Advanced Vehicle Security System on FPGA

[1] K.Murali Chandra Babu, [2] Dr.P.A.Harsha Vardhini
[1], [2] Vignan Institute of Technology and Science, Deshmukhi

Abstract: - **Now-a-days the automobiles can be ignited using the key which can control the opening the door, high frequency transceiver system, alarm system and so on. Once the key is lost or taken by unauthorized persons then Biometric recognitions techniques can surpass this situation. The proposed system utilizes the fingerprint system, face recognition system and GSM module. If any user can ignite the vehicle, he/she fingerprint image should match with the database. The face detection system can recognize the faces in vehicle. when nobody is present in the vehicle, if unknown person enters and face image does not match, then alarm will blow and if finger print doesn't match then message will be sent to the owner of the vehicle with the GSM module.**

Keywords: - **Spartan FPGA, Finger Print, Face Detection, Sensor.**

I. INTRODUCTION

A vehicle is started by using a key. The security system can be provided in the vehicles, when the unknown person tries to open the door without the key then an alarm sound will be blown. The proposed system provides the advanced security system to the vehicle consisting of face detection system to detect the faces of the persons entered in the vehicle, if any mismatch occurs then the alarm blows. Biometric fingerprint sensors can be used to ignite the vehicle if the finger print matches with the data base then the ignition can be started else the vehicle will be in off state and message is send to the owner of the vehicle through the GSM module. The proposed system consists of finger print sensor. Web camera, car engine FPGA board as illustrated in Fig.1.
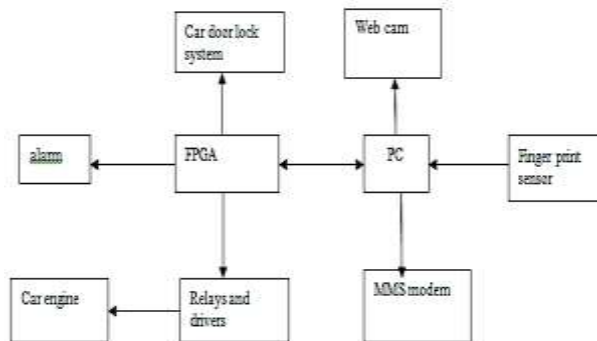

Fig.1. Block diagram of the proposed Security System

A. Fingerprint Sensor

It is an electronic device which can seize the digital image fingerprints patterns of human. All different driver fingerprints can be stored in a pc and from the sensor the image will be compared with the database to match with the sensor output.

B. Face Detection System

The face detection system can be capable of recognizing the person from a digital image or video. Some face recognition algorithms will identify the landmarks or features from the image. The adaboost algorithm can be used in this proposed system.

C. FPGA

A Field Programmable gate Array is an electronic device can be used to start the vehicle ignition and send the information to the owner when the vehicle is theft or used by the unknown person. FPGA can be used to blow the alarm and control the relays.

II. IMPLEMENTATION

The proposed system can be implemented in MATLAB and the results can be check in the FPGA hardware. A MATLAB code can be written for Face recognition and for fingerprint matching. An flow of design can be shown in fig.2 below.
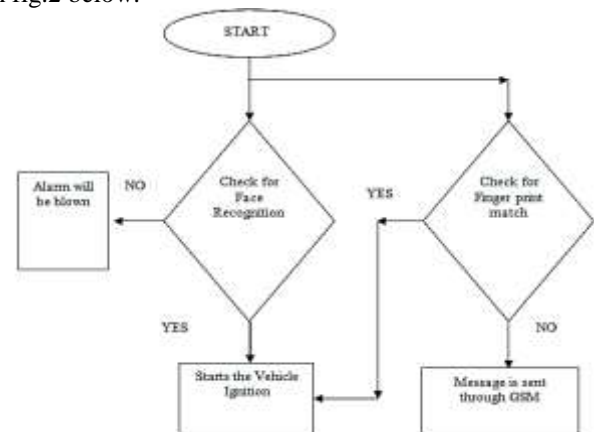

