

Keyless Car Entry Authentication System Based on A Novel Face-Recognition Structure

I. Amulya
M.Tech VLSI System Design,
AITS, Rajampet,
Kadapa (DT)

Mr. K. Sreenivasa Rao,
Associate Professor, Dept: ECE,
AITS, Rajampet,
Kadapa (DT)

Abstract: In this paper, a smart car security system is proposed, which consists of a face detection subsystem, a GPS (Global Positioning System) module, a GSM (Global System for Mobile Communications) module and a FPGA. The face detection subsystem bases on optimized PCA algorithm and can detect faces in cars and make interaction with the car owner through GSM. The GPS sends the location of the car. Even when the car is lost we can get thief face image as well as location of the car so this is most reliable car security system. The car owner may allow new persons also to drive the car using the password. So this car security system is more secure and comfortable.

I. Introduction

The main aim of this project is to offer an advance security system in automobiles, in which consists of a face detection subsystem, a GPS (Global Positioning System) Module, a GSM (Global System for Mobile Communications) module and a control platform.

This Keyless car entry Authentication System Based on A Novel Face-Recognition Structure is used to detect the face of the driver and compare it with the predefined face, for example, in the night when the car's owner is sleeping and someone theft the car then FDS obtains images by one tiny web camera which can be hidden easily in somewhere in one car. FDS compares the obtained image with the predefined images if the image doesn't match then the information is send to the owner through MMS. So now owner can obtain the image of the theft in his mobile as well as he can trace the location through GPS. The location of the car can be displayed to the owner through SMS. So by using this system owner can identify the theft image as well as the location of the car.

II. Existing system

In modern world, communication techniques have been integrated into car security systems. At the same time, the amount of cars lost still remains high.

Previous techniques are sensor based systems, alarm and physical key systems. Sensor based

security systems rely on many sensors and cost a lot. When one car is really lost, no more feedback could be valid to help people to find it back. No information to the Owner if Car get Lost about car position in Alarm and physical key systems. Communication techniques using transmitters also fails to give complete information and also some systems uses Bluetooth, mails should also not give information about thief face. Some systems with face detection system also not have the password facility to allow new persons to drive the car.

III. Proposed System

The proposed system bases on face recognition which is most important biometric used by humans. So security is high in this system. In this system Spartan 3An FPGA is used for controlling all the units. Here a webcam is used for taking the image. GSM is used for sending the MMS; GPS is used for sending the location of the car.

When a new person is entered into the car the webcam will take the face image and sends it to the computer. PC compares the image with the database images. If it matches then it sends person is authorized message otherwise it gives person is not authorized message. When the person is not authorized then GSM and GPS Starts working. GSM sends MMS to the mobile and GPS sends location of the car. If the car owner wants to allow the new person then he use a password.

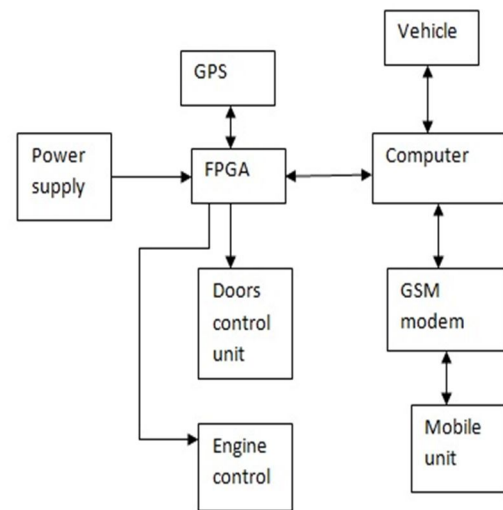


Fig: Proposed system architecture

This system is built on the base of one FPGA SPARTAN 3AN which controls all the processes. Experimental results illuminate the validity of this car security system.

IV. Basic Commands of Matlab:

MATLAB is a high-level language and interactive environment for numerical computation, visualization, and programming. Using MATLAB, you can analyze data, develop algorithms, and create models and applications. The language, tools, and built-in math functions enable you to explore multiple approaches and reach a solution faster than with spreadsheets or traditional programming languages, such as C/C++ or Java.

A. Vectors

A **vector** in MATLAB is defined as an array which has only one dimension with a size greater than one. For example, the array [1, 2, 3] counts as a vector. There are several operations you can perform

with vectors which don't make a lot of sense with other arrays such as matrices. However, since a vector is a special case of a matrix, any matrix functions can also be performed on vectors as well provided that the operation makes sense mathematically (for instance, you can matrix-multiply a vertical and a horizontal vector). This section focuses on the operations that can only be performed with vectors.

