

Smart Examination System

B. Chaitra^{1*}, A. R. Anusha², Nishmitha³, C. Ardra⁴

^{1,2,3,4}Student, Department of Electronics and Communication Engineering, Srinivas Institute of Technology, Mangalore, India

*Corresponding author: chaitra2016b@gmail.com

Abstract: The Smart Examination System is developed for making the Examination process easier and efficient. Now a day's 98% of the colleges conducting the exams in the traditional way. This consumes lots of time and paper work. This Project is to modernize the traditional way of conducting the exams. The project simplifies the attendance management system means attendance will be generated automatically during the examination. This process reduces the duty of the invigilator and the office staffs.

Keywords: Attendance management system, Image processing, Face detection, Local binary pattern.

1. Introduction

The proposed system is a web-based application used to manage some operations during the examination. The System which is based on face detection algorithm. The Face detection system can recognize the individual person in a digital image. This system takes the given face as the input. In our project Attendance Management System which undergo three process, they are image capturing, image training and face detecting. By using LBP (Local Binary Pattern). We can also detect the faces in the case of identical twins.

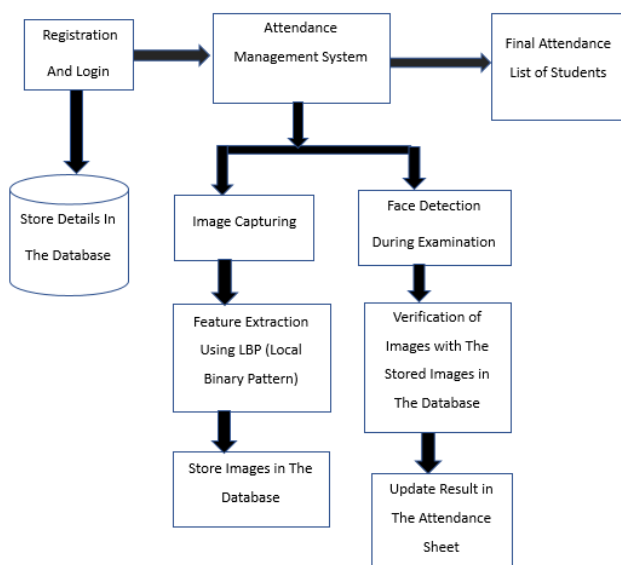


Fig. 1. Block diagram of smart examination system

The figure 1 above shows the block diagram of Smart Examination System. Students can register by entering the

name, Id, mobile number, username, email and password. Admin will login to the application by entering username and password. It will direct to the Attendance Management System. This system is divided into two parts. First one is Image Capturing, Feature Extraction Using LBP, Store Images in the Database. Second one is Face Detection During Examination, Verification of Images with the stored images in the database and Update the Result in the Attendance Sheet. After the successful completion of these steps the application will produce the final attendance list of students.

2. Software Requirements

A. PyCharm 3.6

PyCharm is a most popular IDE tool it is used for scripting language of the Python. PyCharm offers some of the important features to its users and developers such as code completion and inspection, advanced debugging, support for web-programming etc. The software provides smoother code completion service.

B. SQLite Studio (Database)

SQLite is a software library that provides a relational database management system (RDMS).

The lite in SQLite means light weight in terms of setup, database administration, and required resource. SQLite software implements self-contained, server less, transactional SQL database engine, zero-configuration. It does not require a separate server process or system to operate.

The complete database is stored in a single cross-platform disk file.

3. Working

The computer programming is basically a designing, implementing, testing, debugging and maintaining the source code and these codes are written in a particular programming language.

The purpose of creating programming language is that exhibits a certain desired behaviour.

A. Registration/Login

The Python 3.6 software is used to write the code for the registration/login activity. After running the code, HTTP URL will be generated. When we browse that URL, it directs to the Home Page of the application as shown in figure 2 below.

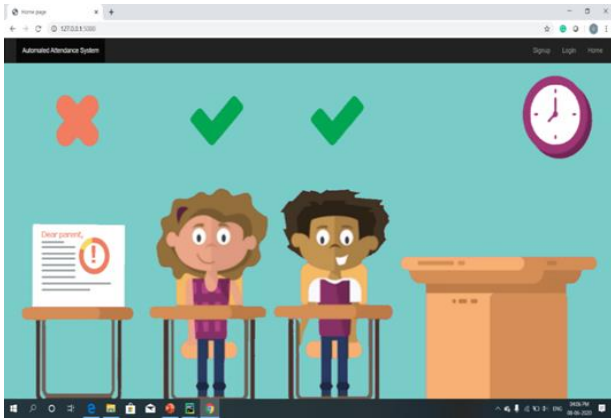


Fig. 2. Home page

On the home page we would get a signup and login options. If the student is a new user, he must signup first by clicking on the signup option. In the signup page the student must fill the required information such as Name, Mobile Number, Email Address, User Name, Password and Password Confirmation as shown in the figure 3. Admin can login by entering the username and password as shown in the figure 4. It will direct to the Attendance Page. The details will be stored in the database.

