REAL TIME SMART ATTENDANCE MONITORING MODEL BASED ON FACE RECOGNITION

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ABSTRACT

Educational institutes these days are worried mostly on the consistency of student’s performance. One explanation for this decrease in scholar overall performance is the insufficiency in attendance. There are numerous approaches to mark a student’s attendance, and the most common way is by calling the student’s name or roll number or the signature of the students. It takes lot of time and sometimes becomes difficult. To overcome this, an automated and computer-based student attendance checking system is required that helps the institutes in holding the facts about student’s attendance. We have used an intelligent attendance system primarily based on face recognition in this project. We have proposed and enforced a "Real time smart attendance monitoring model based on face recognition" within which huge packages are integrated. The prevailing implementation consists of facial identification that is time saving and eradicates the possibilities of proxy attendance.

OpenCV, NumPy and pandas libraries from python are the primary necessities for this system. This system compares the photo of the student taken at the time of attendance and compares with the training image and then determines who is and is not present. The attendance facts are stored in an excel sheet that is robotically up to date inside the system. The proposed device proved to be a strong tool for taking attendance in a school room without any time intake and manual work. The system evolved is cost-efficient and needs less installation.

Key-Words: Attendance, OpenCV, camera, face recognition, pandas, face detection, numpy.

I. INTRODUCTION

In a classroom, taking attendance is one of the hectic and time-consuming things to do for a lecture, specifically in a study room of 70-80+ college students. Some of these hand-written documents of attendance inside the form of statistical information is hard to compute and analyze manually. And these strategies are more vulnerable to false attendance or proxy. As a way to this many people came up with various other strategies to record attendance of a student. Some other fine solutions have been scanning identification using fingerprint sensors and face recognition systems. Each of these has its own benefits and drawbacks. Despite the fact that fingerprint approach is considered the pleasant biometric system for identification of a man or woman, it is alternatively greater time consuming than the manual approach. Right here face recognition system is considered the quality possible solution. Now the subsequent task is to recognize these detected faces of college students. There are numerous face popularity algorithms like eigen face, PCA (Principal Component Analysis), LBPH algorithms and many others. Here we are using Haar cascade algorithm. Within the Haar cascade set of rules, as soon as the detection of faces is achieved, the faces are cropped from picture. A couple of functions of samples delivered out from those cropped images like framework of the face distance among eyes, nose, and so on. Now by evaluating those faces with pixel intensities throughout diagonals and faces inside the database, each pupil may be marked present or absent. Each pupil has to check in their face and identification like roll number, name, or unique identification directly to a database.

II. LITERATURE SURVEY

Smart Attendance Monitoring System (SAMS). “Shubhobrata Bhattacharya, Gowtham Sandeep Nainala, Prosenjit Das and Aurobinda Routray”
This page focuses are on capturing the features from the face using portable device which can fit in a classroom and the represent the face of each student using deep convolutional neural network. The input is taken from video stream and then the facial data captured is processed. Face detection is done with the help of Dlib library, since its best suited for detecting the face from video streams. Parameters considered here are, pose estimation – since it’s a real-time video and the person can move or look at other directions. This is solved by normalization. Sharpness is considered to improve the quality of the captured image from moving video stream. Image size is considered when the distance between the camera and person increases to improve face quality. Brightness is included to get the correct features which can be compromised with dark images. The final score depends on the above parameters i.e., pose estimation, sharpness, resolution and brightness. Then the representation of face is done using convolutional neural networks which is essential part and effects in the results.

Face Recognition Based Smart Attendance System. “Arun Raj, Mahammed Shoheb, Arvind K, Chethan KS”

This paper gives insights on using LBPH algorithm for recognition of face. The methodology is pretty simple. First the face is detected from the entire window and two kind of decisions come into picture here, either the face is present or not. Based on the above decisions, we move forward. Then the face recognition is done by comparing the characteristics with the already existing data. Then identify the face by authentication and verification. All this is done with LBP (Local binary patterns) algorithm, gives the outcome as binary values based on image pixels. To make this happen, first the system is trained with facial data sets each associated with the unique ID of the student. This algorithm makes use of sliding widow concept and generates some intermediate images. This generated histograms and then the unique Id of the student which best matches with the given input data’s histogram is given as output. This is a good technique but additional hardware is also required in this system.


