

# A NOVEL APPROACH AUTOMATIC DIGITAL DOOR OPENING AND CLOSING SECURITY SYSTEM

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**Abstract:** Currently, theft has been done in lot of places in our society while considering safety issues this idea is proposed. The objective of this paper is to design the image based door opening/closing system which further increase the security in banks, colleges and residence based on biometric system. The biometric person authentication technique based on the pattern of the human iris is well suitable for application to any access control system requiring a high level of security. Today, biometric recognition is a common and reliable way to authenticate the identification of a person based on physiological or behavioral characteristics. The proposed system if iris is matched, the door automatically will be opened otherwise it will not be open. IR sensor is used to detect the human in or out. Conventionally, by using the finger print it has some drawback. In order to avoid theft in bank, residence and also it's very useful to our society. The implementation of the system is achieved by using the microcontroller and simulation is done in MATLAB.

**Keywords:** Microcontroller, GSM, IR Sensor, Web camera, MATLAB.

## INTRODUCTION

Presently Industries are increasingly shifting towards automation. Two principle components of today's industrial automations are programmable controllers and robots. In order to aid the tedious work and to serve the mankind, today there is a general tendency to develop an intelligent operation. Microcontroller is the heart of the device which handles all the sub devices connected across it. It has flash type reprogrammable memory. It has some peripheral devices to play this project perform.

Face recognition (FR) has received a significant interest in pattern recognition and computer vision due to the wide range of applications including video surveillance, biometric identification, and face indexing in multimedia contents. As in any classification task, feature extraction is of great importance. The authenticated irises are stored in the data base. Then the captured iris is compared with data base. The driver circuit controls the relay. The relay output is directly connected motor which is attached in the door. Recently, local texture features have gained reputation as powerful face descriptors because they are believed to be more robust to variations of facial pose, expression, occlusion, etc. In particular, Gabor wavelets and local binary pattern (LBP) texture features have proven to be highly discriminative for FR due to different levels of locality.

It also provides sufficient power to inbuilt peripheral Devices. We need not give individually to all devices. The peripheral devices also activates as low power operation mode. These are the advantages are appear here. Finger print sensor is the special type of sensor which is used to identify the human finger print. Finger print sensor is interfaced with microcontroller through the arm processor circuit. The arm processor circuit is used to activate the finger print sensor at time of finger is placed on the sensor. Then the related data is stored in the microcontroller.

Microcontroller received the data from the finger print sensor. Then compared with stored data if it is correct the microcontroller activate the driver circuit. The driver circuit controls the relay. The relay output is directly connected motor which is attached in the door. Now the door is open. Again place the same finger on the sensor the door will be closed. If data is not matched microcontroller will display the "Authentication Fail" on the LCD display and also activate the driver circuit for alarm. So the alarm makes the sound for indicate the Authentication Fail. A microcontroller is a kind of miniature computer that you can find in all kinds of Gizmos. Some examples of common, every-day products that have microcontrollers are built-in. will be closed.

## II.LITERATURE SURVEY

Yang Ni, Et-al: In this paper an original CMOS Imaging system dedicated to human face recognition. The main interest of this work is to provide ambient light invariant images and facilitate segmentation of the face from the background. This system has been implemented in a specially designed CMOS smart image sensor with only one analog memory per pixel. This simple pixel design gives the possibility to incorporate this functionality into classic low-cost CMOS image sensors. The proposed method was tested on Yale face database. One of its possible applications is face recognition, since the human face appearance is dramatically dependent on illumination conditions. A first indoor experience with different illumination conditions shows that a simple correlation-based verification algorithm on face images of 25 people of the INT database gives promising results.

Kyu Hwang, Et-al: The novel wireless access monitoring and control system based on the digital door lock, which is explosively used as a digital consumer device. Digital door lock is an electronic locking system operated by the combination of digital key, security password or number codes. This paper presents a prototype of the proposed system and shows a scheme for the implementation. To implement the system with ZigBee network protocol, four types of modules are developed, ZigBee module, digital door lock module, human detection module.

LON.E M.A, Et-al: The paper of the face recognition involves the extraction of different features of the human face from the face image for differentiating it from other persons. It is the problem of searching a face in reference database to find the matches as a given face. It is to find a face that has highest similarity with a given face in the database. For enhancing the performance and accuracy of biometric face recognition system, we use a multi-algorithmic approach, where in a combination of four different individual face recognition techniques is used to develop a face recognition systems based on one combination of four individual techniques namely Principal Component Analysis (PCA), Discrete Cosine Transform (DCT), Template Matching using Correlation and Partitioned Iterative Function System (PIFS).

