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SMART ATTENDANCE SYSTEM USING FACE RECOGNITION

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ABSTRACT: To maintain a discipline and late students grass atmost knowledge in schools, istitutions the attendance system was introduced.face is the important part of the human body that uniquely identifies a person. Using the face characteristics as biometric, the face recognition system can be implemented. The most demanding task in any organization is attendance marking. In traditional attendance system, the students are called by the teachers and their presenty or absenty is marked accordingly. However, these traditional techniques are time consuming and boring. In this project, the Open CV based face recognition approach has been proposed. This model includes a camera that captures an input image, an algorithm for detecting face from an input image, encoding and identifying the face, marking the attendance in a exelsheet and converting it into PDF file. The training database is created by training the system with the faces of the authorized students. The cropped images are then stored as a database with corresponding labels. The features are extracted using LBPH algorithm.

KEYWORDS : Attendance system , Face recognition , Dataset , Machine Learning , Face capturing , Haar cascade, LBPH.

I.INTRODUCTION

Attendance maintenance is a significant function in all the institutions to monitor the performance of the students. Every institute does this in its own way. Some of these institutes use the old paper or file based systems and some have adopted strategies of automatic attendance using some bio-metric techniques. A smart attendance system using facial recognition is a computerized bio-metric software which is suited for determining or validating a person by performing comparison on patterns based on their facial appearances. Face recognition systems have upgraded appreciably in their management over the recent years and this technology is now vastly used for various objectives like security and in commercial operations. Face recognition is a powerful field of research which is a computer based digital technology. Face recognition for the intent of marking attendance is a resourceful application of attendance system.

II.Face Recognition System

Face Recognition is one of the areas from Computer Vision. The practical applications for it are many, ranging from biometrical security, to automatically tagging your friends pictures, and many more. Because of the possibilities, many companies and research centers have been working on it. The performance in face verification could not always be directly related with the one in face recognition. This recognition solution is capable of uniquely identifying or verifying an object using Deep learning based AI/ML techniques. The unique advantage about this solution is the ability to do it at

the source (edge) without the need for expensive streaming and storing. This is basically an Artificial Intelligence based engine for edge computing. This system uses a deep convolution network trained to directly optimize the embedding itself. To train, use triplets of roughly aligned matching / nonmatching input patches generated using a novel online triplet mining method. The benefit of this approach is much greater representational efficiency. CNN are deep artificial neural networks that are used primarily to classify the image.

III.RELATED WORK

A. Face Recognition Based on HOG and Fast PCA Algorithm Xiang-Yu Li(&) and Zhen-Xian Lin By using hog features and PCA algorithms face is recognition. By applying recognition algorithm to cropped faces, we get similarity b/w taken image and database image. PAC algorithm used for face detection and recognition.

B. Attendance Marking System Using Biometrics Biometric are characteristics of human being that can be used to recognize an individual or verify an individual's identity. Attendance is taken electronically with the help of a fingerprint device the record is stored in the database. Attendance is marked after student Identification.

C. The Performance of the Haar Cascade Classifiers Applied to the Face and Eyes Detection The Haar Cascade is applied to the face and eyes for detection. The system is based on real time face recognition which is fast and reliable and needs improvisation of images in various lighting environments.

IV.METHODOLOGY

Following sections deals primarily with proposed techniques, methodologies and concepts relevant to facial recognition and image processing which is more specific and niche to a single process which uses facial recognition algorithms image processing techniques. The proposed project includes four sequential phases; namely capture ,detection, image matching and attendance marking.

1.**Database creation and training**

Original database containing the images of the students is created by taking a live real time video of the students, and splitting the video into thirty frames, converting them to gray scale and storing only the faces of the students as images, then we will be training the respective images using the LBPH algorithm all the while storing their respective histogram value's and then comparing the stored and trained images against the captured images to mark the attendance. The software used for splitting the video into frames is Open-CV.

2. **Image Capturing Step**

In following step the professor will capture a real time video of the class room or lecture hall by means of their own mobile device and making use of the DroidCam application which links the system that is running on your laptop to your mobile device and lets you use your mobile camera to capture the students present in the class room, the system can be accessed by the professors by accessing the laptop where all the data is stored.

3. **Image Detection Step**

In this second phase once the video has begun capturing, simultaneously the Haar Cascade algorithm is applied to the video to get individual faces of the students and obtaining the distinct features of their face(eyes, nose, ears and lips) by making use of line features and edge features, the Haar cascade algorithm basically works by giving us the parts of the face that are needed most for detection i.e, the ROI (Region of Interest) and processing and cropping out other regions of the face that do not play a role in the image processing and matching part. Once the faces are detected they are extracted and stored.

