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ADVANCED MULTI-USER ATTENDANCE MARKING SYSTEM

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Abstract: The manual attendance marking system is a difficult task to the teachers because it is done by hand. To avoid this problem, we are proposing a smart and automated attendance marking system. But in this system authentication is an important key feature. The smart attendance system is generally executed with the help of biometrics. Face recognition is one of the biometric methods to improve this system. Being a prime feature of biometric verification, facial recognition is being used enormously in several such applications, like video monitoring and CCTV footage system, an interaction between computer & humans and access systems present indoors and network security. By utilizing this framework, the problem of proxies and students being marked present even though they are not physically present can easily be solved. The main implementation steps used in this type of system are face detection and recognizing the detected face. This paper proposes a model for implementing an automated attendance management system for students of a class by making use of face recognition technique, by using Haar cascade classifier, LBP(Local Binary Pattern). After using these, the recognized faces compared with the database for the authentication. This proposal will be a successful for marking the attendance and managing the students records.

1. Introduction

In the modern days, Image processing is a widely used technology which is used to extract the useful information from a digital image. It is mainly focusses on two tasks

- Improving the information of digital image.
- Processing of digital image data for storing, which can understandable by machine.

Here in our proposal we are using the computer vision technology along with the machine learning and deep learning technologies.

Facial recognition is one of the biometric application which is a unique key feature of human. In human face is a multidimensional structure which need to be recognized. Biometric methods like fingerprint, iris are used for the purpose of recognition. But they are time consuming processes because at a time one person will be recognized.

Every institute, university, college, schools are maintained attendance of every student. There is a relation between the students attendances and their academic performances. There was also a claim stated that the students who are having poor attendance records will

generally link to poor retention.

Therefore, faculty has to maintain accurate record for the attendance. The manual attendance management system is not efficient to calculate the average attendance of each student and also it requires more time to arrange the record of each individual. Hence there is solution for the problem of student record arrangement and the calculation of student average attendance. Here the solution to make automatic student attendance system is provided by using facial recognition.

2. Literature Review

In this paper we are discussing the system is to capture the face of the each student and to store in the database for their attendance. The face of the student needs to be detected, even the seating and the posture of the student need to be recognized. There is no need for the teacher to take attendance manually in the classroom because in this system the camera captures a continuous video and gives it to the further processing steps and then the face is being recognized and the attendance database is updated. For all this we are using computer vision which includes Haar cascade classifier and Local Binary patterns.



Fig.1. system architecture

What happened there when a person is being captured by the camera. Let us see the block diagram in figure describes the system for Face Recognition based attendance marking system. The system requires a camera installed in the classroom at a position where it could capture all the student faces in the classroom effectively. Then the captured image is processed to get the desired results. The entire working is explained in brief below:

Capturing Camera: For capturing the face of the student the Camera is installed in a classroom. The camera has to be placed in a classroom such that it captures the face of all the students effectively. For further processing this camera has to be interfaced to computer system either through a wired or a wireless network. We are using an in-built camera of the laptop in our prototype.

3. How An Image Processing Is Done?

In this we are applying Facial recognition algorithm on the captured image. The image is cropped and stored for processing. Then the module recognizes the images of the students face which have been already registered manually are stored in the database with their respective names and ID codes. We use PYTHON for all the image processing and acquisition operations. The whole process requires the following steps:

Train Database: Initially we take facial image of the students who are enrolled in a particular organization. In our system we

have taken a few images each. This data can be used later in the facial recognition algorithm. It is done using Image Acquisition Toolbox of the PYTHON. After that all the cropped image of the individual face is resized to a 240 X 300 image.

4. The Process Of Detecting The Face and Cropping

For detecting the face the captured image of the classroom is initially scanned. This is done by using the function `vision.CascadeObjectDetector()` in Computer Vision Toolbox. This function completely works on the basis of Viola- Jones algorithm. This algorithm mostly focusses on speed and reliability. Then the detected faces are cropped and resized to a 240 X 300 image, same as the train database.

