

Attendance and Pay Calculation using Face Recognition

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ABSTRACT

Security has become a very crucial issue in various countries. Many techniques were came into use to resolve the issues related to security. So these various techniques were mostly used by higher organizations like MNC's, still there are some issues related to Attendance marking. Traditional ways of attendance marking were of no use. The reason behind that is the increase in number of proxy attendance. As the payment of employee is based on his attendance as well as on his work, so there is an increment in number of proxies by the employees, of their colleagues. So to overcome this issue, a system has to be there which will keep track of attendance, where the attendance will be taken by a system and on the basis of that attendance the payment will be calculated. This paper proposes a system where the attendance of employees will be taken by the system by using face recognition technology and on the basis of that, the payment will be calculated. It also includes a door access system for security purpose, where the access will be given to only authorized employees, the one who will be recognized by the system.

Keywords : Face Recognition, Image Processing, Embedded System, Gray Scale.

I. INTRODUCTION

Biometrics is the science of using biological or behavioral characteristics in order to identify an individual. The biometrics include basic forms like fingerprints, voice-patterns, retinal patterns, signature. Face recognition is nothing but the capturing the uniqueness from the faces for identification of humans. It is one of the famous technique used recent in biometrics. Face recognition is a passive method for verifying the identification of a person. Based on different fundamentals or theory the methods are discovered Today MNC's are using these systems for attendance and payment of the employees. But nowadays they are facing some issues related proxy attendance. Because attendance is marked appropriately by the colleagues or friends of a particular employee even though the is coming late or absent. This is happening frequently in the companies.

So, the approximate solution we are trying to resolve in our system.

The objective of this project is to provide enhanced security related to authorized access by implementing a face recognition system.

Face detection and recognition:

Face detection and recognition section detect the face from the image captured by the camera, and the image of the face is crop and store. The object recognizes the images of employee's face, which have been register manually with their names and ID in the record. Over the past years, Automatic face recognition (AFR) technology has seen remarkable improvement and these systems are now have huge usage for safety and marketable applications. An automatic system for human face recognition in a real

time environment is used for a university to mark the attendance of their employees.

Door Lock System :

Door lock system has been used at various places in real time. The use of this system is to provide access to only authorized person. This system will avoid the unauthorized access. The system basically consist of hardware to which software is connected. It works on some conditions which are set at the time of development of it by the developer. As per the commands it will operate. Either the door will be opened or locked.

II. RELATED WORK

Literature survey is about gathering the information similar to proposed system and flaws of the existing system.

1] Author :- Mashhood Sajid, Rubab Hussain, Muhammad Usman 2014

- Method :-
- ✓ Pre-processing - Biometric Attendance Management mainly uses iris recognition or thumb scanning.
- ✓ Segmentation - They applied Biometry, Facial Recognition, Identification, Management, and Attendance Validation.
- ✓ Algorithm-PCA(Principal Component Analysis)

2] Author: Rekha.E, Dr.Ramprasad.P 2017

Method :-

- ✓ Pre-processing – The objective of this paper to automatic the attendance system by combines the facial recognition using Eigen face algo.
- ✓ Segmentation - They applied facial recognition system, student attendance system, eigen face database.
- ✓ Algorithm-PCA(Principal Component Analysis) .

3] Author: - Adrian Rhessa Septian Siswanto, Maulahikmah Galinium 2014

Method :-

- ✓ Pre-processing –it's based on Key magnetic or Chip card, Pin password, identity verification has achieved more reliable verification and identification well-known as biometric.
- ✓ Segmentation - They applied face recognition, opencv, eigenface, fisherface, biometric.
- ✓ Algorithm-PCA(Principal Component Analysis) and LDA(Linear Discriminant Analysis).

4]Author: Hteik Htar Lwin, Aung Soe Khaing, Hla Myo Tun 2015

Method :-

- ✓ Pre-processing – This paper help users for improvement of the door security using face detection and recognition.
- ✓ Segmentation - They applied Viola-jones face detection method, PCA, Eigenvector, Covariance, Euclidean distance, Eigenface, microcontroller
- ✓ Algorithm-PCA (Principal Component Analysis), Eigenface alogorithm.

III. EXISTING SYSTEM

Improvements have been performed in this filed over the years. This section determines the advances towards the requirements and achieves the purpose mentioned above (related work).

IV. PROPOSED SYSTEM

In this proposed system,the employee will have to register in to the system first. For the process of registration, there will be some steps for face recognition. In the face recognition process, it includes camera interfacing, frame extraction, face localization, features extraction. In features extraction process, there are few more sub processes like pre-processing, gray scale, thresholding and binary pattern. After these processes, the employee will be registered in to the system. And that employee will get an unique employee id. In face recognition

process, the different faces of particular employee will be captured and those will be saved in to the database. So while login in to the system, the employee will have to enter the employee id which is assigned to the particular employee and it is unique. After entering the employee id, the system will start the camera. Camera will capture the current face of the employee. Then the system will start the comparison. The comparison will be between the current face captured by the system and the dataset which is stored along with the employee id. The employee id will direct the associated dataset where the particular employee's database is stored. If the comparison between the current face and the dataset matched successfully, then and only then the door will be opened. And if the employee's comparison with dataset fails, then the alarm will get activated and the door will not be open.