4.**Image Matching Step**

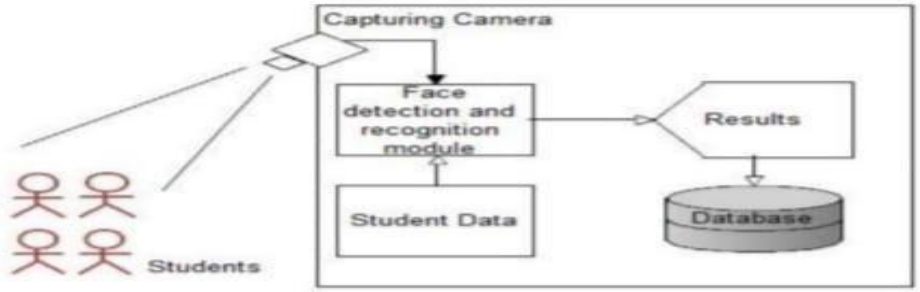
In this third and most crucial phase of recognising the student, that is comparing captured image against the stored images in the database, this method is done by making use of the LBPH algorithm(Local Binary Pattern Histogram), each image stored in the database has it's histogram value calculated and is cross checked against the calculated Histogram value of the images extracted from the captured video feed. The name of the student appears above and the number indicates the confidence. Note: Lower the confidence number higher is the

accuracy. As we can see from Fig. 5, the system not only detects just one face of a single student, but of multiple students or faces. As the system works for three faces at once by law of induction we can say that it will work for at least more than 15 faces at a single time.

5.**Attendance Marking Phase**

In this phase the attendance is marked, if the uploaded image matches the image stored in the database, then the attendance is marked present for that lecture and saved, but if any student goes unrecognized then that particular image is stored in the secondary database and an alert is generated for the admin.

6.**Proposed Architecture**



The architecture for the proposed system has been designed to keep it pretty straightforward and easy to understand. The steps that have to be undertaken to reach the final end step of the system which is making sure the attendance of the student is updated correctly and timely. The system can easily be accessed by anyone, where attendance of the students can easily be checked and maintained by the faculty as when required. The DroidCam ap will allow easy use for capturing live video feeds of the class and simultaneously perform recognition for the students. OpenCV-Python will be used to access the Haar Cascade and LBPH algorithms and their libraries that are required for training, recognition and matching of the captured images against the stored images available in the previously acquired data sets. Algorithms being used:

1. HaarCascade

The HaarCascade algorithm is a set of classifiers used for object detection. Haar Cascade is a machine learningbased approach where a lot of positive and negative images are used to train the classifier. The images which we would like to be classified by the classifier are known as positive images and the images we would not want our classifier to classify are known as negative images.

2. Local Binary Pattern Histogram

The Local Binary Pattern is used for face recognition, which means identifying the captured image against the image already stored in the database. The algorithm makes use of four main parameters to recognise a face. The Local Binary Pattern is applied to the image and compared against the central pixel of the image, then we calculate the histogram value for the said lbp image. The value of the newly calculated histogram is then compared against the already pre-processed histogram value of the already stored image in the database. This is how the Local Binary Pattern Histogram carries out facial identification of images.

V.RESULT AND DISCUSSION

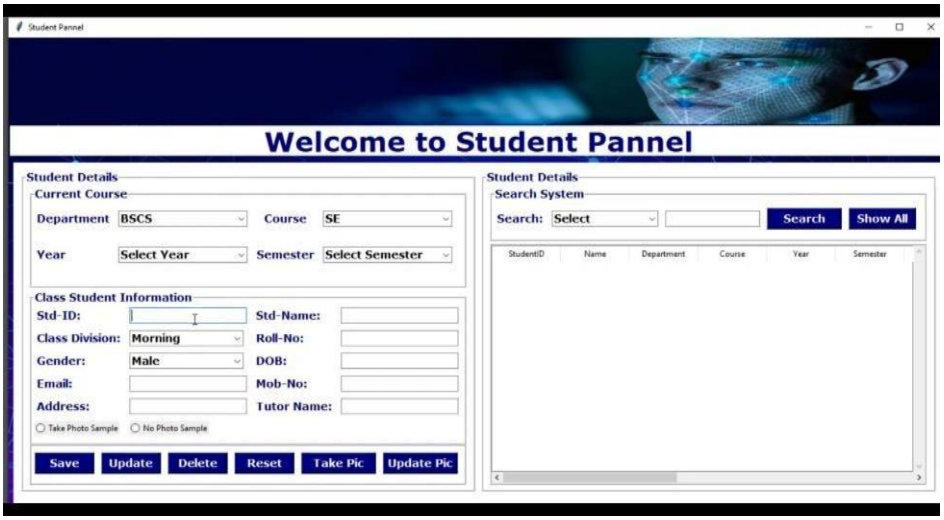
The Result and Discussion about Smart attendance system using Facial Recognition system using HaarcascadeOpencvHaarcascadeOpencv(Object Detection) and LBPH Local Binary Pattern (LBP) algorithmns.

1.Result

The section shows the result in the form of screenshots(step by step working of system).

- Home Interface

- Student Portal



Training Panel

2.Discussion

This proposed approach provides a method to perform face recognition for student attendance system, which is based on the texture based features of facial images. Face recognition is the identification of an individual by comparing his/her real-time captured image with stored images in database of that person. Thus, training set has to be chosen based on the latest appearance of an individual other than taking important factor for instance illumination into consideration.

VI. CONCLUSION

Proposed system is designed to reduced the human effort for taking the attendance manually which take place in every organization. the attendance marking process is completed without any humaninstrision, which is the main scope in the system, the goal is completed.

VII. FUTURE WORK

In future, the work can be expanded to process face recognition technique on various degree of angle upto which the system can be recognize. This work can also be expanded to mark attendance for similar twins where a minute change can be noted from the face of the
similar ones.

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