**Automatic Attendance Management System Using Face Recognition in Classroom Environment**

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***Abstract-***Student attendance check plays an important role in study activities, its giving a contribution factor to student participation and the final success in student courses. Sometimes taking attendance by calling out student names or passing around an attendance sheet are time consuming and it's easily to be fraud. Nowadays many attendance method can be alternative like using RFID, fingerprint, wireless, iris and face recognition. The face is the identity of specific person and face recognition become the famous one authentication in recent years. Face recognition system itself defined as an application of computer vision and image processing which is capable of performing two major tasks of identifying and verifying a person from an image or a video database. This paper presents the automatic attendance management system by integrating the face recognition technology using Eigen Face database and PCA (Personal Component Analysis) algorithm. The system will record the attendance of students in class room environment automatically and it will provide the facilities to the faculty to access the information of the students easily by maintaining log for clock-in and clock-out time.

**I.1 Introduction**

In school environment, attendance check is used to record when student start and stop study, also used to keep detailed records of attendance issues such as sick leave and who comes in late[1]. There are a lots of schools in which thousands of students are taking the education, with large number of students it is a very tedious, inefficient and time consuming to take the attendance manually. To resolve this problem of attendance issue, many attendance management system have been develop in recent years. In 2013, Bhalla et.al [2] have proposed blue-tooth attendance system. The architecture of blue-tooth based is an application software that installed in mobile phone, it enables to register the attendance via blue-tooth connection and transfer the notification to the lecturer. S.S. Mahat et.al [3] tried to implement a mobile base attendance system by develop mobile phone detection system which use RF technology to attendance taking and detecting use of mobile phone in the classroom. NFC based attendance system also implemented by M.A. Ayu [4] using fingerprint and blue-tooth address of the user to authenticate the identity of the user. It used java based desktop application to receive the NFC tag IDs, other information associated with the mobile phone and user.

However, most of those systems above have respective limitations in portability, accessibility, authenticity and costs. To resolve those limitations, author endeavour to overcome the shortcomings of the respective systems leads to the development of attendance monitoring system based on face recognition. Face recognition technique become one of the most efficient biometric technique for people identification. The process of this face recognition system divided into various steps, the important steps are face detection and face recognition. First steps is taking image of students and store it to the database using their general information. This image can be snapped from the camera device and will be placed in the classroom with at the suitable location from where the whole classroom can be covered by camera device. The captured image will be treat as input to the system. To make it effective, the captured image needs to be enhanced by using some image processing techniques like greyscale conversion of image and histogram equalization[5]. To identify the students who sitting on the last rows, the histogram equalization of image needs to be done. After enhancing the image quality, the image will be passed into face detection process. In face detection process, various algorithm like Ada-Boost algorithm, neural networks, support vector machines are needed to be implement. Ada-Boost algorithm is most effective of all of those various algorithm. Ada-Boost algorithm itself is an iterative algorithm which has Haar features and the calculation of eigenvalues to detecting faces of students[6].

After detecting faces of students from image, the face is needed to be recognize. There are various techniques that can be used to face recognition like Eigen face, PCA and LDA hybrid algorithm. Due to its simplicity, speed and learning capability, Eigen face method is used in face recognition. Eigen face method are principal components of a distribution of faces, or equivalently, the eigen vectors contains of the set of the face images[7]. Eigen vectors contains set of the face images means when faces are detected, it will cropped from image. Each student’s face is cropped and then various features are extracted from that image like distance between eyes, nose, and outline face. Using these features, the face of student are recognized and their attendance is marked by comparing them with the face database. A database of faces is needed to be created for the purpose of comparison with extracted image from eigen features. By enrolling the database, information of students like identity number, student’s name, and student’s photo can be maintain.

By continuously observing the face information using eigen face features, this approach can solve low effectiveness of existing face detection technology, improve the accuracy of face recognition, and can improve the traditional attendance management system as well.

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