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Face Recognition Based Attendance System in Android

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Abstract- **Attendance is an important one in schools and colleges, but still in many schools and colleges the method of taking the attendance is not efficient. Attendance is taken by calling the name of the students and mark their presence or absence manually in a ledger which is time consuming and requires more manual work. Face recognition is one of great ways of identifying a person. To take attendance in an efficient way I propose an android application in which, first all students face will be registered then faculty just need to take a photo of the classroom from the photo students faces will be identified and attendance will be marked automatically in an excel file. Face detection and face recognition is performed using Google ML-kit and MobileFaceNet respectively.**

Keywords – Face recognition, Face detection, ML-kit, MobileFaceNet, Android.

1. INTRODUCTION

In schools and colleges, the first thing they do is taking attendance, the traditional attendance taking method is very inefficient in which the faculty call the name of all the students and mark their presence or absence manually in a ledger. The first problem with this traditional method is time consuming, it takes at least 3 minutes for each session, then manual work is also a problem finally the cost of maintaining the ledger. To overcome this problem many systems have been implemented such as finger print recognition, iris recognition, radio frequency identification but if there are many classes and more students then it needs many recognition machines for each class and if a group of students come at the same time then it will make a queue to record their attendance. So, these systems are also not an efficient one. Now a days face recognition is a trending technology which is being used in many fields. Using this face recognition we can implement attendance system, here we can ask why face recognition? Because using face recognition multiple faces can be recognized at the same time and processing time is also less compared to finger print recognition and iris recognition. And another question we can ask is why to use Android based system? The answer is simple, apparently everyone has android phone thus the cost for setting up a separate camera for face recognition is eliminated. In this proposed system first, the faculty need to register every students face and then faculty need to take a photo of the classroom from that photo students faces will be detected and recognized, finally the information will be recorded in an excel file. Face detection is done by Google ML-kit and for face recognition MobileFaceNet model is used the reason is this model can obtain accuracy up to 99.55 %[1].

2. LITERATURE SURVEY

Dwi Sunaryono [2] introduced an attendance system where students are required to photograph themselves in front of a classroom QR code. This photo is then sent to a server for facial recognition, enabling attendance marking. In our study, we utilized logistic regression, linear discriminant analysis, and k-nearest neighbor algorithms for the facial recognition task. This system achieves an accuracy of 97.27%. Shamsul J. Elias et al. [3] developed an attendance system where a camera positioned at the front of the classroom captures an image of the students.In their system, they employed the Viola-Jones algorithm for face detection and the Local Binary Pattern (LBP) for face recognition. These methods were utilized to process the captured classroom image and accurately record attendance based on identified faces. Preeti Mehta [4] developed a face recognition attendance system using MATLAB and Raspberry Pi2. Their approach integrates local binary pattern (LBP), histogram of oriented gradients (HOG), and support vector machines (SVM) for both face detection and face recognition tasks. This combination of techniques enables accurate identification and attendance recording based on recognized faces. Smitha and Pavithra S [5] have implemented an attendance system where a camera is positioned in front of the classroom to capture live feed of students' faces. They utilized the Haar-cascade classifier for face detection and the local binary pattern histogram for face recognition. These methods enable the system to detect and recognize faces in real-time, facilitating accurate attendance management based on the identified individuals.

3. PROPOSED SYSTEM

I propose an android based face recognition attendance system in that, first all the students face in a class is registered by taking a photo of the student and entering his detail. That photo will be used by google ML-kit to detect the face, then the detected face is cropped and fed to the Mobile Face Net where it produces embeddings which will be stored and used for face recognition. After registering all the students faces, the faculty need to take a photo of the classroom by using that photo again the faces will be detected by Google ML-kit and then faces are cropped and embeddings will be obtained. This obtained embeddings will be compared with already stored embeddings in order to recognize a student face and finally students whose faces are being detected and recognized will be marked as present and rest of others will be marked as absent in an excel file. The system architecture is shown in Fig.1.

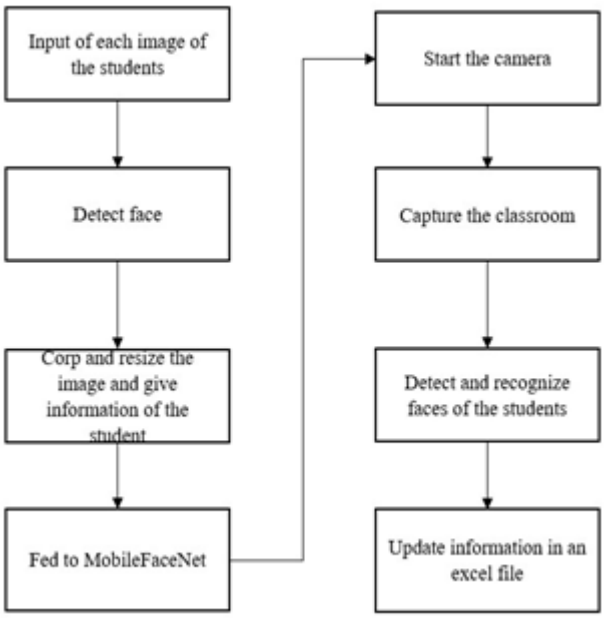


Fig.1 System Architecture

The working of the system can be divided into 3 modules namely Registering the students, taking photo of the classroom, and updating information in excel.

A. *Registering the students*- Students face is registered by taking a photo of the student using the proposed application, from that photo student face is detected by Google ML-kit and it gives bounding region of the face which can be seen in Fig 2. Using that bounding region face is cropped to 112 X 112 pixels because which is the default input size for the MobileFaceNet model. The cropped image is fed to MobileFaceNet which will produce embeddings, embeddings are 128 dimensional vector of floats which is stored and used in recognition process. The cropped image and entering name of the student can be seen in Fig 3.