Zimmerman,I.A, Et-al: The paper guide Some InfraRed (IR) thermal measurement technique is

Presented to independently validate and verify (V&V) numerical codes used for computational electromagnetic (CEM) field predictions using Feature selected validation (FSV) routines. The Proposed method was tested on Yale face database. Images are compared to the predicted images of the scattered fields calculated with a selected CEM simulation code over the same measurement plane to V&V that the field patterns and the intensity levels are correct. In addition, the measured field can be visualized with the IR thermo gram images.

M.A.Turk, Et-al: Describes, a new face recognition method based on PCA (principal component Analysis), LDA (linear discriminant analysis) and neural networks is proposed. He explains it in using four steps: i) preprocessing, ii) dimension reduction using PCA, iii) feature extraction using LDA and iv) classification using neural network. Combination of PCA and LDA is used for improving the capability and precision level of LDA when a few samples of images are available and neural network classifier is used to reduce number misclassification caused by not-linearly separable classes. The proposed method was tested on Yale face database. Experimental results on this database demonstrated the effectiveness of the proposed method for face recognition with less misclassification in Comparison with previous methods.

## III.HARDWARE DESCRIPTION FOR PROPOSED SYSTEM

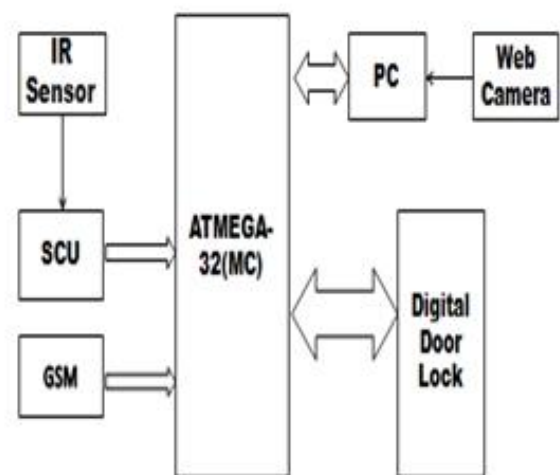


Fig: 1. Automatic Digital Door Opening And Closing System

ATMEGA-32 microcontroller controls the opening and Closing of the door. In case the user is in out off station, to overcome this problem GSM technology is used. GSM sends the random password to the users' mobile, so the known person of the user can access. The signal conditioning unit accepts input signals from the analog sensors and gives a conditioned output of 0-5V DC corresponding to the entire range of each parameter. The authenticated irises are stored in the data base. Then the captured iris is compared with data base. If it image is matched PC send the Microcontroller. Further it is connected with PC through RS 232 and the output is given to relay circuit which is placed in digital door lock. The relay driver circuit is constructed with transistor which acts as switch to turn ON and turn OFF the relay. The relay output is directly given to motor which is attached in the door.

A microcontroller is a complete microprocessor system built on a single IC. Microcontrollers were developed to meet a need for microprocessors to be put into low cost products. Building a complete microprocessor system on a single chip substantially reduces the cost of building simple products, which use the microprocessor's power to implement their function, because the microprocessor is a natural way to implement many products. Global System for mobile communication (GSM) is a globally accepted Standard for digital cellular communication. The modem which we have used here is serial device used to send SMS and Data over GSM Network's is used to transfer the information immediately. The product has SIM card holder to which activated SIM card is inserted for normal use. This product provides great feasibility for Devices in remote location to stay connected which otherwise would not have been possible where telephone lines do not exist.

IR Sensors work by using a specific light sensor to detect a select light wavelength in the Infra-Red (IR) spectrum. By using an LED which produces light at the same wavelength as what the sensor is looking for, you can look at the intensity of the received light. If it image is matched PC send the microcontroller. The signal conditioning unit accepts input signals from the analog sensors and gives a conditioned output of 0-5V DC corresponding to the entire range of each parameter. This unit also accepts the digital sensor inputs and gives outputs in 10 bit binary with a positive logic level of +5V. The calibration voltages\* (0, 2.5 and 5V) and the health bits are also generated in this unit. A webcam is a video camera that feeds its images in real time to a computer or computer network, often via USB, Ethernet, or Wi-Fi.

## IV. SOFTWARE DESCRIPTION

MATLAB is a high-performance language for technical computing. The various basic are Image Processing, Acquisition, Preprocessing, Segmentation, Representation and Description, Recognition. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical.