System Architecture:

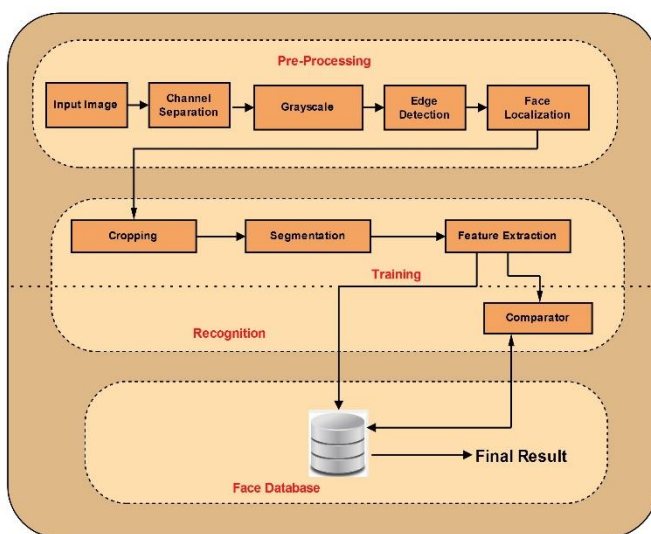


Fig 1. System Architecture

V. METHODOLOGY

Input:

- 1.Camera Interface
- 2.Frame Extraction

Pre-Processing:

- 1.Grey Scale:(8 Bit)
- 2.Thresholding (1 bit)

3.Feature Extraction

Output:

- 1.Hardware Control
- 2.Log Generation

INPUT:

1. Camera Interface:

For detecting the face by the system we need camera interfacing supporting to the application.

2. Frame Extraction:

After capturing the face while registration that image is processed in the number of copies extracted from input image called as Frame Extraction.

PRE-PROCESSING:

1. Grey Scale:

Grey Scaling is nothing but to interpret the original image in combination of black-white colour. Every pixel in the GreyScale image represents the intensity of the light which hold by every pixel.

Grey scale has defined greyscale colourspace.Colourspace is nothing but the school or organization of the colours.

It allows analog and digital representations to map the numeric values stored to the standard colourspace.

In a (8-bit) grayscale image each picture pixel has an assigned intensity that ranges from 0 to 255.A grey scale image is not only about black and white image it is different from it since a grayscale image also have shades of grey apart from pure black and pure white color. Grayscale images are usually required for image processing.

1.1 Separation of R-G-B:

Image is created by plenty of pixels where each pixel hold 24-bit size(8-8-8 :R-G-B). To calculate greyscale of an image we have to separate these pixels in R-G-B colour format.Pixels are stored as Integers.The

integers can be 8-bit, 24-bit or 32-bit depending on the image type. Most popular are 24 bit color images which we uses where 8 bits are hold by each Red, Green and Blue color values used to represent a 24-bit pixel value. 8 bit images are nothing but the grayscale images.

Sample PIXEL value in HEX = 0EDEB5. In programming the hex numbers are represented as 0x0EDEB5. 0x prefix is for hex notation. Then individual color channels: 0E (red) - DE (green)- B5 (blue): 00001110 – 11011110 – 10110101.

Traverse Through Entire Image

```
for(y=0;y<height;y++) {
  for(x=0;x<width;x++) { pix = input[y][x];
}
```

Extract 8-bit R, G and B values from 24-bit Color Value

```
b = pix & 0xff;
g = (pix >> 8) & 0xff;
r = (pix >> 16) & 0xff;
```

1.2 R-G-B to GreyScale Conversion:

Steps / Algorithm

- Traverse through entire input image array.
 - Read individual pixel color value (24-bit).
 - Split the color value into individual R, G and B 8-bit values.
 - Calculate the grayscale component (8-bit) for given R, G and B pixels using a conversion formula.
 - Compose a 24-bit pixel value from 8-bit grayscale value.
 - Store the new value at same location in output image.
 - Traverse Through Entire Image
- ```
for(y=0;y<height;y++) {
 for(x=0;x<width;x++) { pix = input[y][x];
```

- Extract 8-bit R, G and B values from 24-bit Color Value

```
b = pix & 0xff;
g = (pix >> 8) & 0xff;
r = (pix >> 16) & 0xff;
```

- Calculate grayscale component

```
gs = (r + g + b) / 3;
```

- Re-Compose 24-bit Value & Save To Output Image

```
r = g = b = gs;
output[y][x]=(r<<16)|(g<<8)|b;
}
}
```

## 2. Thresholding (1 bit)

Thresholding is nothing but the separation of the foreground from the background image which is calculated either in 0 or 1.

## 3. Feature Extraction

Feature extraction is nothing but the values extracted from the image which represents the uniqueness of the face.

## OUTPUT:

### 1. Hardware Control

As proposed project combines hardware with software. So, we required hardware control through the application. Hardware mainly consist of microcontroller, latch, bluetooth controller. Hardware and Software establishes the connection through the bluetooth controller and hardware will behave according to application.

### 2. Log Generation

As per the monthly data we can generate the log of the employees to check the availability of the employees throughout the month and their payment calculation.

## VI. CONCLUSION

The proposed system generate logs regarding calculation of payment which is based on attendance of the employees. Attendance is taken by using face recognition technique and it provides access to authorized employees.

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