Declare vectors as if they were normal arrays, all dimensions except for one must have length 1. It does not matter if the array is vertical or horizontal. For instance, both of the following are vectors:

```
>> Horiz = [1, 2, 3];  
>> Vert = [4; 5; 6];
```

B.Functions

MATLAB allows you create variables on the fly. To create a variable just use it on the left hand side of an equal sign. The following examples show how to assign values to three variables, x, y and z. It also shows the MATLAB response to the assignment statements.

```
>> x = 5  
x = 5  
  
>> y = pi/4  
y = 0.7854  
  
>> z = y + x^0.25  
z = 2.2807
```

Note that z exists only as a numerical value, not as the formula with which it was created.

V)IMAGE RECOGNISATION:

Image Recognition consists of three parts database, feature extraction and classification. Database consists of set of known faces. Feature extraction means calculating the Eigen values and Eigen vectors. Classification means comparing the Eigen values of database images with new image.



Fig: Face database

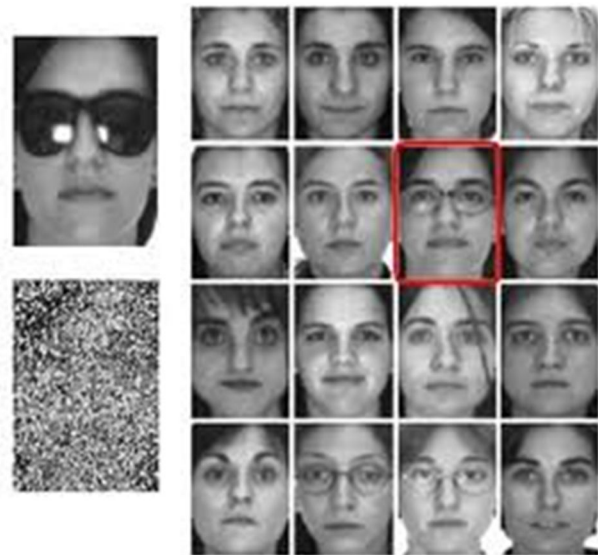


Fig: classification of images

VI) Flow chart

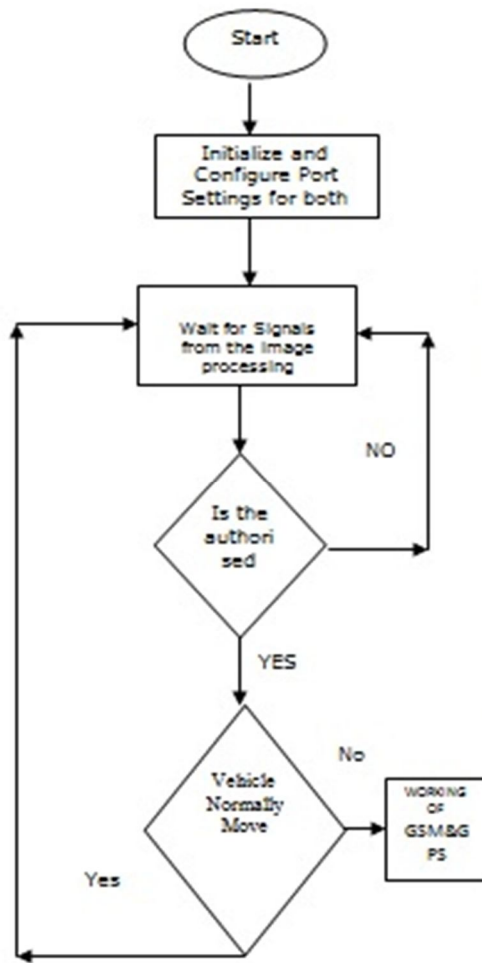


Fig. flow chart of the project

VII) Experimental Results

Experiments are performed on gray level images to verify the proposed method. These images size is 640x480. Images shows experiment outputs are shown in below figure.

