Online Attendance System using Machine Learning Algorithms

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Abstract— **In many of the educational institutions, managing attendance of students/candidates is tedious, as there would be large number of students in the class and keeping track of all is onerous. There are situations where student act as proxies for their friends even though they are not present. This system, which is based on face detection and recognition algorithms, spontaneously detects the student when he enters the class room and marks the attendance by recognizing him. The database is then modified or updated automatically. This reduces time and effort of manually updating the attendance. This system also provides authentication using recognition of face of the admin or teacher to unlock as there are chances of trespassing by the third party. So this rises the security of the system.**

I. INTRODUCTION

Technology has developed by Artificial Intelligence lab, which can recognize faces with up to 97.3% accuracy, which are 2.7 less accurate than humans.
Facial recognition is something we've evolved to do. Hence AI identification endeavor to mimic this manner of human.
The system will cleave the face into visible marks called nodal points which presents the things like the distance between eyes, depth of the eyes sockets and width of the nose. So the difference between these areas is used to create a unique code of face print.

Manual attendance marking in a class is a bit burdensome due to a wide number of students present in a class and maybe a chance of proxy attendance.
So building a face recognition based attendance system which can manage the records of the students will be more efficient, advantageous also time saving and secured.
Our main aim is to build a system which can mark attendance of many number of students at a time, or within a single capture to spot and mark attendance of students in a group irrespective of background. This was achieved by using machine learning and python. We also have authentication step which makes system only acessible for authorized users. This protects the system from trespassers operating it. And detection of face is done using haarcascade algorithm and OpenCV.

The software measures a various features of face. Each code uses different nodal points and collects different measurements.
This data is converted into a formula which represents unique facial signature. And that face is compared to a known faces in a database.
Hence the attendance is marked into an any freeware.

II. LITERATURE SURVEY

The uptrend of machine learning and the gathering of artificial intelligence, IoT has procured vast heed in totality of technology growth.

In this paper let's crack the deformity that were proposed by other authors on face recognition algorithms.
Below are some top picks of reviewed papers:

- Authors Shireesha Chintalapati and M.V. Raghunadh presented an instinctive system, built on face recognition algorithms which says, when a student enters class room, his image is captured by camera at the arrival. Only face region is considered and then extracted for further cook-up. Finally after flashing on to student's face, it is then fed to post-processing.

Out of many methods they have chosen Viola-Jones detection algorithm considering its high detection rate. Histogram Normalization technique has also been said to be implemented to obtain the clear image. As PCA does not consider the discriminative information in the data, Linear Discriminant Analysis (LDA) was proposed, where it maximizes the ratio of the scattering. To extricate the accuracy of system from switching of database size, Latterly Local Binary Pattern Histogram (LBPH) was introduced. To prevail over mockery eye blink detector is included, that holds precision regardless of the facial changes

The main disadvantage is, only two persons are allowed to enter the classroom at a time, to expedite algorithm's effort and to avert the cluttering of data. However this technique proved to be time saving and secured, if a person poses any

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unintentional changes the recognition rate will gradually low down. This system can only concede a person's face up to 30 degrees angle variations, which is a drawback. This proposed system lacks accuracy.

- Authors Suman Kumar Jha, Aditya Tyagi, Kundan Kumar, Madhvi Sharma proposed a different technique with LBPH algorithm and Haar Cascade Classifier. LBPH is basically used to concede the front face and to obtain complete attendance system. It cuts the depiction into pixels, each pixel is held by eight nearest pixels. To gain high degree of accuracy Haar Cascade Classifier was implemented. Coming to the function, this application promotes two different parts: Development of Face Recognition System, Development of Attendance System. First two fields hold roll number and name of the student then image is captured, converted to greyscale, subsequently stores in database.

Disadvantage of this system be requisition of high processing power, reduced accuracy/quality of image as some images poses noise. It also restricts number of students successively.

- Author Dulyawit Prangchumpol proposed Framework of Attendance Management System to increase the correction on conceding system, it holds five division

first comes student registration, here face image is captured more than 10times with different expressions in vertical form. Next for face diadnosis, author opted for Haar cascade technique, to acheive high degree accuracy and speedy evaluation. Further a program was developed for getting face result, which employs database to compare the face of the tester to data in system. Next comes Storage talk, here they have employed google cloud for database, to enable editing.

