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DESIGN OF VEHICLE ANTI THEFT SYSTEM BASED ON FACE RECOGNITION TECHNIQUE

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ABSTRACT

Design of Vehicle anti theft system based on face recognition using microcontroller is proposed. For face recognition, camera will capture the image of the person who entered in to the vehicle. The captured image is processed to identify whether the person is authorized or not. The output obtained from this is given to the PIC microcontroller. Controller starts the engine for the corresponding input. Sensors are activated once the engine is on; these are used to provide safety to the driver. Distances of the obstacles and vehicle crash are identified using these sensors. LCD is used to display the sensor output. GSM module is used to alert the vehicle owner about the unauthorized access.

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1. INTRODUCTION

Over the last few years, Face recognition researches have accelerated technological development in human identification for security and safety purposes.

The extracted features of the images are then represented to belong with a class and separate faces to different classes. Features which are having high reparability are continued for further processing and lower one is discarded. Principal Component Analysis algorithm is used for face recognition.

A system of face recognition basically performs the functions of human authentication, face detection and person recognition has innumerable applications in defense, security and automatic access control, human-computer interface.

In bank location for particular secured room, the recognition is performed.

In this system the PCA with LDA algorithm is used for improving the accuracy of authentication. If the entered person is not authenticated means by using PIC16F877A micro controller, it produce the alert signal from the buzzer. Also it displays the recognized output about authenticated or not.

2. SYSTEM STRUCTURE

The system consists of two modules-hardware and software part. Image of the person who engaged to start the vehicle is captured and it is compared with the stored authorized person images. These are achieved by using the software tools.

Hardware unit is composed of microcontroller, sensors and GSM unit. Microcontroller makes use of output from the software part to decide either start or not. GSM is to transfer the information about the unauthorized person to the vehicle owner. Sensors used to provide the additional safety to the drivers. The block diagram of the structure is shown in Figure 1.

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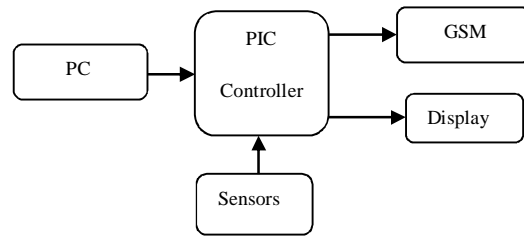


Figure 1 Block diagram

3. HARDWARE PART

The hardware components such as web camera, microcontroller, sensors, motor, GSM, display unit are used in this. Web camera inside the car is used to capture the image of the person who entered in it. The captured image is act as an input to the microcontroller. Microcontroller then controls the action of the motor according to the output from the camera. If the image of the person is authorized then it starts the motor else it will send the message about the unauthorized access to the predefined numbers through GSM. Once the motor starts running then the three sensors are ready to sense the environment. Ultrasonic sensor is used to find the distance of the vehicle. It works on the principle similar to the RADAR. Distance of the obstacles is calculated according to the time of flight. It emits short and high frequency signals of 20 kHz - 10MHz.

MEMS (Micro Electro Mechanical System) sensor is used for motion and tilt sensing applications. By this, any crashing of the vehicle is detected. Alcohol sensor is used to detect Ethanol in air. It has good resistance to gasoline, smoke and vapor. It is used to find whether the person consumes alcohol or not. The measurable concentration is 0.05-10mg/L. LCD combines the properties of both liquids and crystals. It is easy to read even in dark place because of backlight. The sensor outputs are shown on this display. The LCD's have long life and a wide range of operating temperature. Changing the display size or the layout size is relatively simple.

4. SOFTWARE PART

Software is used for the recognition of the person's image which is captured by the web camera hide inside the vehicle. LDA and PCI algorithms are used to recognize the image of the person using MATLAB tool.