Fig.2. Flow diagram representing the system

The Spartan 3AN FPGA board is used to implement the proposed system is given in Fig.3 and When the person is authorized or unauthorized then the output voice is delivered through the speaker as in fig. 4.
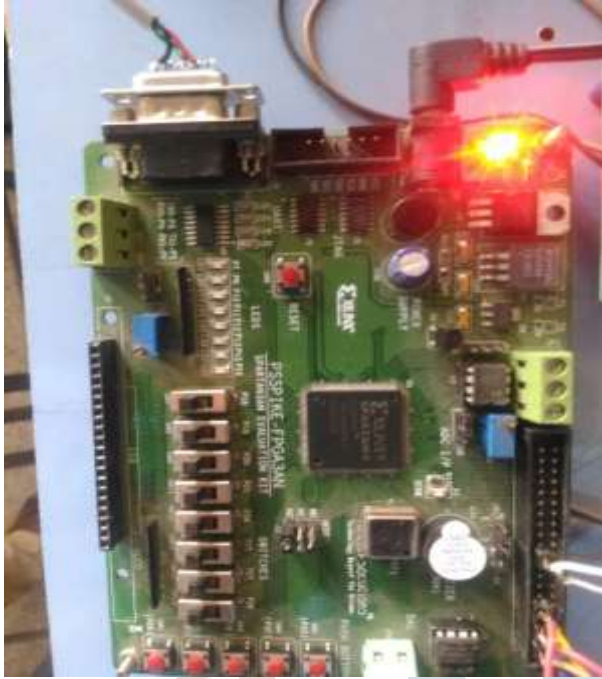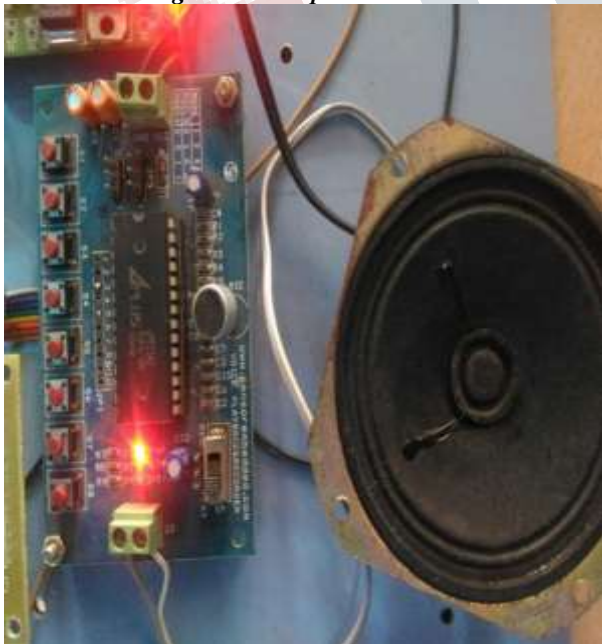

Fig.3. FPGA Spartan Board

Fig.4. Speaker connected to FPGA

III. RESULTS

The proposed system can be implemented in MATLAB and verifies the fingerprint image from the data base. The below fig.5 shows the fingerprint is scanned from the sensor and it is to be verified with fingerprint from the database
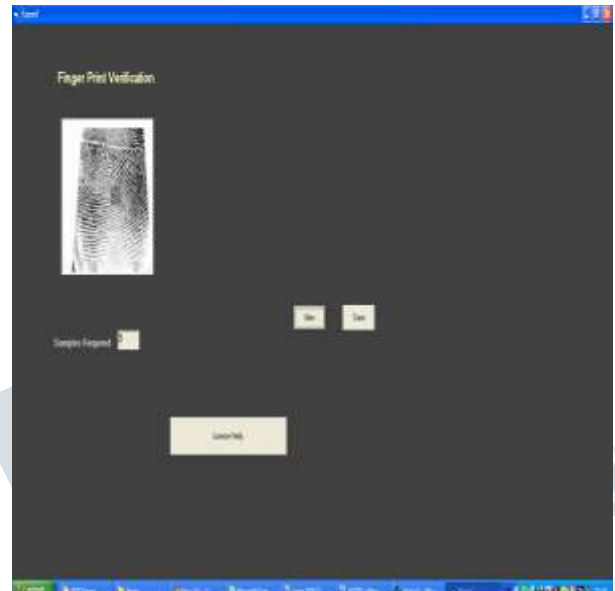

Fig.5. Sample Finger Print: Taking the sampled finger print

If the fingerprint matches with the database then the system will display as authorized which is shown below in Fig.6.

Fig.6. Authorized Finger Print: finger print matched

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After authorizing the fingerprint then from the web cam the face is captured and it will verify with the database. If the image is matched with the database then it will display as authorized if not it will display as not authorized which is shown in the Fig.7 and Fig.8

Fig.7. Authorized Image: when taking the person image is authorized.

Fig.8. Unauthorized Image: person is not authorized.

IV. CONCLUSION

The advanced security system is implemented to the vehicles by face recognition and fingerprint system. This system is designed in MATLAB and implemented in Spartan FPGA board.

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