### A. Algorithm for face recognition with flowchart

Step1: Start the process.  
 Step2: Recognize the User Face.  
 Step3: If the user is correct the door will open.  
 Step4: Else send the random number to the correct user via GSM and again go to step 2.  
 Step5: stop the process

### B. Flowchart



### C. Program

```

clc
clear all
close all
[f p] = uigetfile('*.jpg');
I = imread([p f]);
I = imresize(I,[255,255]);
imshow(I);
title('INPUT IMAGE');
R = I(:,1);
G = I(:,2);
B = I(:,3);
Y = 0.257.*R+ 0.504.*G + 0.098.*B + 16;
YCbCr = cat(3,Y,Cb,Cr);
figure,imshow(YCbCr);
  
```

```

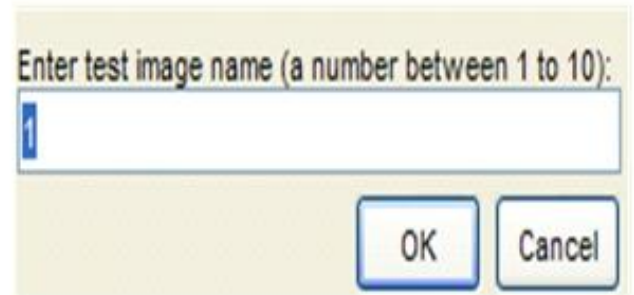
title('YCbCr IMAGE');
Y = YCbCr(:,:,1);
Cb = YCbCr(:,:,2);
figure,imshow(Y);
imshowinfo
title('Y');
YCbCr = cat(3,Y,Cb,Cr);
figure,imshow(YCbCr);
figure,imshow(Cb);
imshowinfo
title('Cb');
figure,imshow(Cr);
imshowinfo
title('Cr');

```

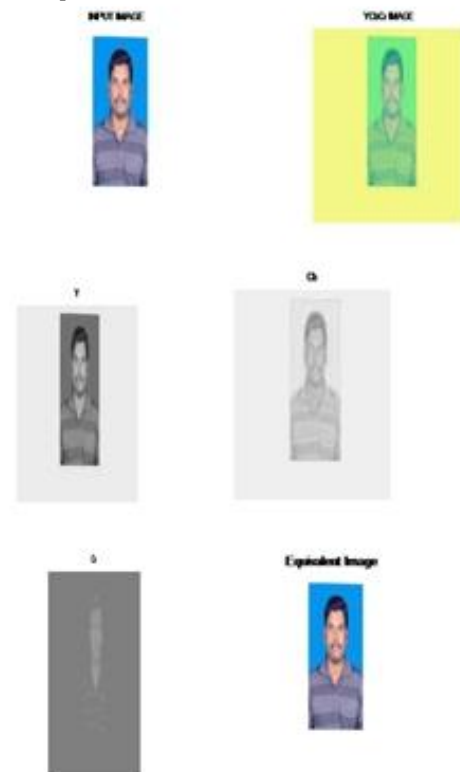
#### D. Simulation result

Recognition is the process that assigns a label to an object based on the information provided by its descriptors. Interpretation involves assigning meaning to an ensemble of recognized objects. RGB color model is an Input image which is matched with YCbCr color image by using PRINCIPAL COMPONENTS ANALYSIS (PCA). The main idea is that for every pixel of an image the LBP-code is calculated. The occurrence of each possible pattern in the image is kept up. The histogram of these patterns, also called labels, forms a feature vector, and is thus a representation for the texture of the image. These histograms can then be used to measure the similarity between the images, by calculating the distance between the histograms. If the RGB and YCbCr is matched Face recognition successful., `ycbcrmap = rgb2ycbcr(map)` converts the RGB values in map to the YCbCr color space. Map must be an M-by-3 array. Ycbr map is an M-by-3 matrix that contains the YCbCr luminance (Y) and chrominance (Cb and Cr) color values as Columns. Each row in ybcr map represents the equivalent color to the corresponding row in the RGB color map, map. If the image is RGB image, output is converted to YCBCR color space it doubles the precision and resolution level

#### E. Input of face recognition test image



#### F. Output





**Fig: 2. Prototype Type Model for Automatic Door Opening and Closing System.**

## V.CONCLUSION

The Proposed system plays an important role can provide a safe secure and efficient way to avoid theft in bank and higher authority places. The GSM based Automatic digital door opening & closing security system is implemented by using microcontroller. Atmel microcontroller is more compact, user friendly and less complex, which can be readily used in order to perform in automation system. Though our proposed system were designed in hardware and the output result shown in MATLAB simulation. This system is very useful to the society and the industrial needs. It can be extended for other purpose such as commercial applications. When compared to finger print the GSM and IR sensor gives high security. GSM can be transmitting message to the user immediately. In future this system can be implemented by using Advanced Embedded Controller.

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