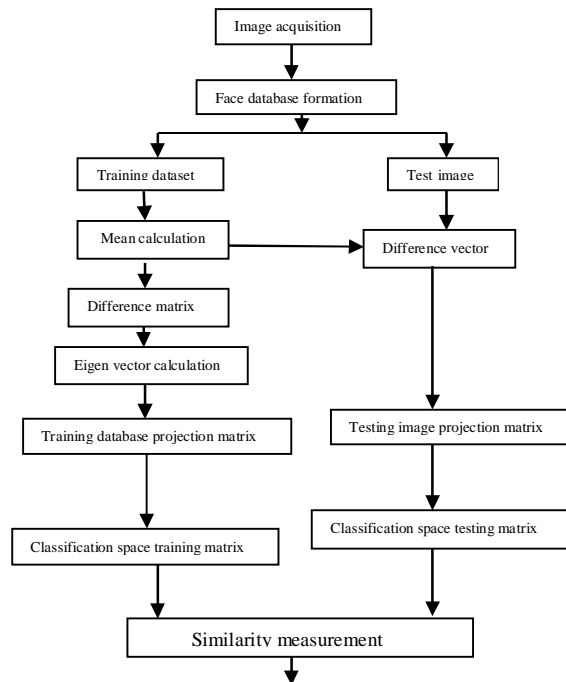


Figure 2 Software flow chart

Linear Discriminative Algorithm is used to yield the largest mean differences between the desired classes. Principal Component Analysis (PCA) is a dimensionality reduction technique which is used for compression. These two algorithms are used to reduce the largest number of input images.

To identify an input test image, the test image is compared to each projected training image and the test image is identified as the closest training image. The training images are classified with the test images by calculating its mean, Eigen vector and projection matrix, the flow chart of this is shown in Figure 2. On comparing this, the difference between the images is small then it will produce the signal to start the vehicle.

5. SOFTWARE OUTPUT

Face recognition is done by using the MATLAB tool. In PC, the training images are stored as a .jpg file. MATLAB coding is written to check whether the test image is same as training image.

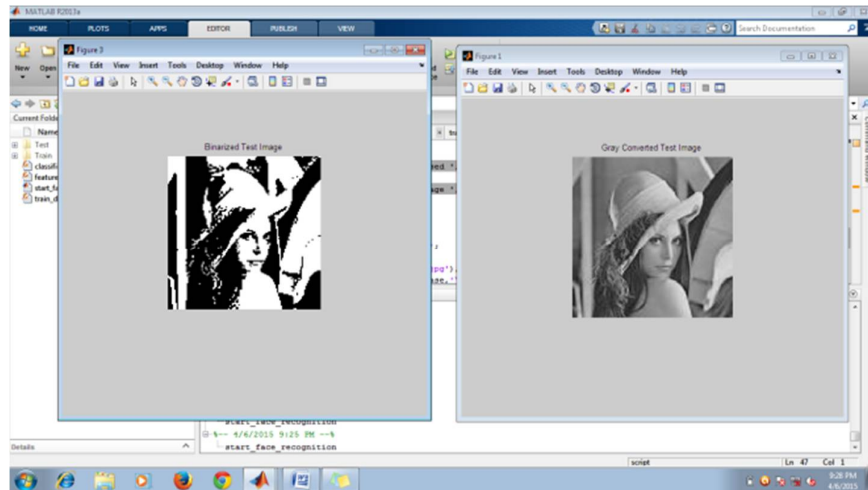


Figure 3 Binary, Gray scale image

The test image is converted as binary (0, 1) image, gray scale in order to ease the comparison process which is shown in figure 3. After comparing this, images are displayed.