B. *Taking photo of the classroom*- After registering all the students faces. The faculty need to take photo of the classroom for taking attendance, from that photo again Google ML-kit is used to detect faces and faces will be cropped and resized and fed to the MobileFaceNet to get the embeddings of each detected face in the image finally these embedding will be compared with already stored embedding of the students to recognize the face. And recognition is done by calculating the Euclidean distance between newly got embedding and already stored embedding if the distance is considerably low then the two images from the same person. Recognition students in class can be seen in Fig 4.

Fig 2. Face detection of student

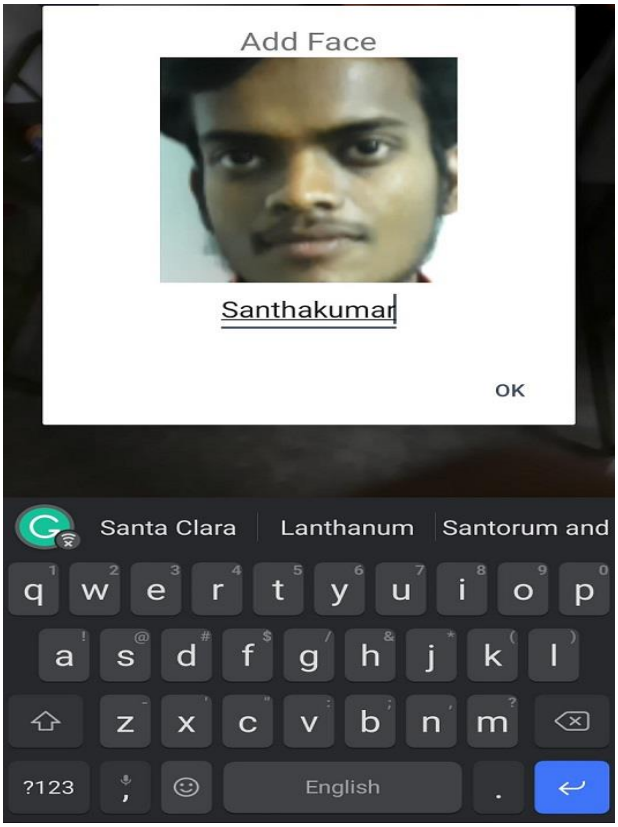


Fig 3. Registering a student face

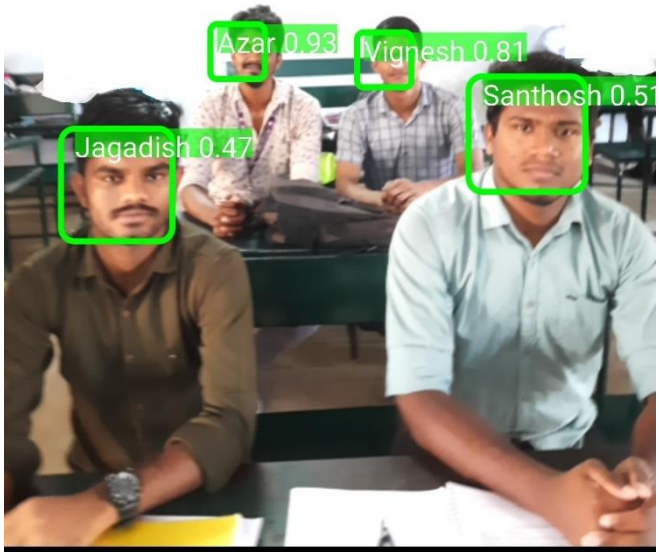
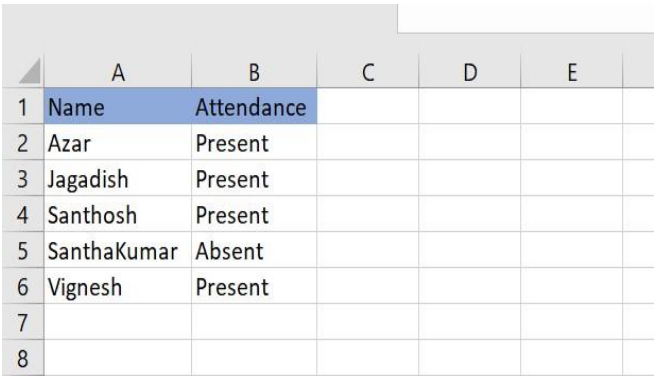


Fig 4. Recognition of students in classroom

C. *Updating information in excel file-* After detecting and recognizing students faces from that classroom photo the students whose faces are being detected and recognized will be marked as present and rest of others will be marked as absent in an excel file this can be seen in Fig 5.



	A	B	C	D	E
1	Name	Attendance			
2	Azar	Present			
3	Jagadish	Present			
4	Santhosh	Present			
5	SanthaKumar	Absent			
6	Vignesh	Present			
7					
8					

Fig 5. Attendance marked in an excel file

5. RESULT AND DISCUSSION

Using a separate camera for capturing the classroom would seems to be an ideal solution because we do not need to take photo of the classroom manually but there is the cost of initializing camera into all the classrooms. But in my android system the cost is zero since everyone has an android phone. This system preforms better when the number of students is less than 50 if we want to recognize more than 50 students then the faculty need to take multiple photos of the classroom from different position so that everyone is covered.

6. CONCLUSION

This system aims to build an effective way to take attendance with three main objectives those are reduce amount of time consumed, reduce manual work and low cost system. These objectives have been achieved in this system. So, I believe this would be an effective solution.

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