Attendance System Using Face Recognition Technique

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Abstract: **The management of the attendance which is manual in fashion will create a huge burden on staff. This primitive fashion of attendance system where staff calls a student by his name or roll no. or the sheet is passed around the whole class for taking signatures on it, which can be easily manipulated by students. Many more technologies of attendance system like RFID, Fingerprint scanner and other biometric does exist in most of the institute or organization. These attendance systems require installations of gadgets which drives up the cost and has more maintenance and is also time consuming. This project paper aims to introduce a face recognition attendance system where no extra gadgets are required. When students will be gathered in the class, their faces will be captured from a live video feed and then compared with existing facial database of student's directory. If it matches, then the attendance is marked along with the time.**

Keywords: **attendance, fingerprint scanner, biometric, RFID, facial database**

I.   INTRODUCTION

This project mainly focusses to the attendance system, where manual attendance system will be upgraded to automated attendance system in the classroom. Most of the higher institutes in our region or state, staff takes the attendance by calling out the name, roll no. or by simply passing the attendance sheet throughout the class to mark the manual attendance of the student. This system of marking attendance is very simple and primitive and can be easily manipulated by the students or as well as staff too. In recent times, the development in the field of Artificial Intelligence, Machine Learning, Image Processing and Convolution Neural Network (CNN) has increased to a great extent, through this the facial recognition technique has reached to its greater heights and enough to be used in real world application. A Classroom is a place where there are many numbers of students and a single staff is present. It becomes a very confusing and a tedious task to mark the attendance physically and particular to each student. To overcome the situation, we have used Python as programming language and OpenCV Library to capture and detect faces of the students. The captured faces of the students will be compared and matched with the ones which are saved in the existing database of the student directory. Saved students images contained in the database help to generate the facial recognition algorithm extracts features like forehead, mouth, eyes, nose, chin, jaws. In research it is mentioned that there are 68 specific points (called landmark) that exist on every face. Face captured in camera, A facial signature is generated and will be compared with the existing signature which is saved in database. If it matches then the attendance is marked only for the ones who is present in the classroom.

II.   RELATED WORK

Step 1: Creating Encodings
The images of the students will be saved in a directory. Simultaneously one by one images will turn through a convolution neural network (CNN). This CNN will return 128 measurements for each face. CNN knows better which part of the faces to take to generate these 128 measurements. The parts of faces which generates measurements are unknown to us.

Step 2: Face Detection
We don't require the colour like data to find faces, the first primary job is to convert the image into black and white. After this the pixel analysis is performed. It will analyse each and every pixel in the image as well as the neighbouring pixel. The process of figuring out how dark or light a particular pixel is a compared to nearby pixels is called arrow shadowing. These arrows are called gradients and they show the flow from light to dark across the entire image. Then the convolution neural network is applied and start breaking the image into small squares of 16x6 pixel each. Each of the square count up the gradient points in each major direction.

Step 3: Posing and Projecting Faces
When the face is being isolated in an image due to any issue, we have to deal with the problem that faces which turned in different direction look totally different to a computer. To overcome to this problem, we will warp the image so that the eyes and lips are always in the sample place in the image. Through this we will be using algorithm known as face landmark estimation. The basic idea of this algorithm it will point out the 68 specific points which exist on every face. Outside edge of eye, top of the chin, inner edge of the eyebrow, etc. Machine learning algorithm is trained to point out the 68 specific points on any face. From this stage of recognition, we know where the eyes and mouth are, we will simply rotate, scale and shear the image so that the eyes and mouth are cantered as best as possible. Now it doesn't matter how the face is turned, we are able to centre the eyes and mouth are in roughly the same position in the picture. This will make our next step lot easier and more accurate.

Step 4: Encoding Faces

The easiest and simplest way to approach to the main technique which is face recognition is to directly compare the unknown face. The thing we need to extract is few basic measurements from each face. Then only we could measure the unknown face the same way and will find the known face with the closest measurements. As we can explain you is like the size of each ear, the spacing between the eyes, the length of the nose, position of the nose, position and size of the forehead etc. Research and studies have discovered that the most accurate approach is to let the computer figure out the measurements to properly match and compare it after collecting the information. Deep learning is the concept where it does a lenient and better job than human at figuring out which parts of the face are important to compare and measure. Typically, as said earlier in the context, 128 different features of the images are collected through deep learning concept.