The algorithms that are been implemented in our proto-type are as follows:

- **Haar-Cascade Classifier:**

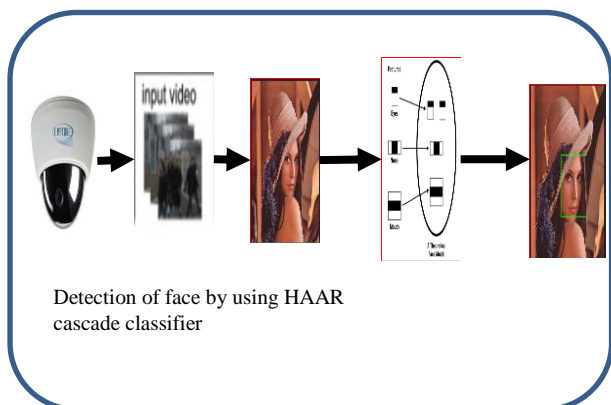


Fig.2. Haar-Cascade Classifier

The Haar-Cascade classifier is mainly used to detect the image that is been captured in the video recording process. Face detection is the process in which algorithms are developed and trained to properly locate faces or objects in images. Face detection uses classifiers, which are algorithms that detects what is a either a face(1) or not a face(0) in an image. Haar-Cascade Classifier is trained from a lot of positive and negative images. It takes an input video that is recorded from the camera, divides that video into frames which are nothing but images and detects the individual faces of the students that are recorded. By taking an individual image it further detects the facial features of the image that is been captured and detected in the video. Further it extracts the important features of the face in the image an of individual for the further processing. The camera that is been placed records the video of the classroom where it captures the student's faces for the whole day and marks the attendance by the period of time that is been given to be marked.

5. How Face Recognition Is Working Based on ?

For recognizing the face, the key feature landmarks are refined and the face is normalized with eyes and month in fixed landmarks. To train a frontal Eigen space, and the leading three eigenvectors are retained we are using images from the face tracker. A single eigen space is enough to the face images have been warped into frontal views. Face recognition is then performed by using the Eigen face approach with additional temporal information added.

- **LBP(Local Binary Patterns)**

The Local Binary Pattern Algorithm(LBP) takes the detected image that is converted into Gray Scale image. LBP combined with Histograms of Oriented Gradients(HOG) descriptor for improves the detection performance. It provides the patterns that are combined with the histograms and defines the values for the image of the pixels. The centered value is known as the Threshold Value and the value greater than the threshold value is denoted with 1 and the value lesser then the threshold value is denoted with 0. Further it defines the values for the binary values ,convert that binary value into decimal value .By using that decimal value it will transform it into histogram ,for the entire image all histograms are combined and gives one histogram and provides a unique id for the image. It stores the unique id of the individual in the database with the individual name and registered id. The LBP algorithm combines with the histograms to give a unique id value for every individual in the class as the unique value helps easily to mark the attendance as the value is been stored in the trained data set for every individual. The value that is been stored in the trained data set will be compared with the value that is been formed with the combination of lbp and histograms. It checks the value and compares the value when compared if matches it marks the attendance of the individual. In this

manner the attendance will be marked to the students of the particular class.

- **Attendance Recording:** For easy-to-use

the output format here we are using Excel Spreadsheet to store the recorded attendance, which is a familiar to majority of the institution staffs. This is done by using Spreadsheet Link EX toolbox. If a particular student is recognized, then the corresponding cell is Updated with '1', else a '0'. Using the Excel formatting, we can retrieve the information effectively.

6. Conclusion And Future Prospects

In this system we have implemented an attendance system for an institution, organization or a laboratory by which faculty or teaching assistant can record students' attendance. It saves the time and effort of the faculty, especially if it is a lecture with huge number of students. This Automated Attendance System overcomes the drawbacks in the traditional (manual) system.

This attendance system demonstrates the use of image processing techniques in classroom. This system can not only merely help in the attendance system, but also improve the goodwill of an institution. standalone module which can be installed in the classroom having access to internet, preferably a wireless system. By improving the applications of this project we are

developing the above things greatly.

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8. References

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