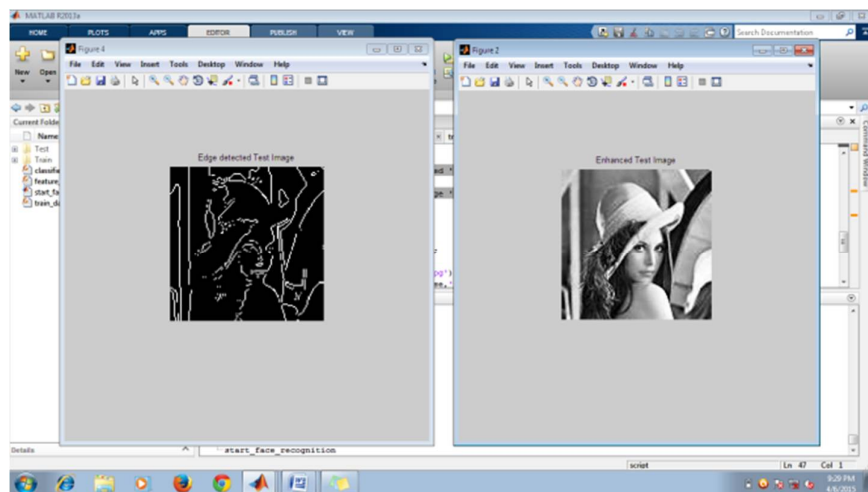


Figure 4 Edge detected, Enhanced image

Edge detection is to reduce the amount of data to be processed and this edge detected image is enhanced to produce the suitable result as an original image which is shown in Figure 4.

In command window, recognized or not recognized information is displayed. If it is recognized, then it will display the equivalent image of the person. This is used as an input to the hardware part to start functioning.

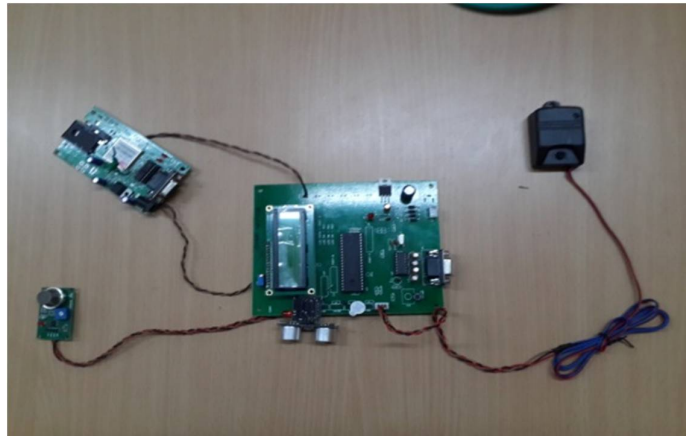


Figure 5 Hardware design

Controller takes this software output to perform the corresponding function in the hardware part. Figure 5 explained the hardware connection of the sensors with the microcontroller. The sensors start sensing the environment once the motor starts running which are connected to the controller.

6. CONCLUSION

An effective solution is provided to protect the vehicle and to enhance the driver's safety. Using software coding in MATLAB, the image of the person who entered into the vehicle is monitored and verified with the trained dataset. This technique helps to safeguard the vehicle from the unauthorized persons. Hardware unit consists of PIC microcontroller, GSM module, sensors and display unit. GSM module is used to transmit the information about the unauthorized access to the predefined numbers. This system helps the vehicle owner to take actions against the theft.

7. REFERENCES

- [1] Ashad, M., Hassan, J., Mohtashim, B., Rameez A. K., Zeeshan M. Y., Zeeshan, R and Safdar. K. 2012. Vehicle Intrusion and Theft Control System Using GSM and GPS. *Asian Journal of Engineering, Sciences & Technology*. September. 2 (2).
- [2] Pravin, S. B., Nitin, N. M. 2014. GPS based anti-theft fleet monitoring & surveillance system. *International Journal for Engineering Applications and Technology*. 1(3): 12-14.
- [3] Prasad, M. R., & Kumar, P. A. (2012). An automated traffic accident detection and alarm device. *International Journal of Technological Exploration and Learning (IJTEL)*, 1(1).
- [4] Chakole, S. S., Kapur, V. R., & Suryawanshi, Y. A. 2013. ARM Hardware Platform for Vehicular Monitoring and Tracking. In *Communication Systems and Network Technologies (CSNT), 2013 International Conference on IEEE*. pp: 757-761.
- [5] Sawant Supriya, C., UL, D. B., & Patil, T. B. 2012. An Intelligent Vehicle Control and Monitoring Using Arm. *International Journal of Engineering and Innovative Technology 000 (IJEIT)*. 2(4).
- [6] Wen, Z., & Meng, J. 2011. Design of vehicle positioning system based on ARM. In *Business Management and Electronic Information (BMEI), 2011 International Conference on IEEE*. 4: 395-397.