Min=min(dist);
if(Min<2)
m=find(dist==Min,1);
det_class=Ctrain(m);
ifdet_class == 1
fprintf(s,'1')
msgbox('1');
elseifdet_class == 2
```

ISSN: 2347-1697
International Journal of Informative & Futuristic Research (IJIFR)
Volume - 5, Issue -4, December 2017
Page No. : 8993-9000

```
fprintf(s,'2')
msgbox('2');
elseifdet_class == 3
fprintf(s,'3')
msgbox('3');
elseifdet_class == 4
fprintf(s,'4')
msgbox('4');
elseifdet_class == 5
fprintf(s,'5')
msgbox('5');
elseifdet_class == 6
fprintf(s,'6')
msgbox('6');
elseifdet_class == 7
fprintf(s,'7')
msgbox('7');
elseifdet_class == 8
fprintf(s,'8')
msgbox('8');
elseifdet_class == 9
fprintf(s,'9')
msgbox('9');
end
%msgbox(strcat('detected class=',num2str(det_class)));
end.
```

IV. FALSE ACCEPTANCE RATE AND FALSE REJECTION RATE

In contrast to methods based on knowledge or possession like PIN, passwords or tokens, biometric systems work with probabilities, because biometric features are invariably affected by noise in the measurement, therefore biometric systems are not exact methods. These limitations result in two problems called as false acceptance and false rejection. The False Acceptance Rate (FAR) is the success probability of an individual being wrongly identified as another individual.

A larger threshold value for the biometric data to be matched leads to a lower FAR value, but setting threshold to higher value increases the False Rejection Rate (FRR). In contrast, the False Rejection Rate (FRR) is the probability of the authentic user to be falsely rejected by the biometric system when presenting his biometric feature [6].

A smaller threshold value for the biometric data to match lead to a very low FRR value, but it increases the False Acceptance Rate (FAR). Both values FAR and FRR are negatively correlated, means if we try to decrease FAR, FRR increases or vice a versa.

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International Journal of Informative & Futuristic Research (IJIFR)
Volume - 5, Issue -4, December 2017
Page No. : 8993-9000

However, these measures can vary significantly depending on how one adjusts the sensitivity of the mechanism that matches the biometric. Therefore, while choosing a separation point it is important to consider both the false acceptance rate and false rejection rate.

If the threshold value for the biometric data to be matched for a successful verification is chosen so that, the values for a false acceptance rate and false rejection rate are equal, this value is called the equal error rate (EER). The equal error rate is also known as the crossover error rate (CER) [7].

V. CONCLUSION

In this paper, an eye detection and OTP system used for purpose of locking and unlocking automotive door. This system is also antitheft system the results show that face detection recognition based on the automotive eye localization based on manual eye positions. The system is not a way to enter number digital card recognition method and it is combination of dynamic digital number input method using the OTP to enhance the user authentication. The access control system is able to obtain permission without administrator's their own possess registered phone.

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ISSN: 2347-1697
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Volume - 5, Issue -4, December 2017
Page No. : 8993-9000

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