Step 5: Finding person's name from the encoding

In this task the final task we need to compare and match the detected and recognized person's name from our database and mark the attendance for the specific person.

III.EXISTING SYSTEM

Face Recognition-Based Mobile Automatic Classroom Attendance Management System:
System requires input from faculty and uses cloud for face recognition and other computational needs. Face recognition could be further tested by other face recognition techniques, such as Support Vector Machine, Hidden Markov Model, Neural Networks, etc. Additionally, detection and recognition processes could be performed on smart devices once their processor capacity is sufficiently increased.

Design of Intelligent Classroom Attendance System Based on Face Recognition:
In this system, Alex Net Convolutional Neural Network. It uses a highly parallel GPU acceleration technology and deepening the number of network layers, and using the ReLU activation function and adding Dropout effectively prevent network overfitting. We verify the necessity and effectiveness of the improvement from multiple angles, then introduces the application of RFID in the system.

Smart Attendance Monitoring System (SAMS): A Face Recognition based Attendance System for Classroom Environment:

A face detection framework that is capable of processing images extremely rapidly while achieving high detection rates. There are three key contributions. The first is the introduction of a new image representation called the "Integral Image" which allows the features used by our detector to be computed very quickly. The second is a simple and efficient classifier which is built using the AdaBoost learning algorithm (Freund and Schapire, 1995) to select a small number of critical visual features from a very large set of potential features. The third contribution is a method for combining classifiers in a "cascade" which allows background regions of the image to be quickly discarded while spending more computation on promising face-like regions.

Smart Attendance Management System:
The proposed system is very user friendly. The reason is the retrieval and storing of data is fast and data is maintained efficiently. Furthermore, the graphical user interface is provided in the proposed system, which provides user to deal with the system very comfortably.

IV.   PROPOSED SYSTEM

In proposed system, we have used Python as programming language and OpenCV Library to capture and detect faces of the students. The captured faces of the students will be compared and matched with the ones which are saved in the existing database of the student directory. Saved students images contained in the database help to generate the facial recognition algorithm extracts features like forehead, mouth, eyes, nose, chin, jaws. In research it is mentioned that there are 68 specific points (called landmark) that exist on every face. Face captured in camera, A facial signature is generated and will be compared with the existing signature which is saved in database. If it matches then the attendance is marked only for the ones who is present in the classroom. The track of the robot in your smart phone itself.

Step 1: A picture of student's face is captured from a photo or video. The face might appear as a single or in a crowd. The image may show looking straight ahead or nearly in profile.

Step 2: Facial recognition technique reads the geometry of the face. Main important factors include the distance between eyes the distance between the forehead and chin. The software identifies facial landmarks on system identifies 68 of them that are key for distinguishing the face. Hence the result is stored in our facial signature which is generated.

Step 3: The generated facial signature is now compared with a database which is saved which has saved faces.

Step 4: A conviction is made. The face print may match that of an image in a facial recognition system database

Step 5: After comparison, match is found and then the attendance is marked in the attendance database.

V. CONCLUSION

The proposed automated face detection attendance system using face recognition, deep learning concepts is a great model for marking the attendance of students in a classroom. This system assists in overcoming the great chances of proxies and fake attendance which in turn a great mental loss of the students who are always present. In today's environment many institutes, organization uses biometrics which is easily available but at higher maintenance and cost consuming. However, the facial recognition turns out to be a simplest and easiest option because of its high accuracy along with less human intervention. This project or this system which we are implementing is aimed to provide a significant level of security. Hence a highly pro efficient attendance system is developed which can perform recognition on multiple faces at single instance. Also, there is no requirement of any special hardware or gadgets for its implementation. A camera, Computer machine, and Database Server machine is sufficient for constructing our smart attendance system.

VI. ACKNOWLEDGEMENT

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