This paper implements the smart attendance system by using Principal Component Analysis (PCA), Convolutional Neural Network (CNN) and Eigen face values. It has a basic architecture. The students and attendance details are stored in different databases. In order to mark the attendance of a person, first the person must enroll into the system and for this the primary information of the students along with their pictures are captured. Then the face is detected with the Eigen face values. The recognition of face is done using Principal Component Analysis (PCA) whose aim is to lessen the variables and represent each picture as a Eigen face. Based on the Eigen faces generated, the recognition is done. It also requires camera setup outside of the class.


This proposed methodology makes use of machine learning and Google drive to capture the attendance even in various poses and image lightning. HOG (Histogram of gradients) method is used to detect faces. Individual faces are taken from the screen with multiple faces and individual processing of the faces are done. This system basically runs from the hand of the tutor. The teacher has to intervene for taking the pictures of the classroom and upload it to the Google drive. Here Google drive’s REST API is used and whenever the pictures are uploaded during class hours, they are downloaded and then processed for face recognition then the attendance report is sent to faculty. Face-net model is used to recognize the faces here. The facial encoding for each student is done and the lesser distance between the facial encodings of trained and input image is more likely to be the result. But this method involves the faculty to explicitly capture and upload the pictures.

Student Attendance System using Face Recognition. “Samridhi Dev, Tushar Patnaik”.

This system uses machine learning algorithms to classify and recognize the faces. Basic information like student’s data and only single picture is captured and this makes use of two or three cameras placed at the ceiling of the classroom. These cameras capture the images and then a start button is clicked to begin the process of face detection. All the adjustments in the quality of images are done since the images can be blurred due to movements. Detection of faces done by considering the 68 landmarks of the face. Cascading is done for the detection of faces. Feature extraction for various facial expressions and angles is done with Gabor filters. K-nearest neighbor, support vector machine and convolutional neural networks are used for face recognition. In the KNN, the entity is determined as a final result if the majority vote than its neighbors. CNN allows us to concentrate on

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the facial features and then generate encodings used for matching the faces. But this system requires multiple cameras which may result in extra hardware.

III. PROBLEM DEFINITION

Face can be considered as an important aspect in determining a person’s identity. And so, we use face of an individual for the purpose of marking attendance automatically. Student attendance is a vital parameter in all colleges, universities and schools for determining his performance. Traditional methods for marking attendance are by manually calling the name or unique ID (roll number) of the student and then recording the response. The problem with this approach is, marking the attendance can be a strain on the teachers if done by hand. And this method also consumes time which is another point of concern. Assume that a one-on-one study session is approximately 60 minutes or an hour and to record attendance it takes for about 5 to 10 minutes.

IV. PROPOSED METHODOLOGY

In our system, the process of attendance takes place by enrolling students. To enroll a student, the basic information such as his/her name, unique Id or roll number are stored in the database and then the camera captures 60 samples for each student for better accuracy. All these pictures are then converted to grey images and stored in the database. For recognition and detection, we use OpenCV (Open-Source Computer Vision) library which offers Haar cascade algorithms that are pre-trained for various categories. The Haar Cascade algorithm is used here to detect different objects (since there can be multiple faces in a given screen) in the given images and generate filters, also called Haar features extracted from the features of images. The concept of window sliding is used here where the image is inspected portion wise (consider this as a window) with the filters. For each window the pixel intensities are calculated. After all the windows are done, the features with high probability come as a final output. For the process of recognition, the faces at the time of taking attendance, LBPH is used and features are extracted. This works on any laptop with the embedded camera and doesn't require any complex installation. Students are captured with this camera and attendance is then marked in the excelsheet.

V. SYSTEM ARCHITECTURE

Fig:1 Flow of activities during the application usage
VI. RESULTS

Fig:2 Initial Screen

Fig:3 Enter Student Data

Fig:4 Capture Student Pictures After enrolling, click on take attendance.

Fig:5 Take Attendance

Fig:6 Show attendance on screen
The Face recognition based smart attendance system can be established as an effective
system in classrooms, laboratories, workplace and security purposes. This approach overcomes the drawbacks of
the traditional attendance marking system and among all other biometric system face recognition has excellent
performance. The chances of having proxy attendance can be reduced by in this way. By using the Haar cascade
for frontal face detection and LBPH for face recognition, we can get 99.38 percent accurate results since we are
gathering for about 60 samples for each student.

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