International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 05 | May 2021 www.irjet.net p-ISSN: 2395-0072

Advance Attendance System using Face Recognition and Android

Hritik Kumar Singh[1], Vishal Jain[2], Ashutosh Kumar[3], Vikram Borana P[4]

[1,2,3,4]*Department of Computer Science,* BMS Institute of Technology, Bangalore, India

---

Abstract - *Taking attendance while lecturing in a classroom is hard work done by professors and consumes their lecture time. Even after noting the attendance, the professor needs to update it to an online platform provided by the university to continuously monitor each student's attendance and notify the students and parents regarding the shortage of attendance as a concern. This two-step process of taking attendance is a tedious process through which a professor goes every lecture and every day. Many attempts have been made to make this process faster and easier using various biometric techniques in recent years. However, for every lecture in the same classroom going through biometrics again is not feasible. Our focus through this research is to make this two-step process faster and enhance the face recognition techniques for more reliable systems in the future. In this paper, we proposed a combined system using android and face recognition to mark the attendance digitally and send feedback with the list of absentees and attendees within minutes with very little human interference*

Key Words: Face Recognition, Android, Attendance Management

1. INTRODUCTION

This In this modern era, face recognition is getting increasingly common these days. We can find it in smartphones, laptops, human databases, etc. In fact, it is one of the most secure security systems out there. Face Recognition can be used by institutions to mark the attendance of students in a much time efficient way. Unlike the conventional method of marking attendance, i.e., manually on paper, which is very time consuming and non-environmental friendly, is a setback. To overcome this problem, Biometrics systems were introduced which use Fingerprint or iris detection. Attendance through biometrics has an extra cost of both money and personal time. As the size of classes increased, the Biometrics attendance system gets time-consuming and complicated, which again didn't serve the purpose of reducing time. So here Face recognition attendance system comes into work.

This Advance attendance system uses Face detection to get each face from the input photograph uploaded by the professor through their phone, having our application connected to the cloud through the University internet. After faces are detected, the system encodes each face found in the photograph and tries to find the matching or nearest encoding in the database having encoding of all class students. If it matches or resembles any encoding in the database, we will mark that student as a present. The same process is repeated for all the faces, and then the final list of absentees and attendees is sent back to the professor through email service. The student's faces are used to verify their appearance. The system is extremely helpful for keeping track of attendance for teachers, students, and administrators.

2. LITERATURE REVIEW

In this section of Literature Review, we have reviewed works of other researchers in the same domain and some meaningful deductions have been derived.

In this paper [1], they used high-definition cameras to detect the faces of the students in the class. Using Faster R-CNN,the camera detects the faces of everyone in a room, and the extracted images are stored in the database for further processing. SeetaFace is used to equate the extracted images with the student database, and the students who are matched are identified as present.

Edy Winarno et al [2] created a Facial Recognition Attendance System that uses a camera to capture photographs. The captured images serve as objects, which are then used to identify patterns as faces. The database is subjected to a 2D-3D image reconstruction method in order to produce a reliable database. Using the CNN process, the captured image is transformed from 2D to 3D.The captured and database images are compared using the vector form and texture, and the captured face is defined using PCA and Mahalnobis.

Samyak Jain et al [3] proposed a Real-Time Smart Attendance System. It is made up of two databases: one for students and another for attendance. They used two cameras, one at the entrance to the class to catch the image of every student who enters, and the other inside the class to ensure that every student is visible to the camera. Faces will be identified and attendance will be recorded using 68 landmarks and PCA, which will be captured by a camera at the entrance. To prevent proxies, the camera inside will assist in sending the final list of students present.

Priyanka Wagh et al [4] In their project, The student will be enrolled in the database using their information and their photo. The camera device installed in front of the classroom will capture the image of the students in the classroom. Then their image is converted into Grayscale to remove brightness in the image, and histogram normalization is done for contrast enhancement, then Noise Removal is done. After that, face detection is used using the Ada-Boost algorithm to detect the faces in the image. Then the face recognition is done by comparing the faces cropped from the image to the database and are verified using the Eigen Face method. After that, correspondingly, attendance will be marked on the server

In this Paper [6], the photograph of students sitting in 2 columns is taken at a time. That image undergoes preprocessing, which includes converting the photograph into grayscale and passing it to other filters for further enhancement. Now these preprocessed images undergo the Viola-Jones algorithm for detecting the faces in the photograph. Then the cropped images are sent to the folder, which is used for further testing. Feature extraction is used to extract the features from these cropped images and then further used for the comparison. The training set contains the faces of individual students in the class. The testing set is then compared with all the faces in the training set, and if the match is found, then the corresponding student is marked present. After that, the student whose photos do not match is considered absentee. These names are converted to voice using Microsoft Speech API. After that, gender classification is done, which consists of preprocessing, geometric-based feature extraction, classification. Preprocessing is done to enhance the quality of the image. The facial image is then divided into four equal parts to extract facial features such as eye to eye distance, eye to nose distance, etc. Ratios of male and female are calculated and, based on the ratios, it decides whether the given image is a male or a female.