Coming to province, they deployed android face recognition technique also called deep learning for detection purpose. Linear discriminant analysis (LDA) was included to get fisherspace, identification is done by projecting a new face onto the fisher space, then KNN algorithm is applied for identification. Euclidean distance (ED) was included for morphometric measures. After storing images of the students registered, classifier will be trained then it will be used in the system for some courses. All face recognition technology comes to the market with both pros and cons. Compared to other system, this technique might increase the accuracy rate gradually as the technique is associated with deep-learning. This also leads to low reliability.

- Authors Narayan T. Deshpande and Dr. S. Ravishankar proposed Face Detection and Recognition using Viola-Jones algorithm and Fusion of PCA and ANN, employees methodology where recognition of human faces done by features derived from image, which is been implemented in two stages: 1. While detecting human face in an image by violaJones algorithm, 2. Recognizing the detected face by mixing two techniques Principle Component

Analysis and Feed Forward Neural Network. It employs Bio ID-Face-Database for the database.

First comes the pre-processing of the easily accessible pixels, and then follows detection process by the application of Viola-Jones algorithm, which can show-up the effect of detection rate up to 45degrees rotation. Two classifiers will come into picture to enhance the speed of the process. Subsequently identification of detected image using principle component analysis and artificial neural network algorithm follows. Then face extraction process appears where PCA is used for facial feature extraction. In next stage i.e., Face Recognition, data will be vitalized by the help of ANN that was trained before. Here in this paper the considered human faces for database is 23, so many networks will be created. Face descriptors/labels are used for the training purpose of ANN. Put-on simulated results for comparison, if the result is greater than the predefined threshold level that assures test image belongs to the recognised person. Output is then sent to Face Tagging, to tag name of the recognised person.

On final note this system show-up highest accuracy rate of recognition among the reviewed papers. Compared to other systems, this depicts an accuracy rate of 92% with fusion of ANN and PCA.

III. PROPOSED SYSTEM

The main aim of our system is to extract the face of the student and perform comparison with the data stored in prior in our system. The system also authenticates the user that prevents the trespasser to operate it.

The face of the student is captured in such a way that all characteristics of student is identified uniquely and even the position of them is identified separately.

By using this system, manual attendance is not necessary as the system captures the image through the camera attached to the computer. By further procedures, the data is changed or updated.
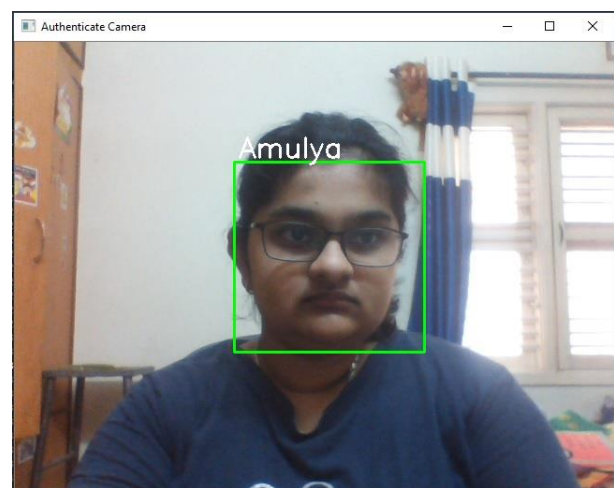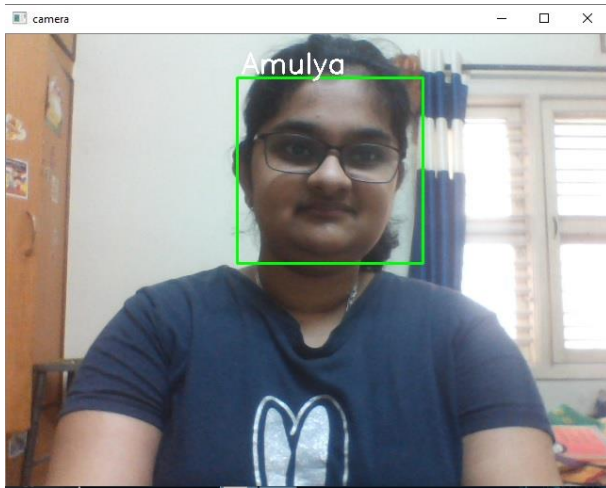

Fig 1: Face Authentication

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Fig 2: Face recognition

Fig 3: Attendance sheet

IV.   ALGORITHM

As the initial stage, we authenticate the user by capturing his/her image and compares with those already stored. If there is a match then attendance process starts else the system terminates.