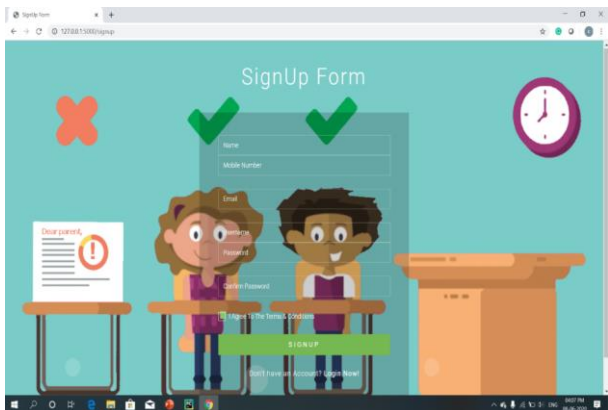


Fig. 3. Signup page

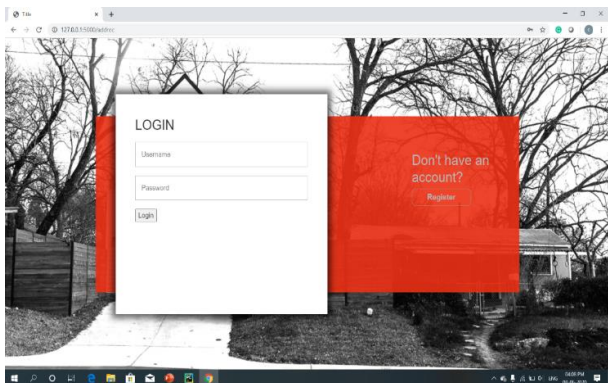


Fig. 4. Login page

B. Attendance Management System

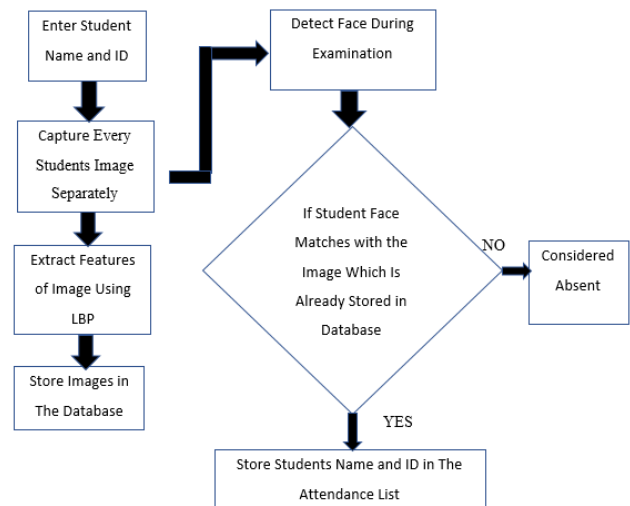


Fig. 5. Flow chart of attendance management system

1) Image capturing

First, we should enter the student Name and ID as shown in the figure 6. When we click the Take Image button, the Camera which is mounted starts to capture the frontal images of the students and the captured images are stored in the size of 168 x 168. We fix the size at the backend to avoid the resizing of the images because resizing may sometimes result in poor performance.



Fig. 6. Image capturing

2) Feature extraction using LBP

When we click the Train Image button as shown in the figure 7. The extraction of important features from the face image is done to get the significant information that is useful to identify the similarities between the different faces. We are using the Local Binary Pattern (LBP) for the feature extraction. The main advantage of the LBP is that it identifies the face in the case of identical twins. In local binary pattern the input face is first converted into the grey image as shown in figure 8. and for that image the binary pattern is calculated by comparing the center pixel with the neighboring pixel. The result will be one if the center pixel is greater than that of the surrounding pixel and the result will be zero if the surrounding pixel is smaller than that of the center pixel. This calculation will be done for each and

every pixel so that we will get the binary pattern.