Vaishnavi Hava et al [5] proposed an Android-based Free Generic Facial Attendance System for keeping track of student attendance. They used SQLite to store the database, which is managed by the administrator, and Machine Learning algorithms for facial recognition. The aim is to capture a image and find faces in that image, extract them, apply calculations of landmarks from extracted images and create a template and store it. Testing the template using Machine Learning algorithms to verify and mark present or absent.

3. PROPOSED METHODOLOGY

For developing this advance attendance system, the following steps have to be followed for accomplishing the task. The steps are:

3.1 Pre-processing the Database

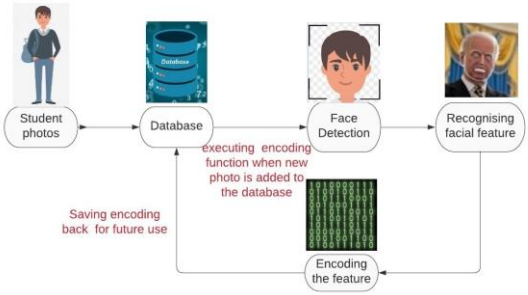


Fig -1: Encoding Student Database

In this step, the database stores the data of students as images. Then the facial features are extracted from individual photos of the student. Using these features, every image is encoded, and these encodings are stored to prevent redundancy. These encodings will be helpful when we perform face detection and recognition to compare with the uploaded classroom image.

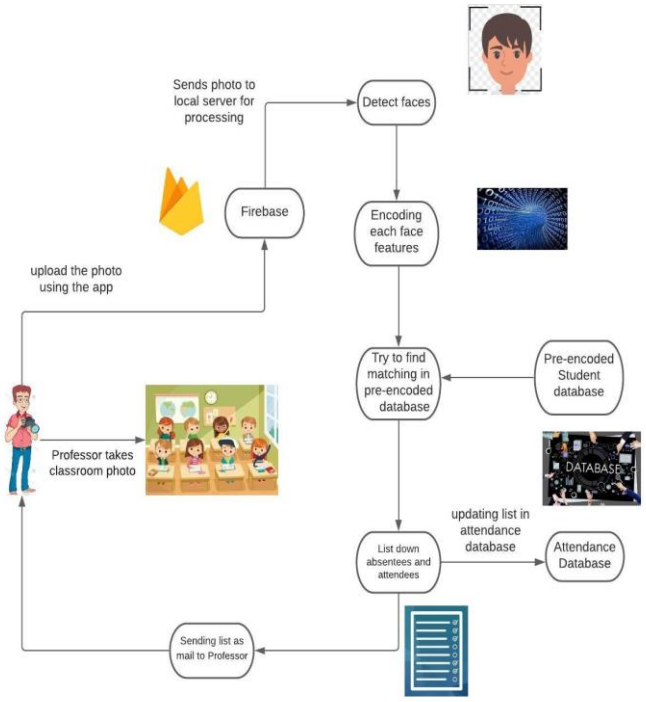


Fig -2: Proposed system architecture

3.2 Professor's uploading to the cloud

This step comprises the professor's work of capturing the image of the entire class and uploading it to the cloud. The professor will be made available with a simple android APP. The APP has a simple interface where the professor uploads the image by pressing the upload button.

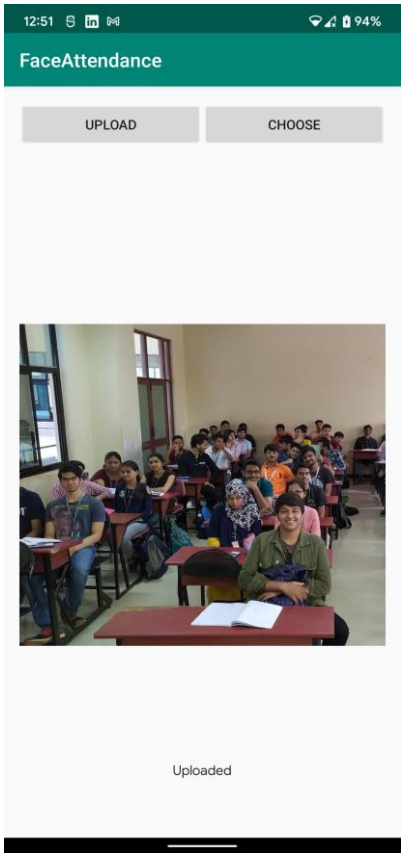


Fig -3: App Interface

3.3 Face Recognition and Detection

As soon as the professor uploads image, the server detects a new image in the cloud and downloads the image for further processing. The initial step in processing the image is to detect the faces present and get the locations of each face saved in a variable. After detecting all the faces, we access each face location from that variable and encode the facial features of the face, and then matching that encoding with the pre-encoded database of student images to check if that face belongs to that class and if it does, then we store that student name in a separate variable containing all the list of students who are present in the class and if doesn't match with any of the encoding in the database then we consider that encoding as an unknown face. In the end, we have a list of attendees, and those who are not on the attendee's list are marked as absentees.