The first priority is to check the lighting condition and noise in the background before capturing the image. Using that image detection of faces are done using haarcascade algorithm. Then the face is compared or recognised with face of student already stored. If found attendance is written or updated.
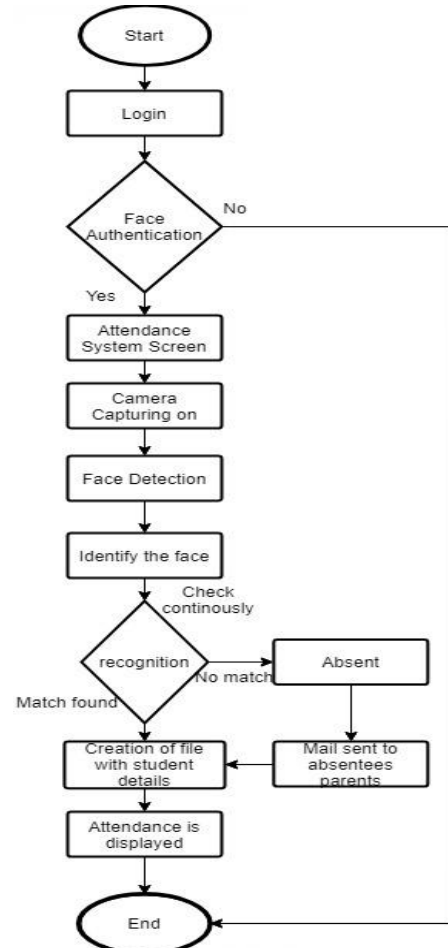
V.   FLOW CHART

Fig 4: Flow chart of our system

VI.   FUTURE WORK

This system can be improvised by making it to recognise students of the whole class accurately. This system can also be implemented in educational institutions. This system can be attached to surveillance camera in such a way that the camera placed in a class captures the image of the whole class and recognises the students and awards attendances to available students. This reduces lot of efforts and time for teaching faculties.

CONCLUSIONS

Online Attendance System using ML algorithms is designed for the motive of reducing the mistakes that may occur during traditional attendance system. Face recognition is one of the easiest and comfortable method to incorporate in the attendance system. Several influential factors are there on which accuracy of separate algorithms vary on. This is a big challenge for class attendance system as it is employed in an uncontrolled environment. Compared with Eigenfaces and Fishers algorithms, LBPH algorithm has highest recognition accuracy in all experiments' with vary in lights, noises at every possible range. LBPH also has the highest impression of the negative light exposure and high noise level compared to other algorithms with statistical approach. Due to the highest accuracy obtained, LBPH algorithm is used as an face recognition algorithm in this system.

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REFERENCES

[1] Dulyawit Prangchumpol, "Android Attendance management system using Face Recognition", IOP Conf. 2019

[2] Shireesha Chintalapati, M.V. Raghunadh, "Automated attendance management system based on face recognition algorithms", IEEE, 26-28 Dec.2013

[3] Suman Kumar Jha, Aditya Tyagi, Kundan Kumar, Madhvi Sharma, "Attendance management system using face recognition", IJERT, 18-07-2020

[4] Neha Kumari Dubey , Pooja M. R. , K Vishal, Dhanush Gowda H. L, Keertiraj, "Face recognition based attendance system", IJERT, 24-06-2020.

[5] Chaitra T.K, M.C Chandrashekhar, Dr.M.Z. Kurian, "Attendance management system using face recognition", ISSN 2349-5162, Aug.2018

[6] Clyde Gomes, Sgar Chanchal, Tanmay Deasi, Dipti Jadhav, "Class attendance management system using facial recognition", ICACC, July.2020

[7] Narayan T. Deshpande, Dr. S. Ravishankar "Face Detection and Recognition using Viola-Jones algorithm and Fusion of PCA and ANN", ISSN 0973-6107, (2017) pp. 1173-1189

[8] Jomon Joseph, K.Zacharia, "Automatic attendance management system using face recognition", Semanticscholar.org, 2013.

[9] Mayur Surve, Priya Joshi, Sujatha Jamadar, Minakshi Vharkate, "Automatic attendance management system using face recognition technique", ISSN 2277-3878, May.2020.

[10] M.Turk and A.Pentland, "Face recognition using eigen faces", proc.IEEE conference ,1991.