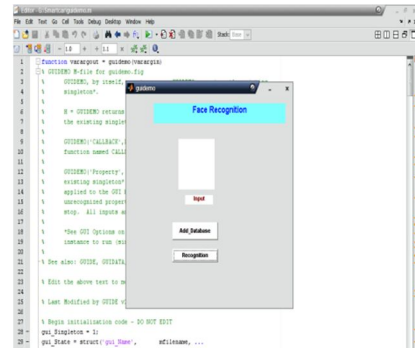


Fig: when code is firstly run this image Will be appeared

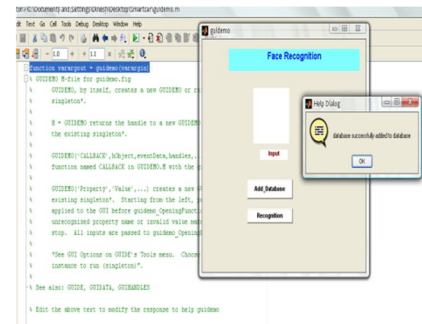


Fig: Image when database is added

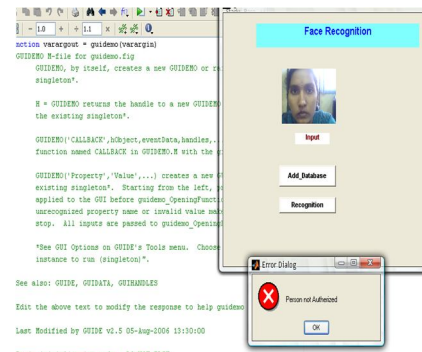


Fig: Image when person is not authorized

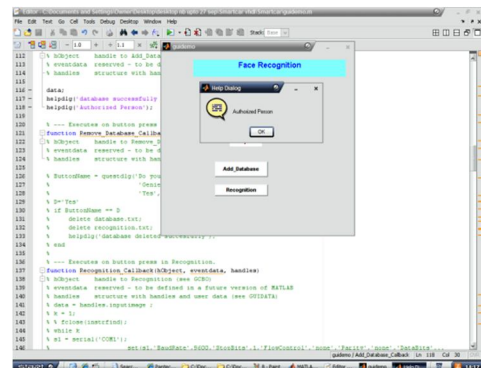


Fig: When person is authorized

VIII. Conclusion

This project implements a secured and safe system for cars Face is the most important biometric so security is high in the systems. By using face recognition we can get the thief image as well as location, so we can easily find the car. It is also used for home, ship and Bank security applications.

IX. References

- 1] Joseph A. O'Sullivan, Robert Pleas, "Advances in Security Technologies: Imaging, Anomaly Detection, and Target and Biometric Recognition", Microwave Symposium IEEE/MTT-S International Volume, Page(s):761 – 764, 2007.
- [2] Viola P, Jones M, "Rapid Object Detection using a Boosted Cascade of Simple Features" Proceedings of the 2001 IEEE Computer Society Conference on Computer Vision and Pattern Recognition, p511, 2001
- [3] Jian Xiao, Haidong Feng. "A Low-cost Extendable Framework for Embedded Smart Car Security System "Proceedings of the 2009 IEEE International Conference on Networking, Sensing and Control, Okayama, Japan, March 26-29, 2009
- [4] Lihe, LvFlang "Design of Intelligent Mobile Vehicle Checking System Based on ARM7"
- [5] Lien hart R, Kuranov A, Pisarevsky, "Empirical analysis of Detection cascades of boosted classifiers for rapid object Detection" Technical report, MRL, Intel Labs, 2002.
- [6] Viola P, Jones M, "Fast and robust classification using Asymmetric AdaBoost and a detector cascade" NIPS 14, 2002.
- [7] Inigo R.M., Application of machine vision to traffic Monitoring and control, IEEE Transactions on

Vehicular Technology, 1989, 38(3):112-122.

ACKNOWLEDGMENT



I. Amulya born in Kadapa, A.P., India in 1990. She received her B.Tech Degree in Electronics and Communication Engineering from J.N.T University Anantapur, India. Presently pursuing M.Tech (VLSI SYSTEM DESIGN) from Annamacharya Institute of Technology and Sciences, Rajampet, A.P., India. Her research interests include VLSI, Digital Signal Processing and Digital Design.



Mr. K. Sreenivasa Rao has received his M. Tech degree in DSCE. Currently, he is working as Associate Professor in the Department of Electronics & Communication Engineering, Annamacharya Inst of Technology & Science, Rajampet, Kadapa, A.P, and India. He has published a number of research papers in various National and International Journals and Conferences. He is currently working towards Ph.D Degree in at Rayalaseema University, Kurnool, A.P, and India. His areas of interests are VLSI, Micro processor, Embedded Systems and Signals and Systems