Fig -4: Detecting Faces

3.4 Updating Attendance in the Database

After generating the list of attendees and absentees, we use this list to update the attendance database. Similarly, we can use this list to mark the attendance in any of the online platforms provided by the university/college.

3.5 Sending feedback to Professor

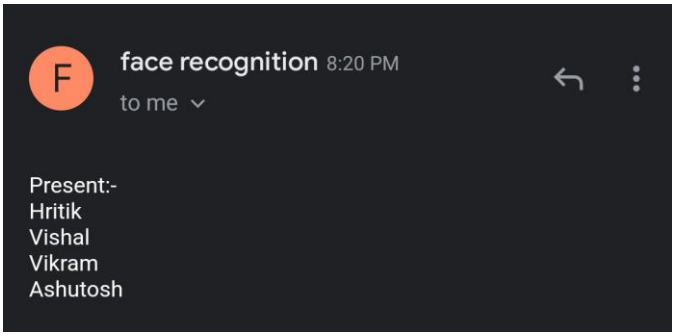


Fig -5: Automated Mail sent to the Professor

After updating the database, we can use the list to send a mail to that respective professor so that he can get to know the student names who are attending and not attending his class while he is teaching.

The above 5 step process takes few minutes from uploading the image through APP to receiving the mail with the list of students.

4. CONCLUSIONS

After reviewing some of the advanced systems and studying how it can be made effective, we have proposed a model which provides better result and better efficiency with minimal effort. It depends on the picture taken by the professor, so the chances of fake proxies reduce. The cost of implementing it is also significantly less as we have not used any hardware devices like cameras, biometric scanners, etc.

The developed system is very reliable and provides better accuracy. This system can be more secure, productive, and efficient if we use the cloud for storing databases and running the server.

REFERENCES

[1] Dan Wang, Rong Fu, Zuying Luo, "Classroom Attendance Auto management Based on Deep Learning", ICESAME 2017, Volume 123.M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.

[2] Edy Winarno, Imam Husni Al Amin, Herny Februariyanti, Prajanto Wahyu Adi, Wiwien Hadikurniawati, Muchamad Taufiq Anwar," Attendance System Based on Face Recognition System Using CNNPCA Method and Real-time Camera", International Seminar on Research of Information Technology and Intelligent Systems (ISRITI) 2019.

[3] Shreyak Sawhney, Karan Kacker, Samyak Jain, Shailendra Narayan Singh, Rakesh Garg," Real-Time Smart Attendance System using Face Recognition Techniques", 9th International Conference on Cloud Computing, Data Science Engineering, Confluence 2019.

[4] Priyanka Wagh, Jagruti Chaudhari, Shweta Patil, Roshani Thakare," Attendance System based on Face Recognition using Eigen face and PCA Algorithms" ,2015 International Conference on Green Computing and Internet of Things (ICGCloT).

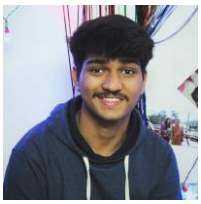
[5] Vaishnavi Hava1, Seema Kale, Arun Bairagi, Chandan Prasad4, Sagar Chatterjee, Anish Varghese, International Research Journal of Engineering and Technology (IRJET), Volume: 06 Issue: 09 — Sep 2019.

[6] Poornima S, Sripriya N, Vijayalakshmi B, Vishnupriya P," Attendance Monitoring System using Facial Recognition with Audio Output and Gender Classification", IEEE International Conference on Computer, Communication, and Signal Processing (ICCCSP-2017).

BIOGRAPHIES

Name: Hritik Kumar Singh
E-mail: kvnl.hritik@gmail.com
Qualification: BE in Computer Science

Name: Vishal Jain
E-mail: jvishal2690@gmail.com
Qualification: BE in Computer Science



Name: Ashutosh Kumar
E-mail: ashutoshkmr032@gmail.com
Qualification: BE in Computer Science

Name: Vikram Borana P
E-mail: vikramborana9603@gmail.com
Qualification: BE in Computer Science