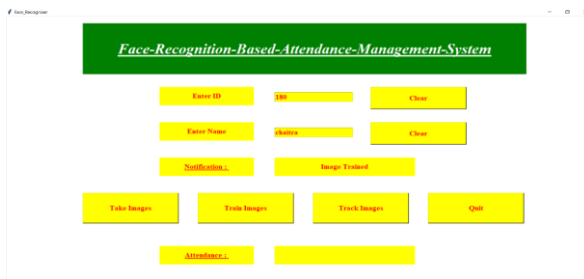


Fig. 7. Image training

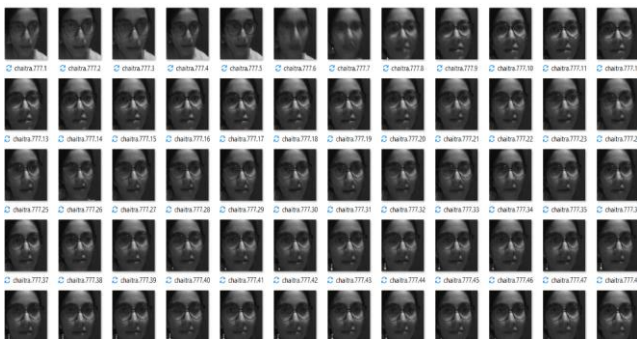


Fig. 8. Captured gray scale image

The center pixel co-ordinates are M_c and N_c , then the coordinates of the neighbor pixels are determined as follows,

$$M_p = R \cos 2 * 3.14 * p P + M_c \quad (1)$$

$$N_p = R \sin 2 * 3.14 * p P + N_c \quad (2)$$

Where M_p and N_p –Neighboring Pixels

g_p is the gray code of the neighbor pixels where p ranges from 1 to $(p-1)$, then the texture of an image can be calculated as,

$$T_x = t g_0, \dots, g_{p-1} \quad (3)$$

One more possible way to find the texture of an image is by subtracting the surrounding pixels values from the center pixels' values which is given as follows,

$$T_x = t g_0 - P_c, \dots, g_{p-1} - P_c \quad (4)$$

Where P_c –Center Pixel

3) Face detection



Fig. 9. Face detection

We obtain the pure facial images with uniform size and shape by using Face Detection process. When we click the Track

Images button the Face Detection process will starts as shown in figure 9. In our project we have taken the images of individual student in different angles, different expressions and also in different lighting conditions. A database of individuals with 60 images of each has been collected. After recognizing the faces of the students, students name, ID, time and date are updated into an excel sheet.

4) Database

In the database we have stored the student information by using the SQLite software which is shown in the figure 10.

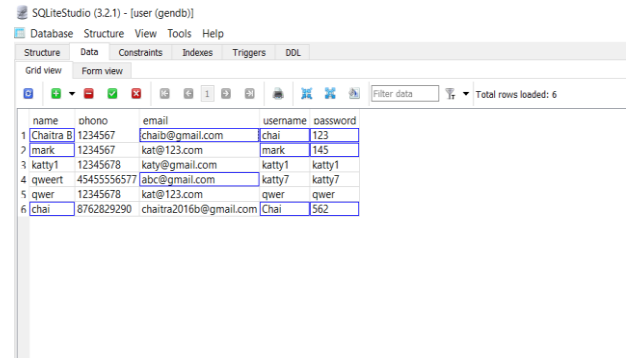


Fig. 10. Stored information in the database

4. Result

After the successful completion of the Face Detection process admin will get the final attendance list, which contains the student name, ID, time and date of the examination through the Excel sheet as shown in the figure 11.

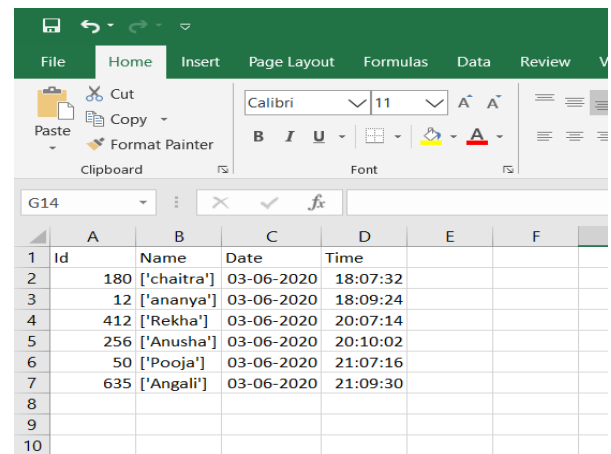


Fig. 11. Final attendance list

5. Conclusion and Future Scope

Now-a-days, new technologies are emerging day by day. Almost all the fields are getting automated. It is possible to implement the Smart Examination System in the colleges as per the requirement with low cost. Instead of doing paper work every time, it is good to use this system to reduce it and also, we can save the time. As per the requirement of the College/University, further changes could be implemented in

the system to make it more compatible, efficient and convenient for everybody to use it.

References

- [1] Shireesha Chintalapti, M. V. “Automated Attendance Management System Based On Face Recognition algorithm”.
- [2] T. S Vishnu Priya, G. Vinitha Sanchez, N. R. Raajan “Facial Recognition System Using Local Binary Patterns”.
- [3] Tarik H. Baldawi, “RFID based technology: university Student attendance system, Design and Implementation”.