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Attendance Monitoring System Using Face with SMS Notification Using Machine Learning

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ABSTRACT: AlgorithmThe face is one of the easiest ways to distinguish the individual identity of each other. Face recognition is a personal identification system that uses personal characteristics of a person to identify the person's identity. Human face recognition procedure basically consists of two phases, namely face detection, where this process takes place very rapidly in humans, except under conditions where the object is located at a short distance away, the next is the introduction, which recognize a face as individuals. Stage is then replicated and developed as a model for facial image recognition (face recognition) is one of the much-studied biometrics technology and developed by experts. There are two kinds of methods that are currently popular in developed face recognition pattern namely, Eigenface method and Fisherface method . Being one of the most successful applications of image processing, face recognition has a vital role in the technical field especially in the field of security purposes. Human face recognition is an important field for verification purposes especially in the case of student's attendance. This paper is aimed at implementing a digitized system for attendance recording. Current attendance marking methods are monotonous & time consuming. Manually recorded attendance can be easily manipulated. Hence the paper is proposed to tackle all these issues. Python is connected to Android Apps. When the system detects a face, the attendance of that person will be updated automatically on the Android app.

I. INTRODUCTION

The human face is a sophisticated multidimensional structure that can convey a lot of information about the individual, including expression, feeling, and facial features. Effectively and efficiently analysing the features related to facial information is a challenging task that requires a lot of time and effort. Recently, many facial recognition-based algorithms for automatic attendance management has been proposed and also new algorithms developed or some existing algorithms improved or combined with other methods, techniques, or algorithms to build facial recognition systems or applications.

Maintaining attendance is very important in all learning institutes for checking the performance of students. In most learning institutions, student attendances are manually taken by the use of attendance sheets issued by the department heads as part of regulation. The students sign in these sheets which are then filled or manually logged in to a computer for future analysis. This method is tedious, time consuming and inaccurate as some students often sign for their absent colleagues.This method also makes it difficult to track the attendance of individual students in large classroom environment. In this project, we propose the design and use of a face detection and recognition system to automatically detect students attending a lecture in a classroom and mark their attendance by recognizing their faces.

1.1 Problem Statement:

The traditional manual methods of monitoring student attendance in lectures are tedious as the signed attendance sheets have to be manually logged in to a computer system for analysis. This is tedious, time consuming and prone to inaccuracies as some students in the department often sign for their absent colleagues, rendering this method ineffective in tracking the students' class attendance. Use of the face detection and recognition system in lieu of the traditional methods will provide a fast and effective method of capturing student attendance accurately while offering a 2 secure, stable and robust storage of the system records, where upon authorization; one can access them for purposes like administration, parents or even the students themselves

1.2 Literature Survey

E.Varadharajan,R.Dharani et.al [1] is about the biometric attendance management. In this method the camera is fixed in the classroom and it will capture the image, the faces are detected and then it is recognized with the database and finally the attendance is marked. If the attendance is marked as absent the message about the student's absent is send to their parents. The Eigen face method is used to recognize face. Eigen faces is set of Eigen vectors which are used in computer vision problem of face recognition.

Sujay Patole1 et.al [2] the system proposed in provides features such as detection of faces, extraction of the features, detection of extracted features, and analysis of student's attendance. The proposed system integrates techniques such as Principal Component Analysis (PCA) for feature extraction and voila-jones for face detection Euclidean distance classifier. Faces are recognized using PCA, using the database that contains images of students and is used to recognize student using the captured image.

B Prabhavathi et.al [3] spontaneous presence for students in classroom is presented. At first classroom image has been in use and after that image is kept in data record. For the images that are stored in the database we apply system algorithm which includes steps such as, histogram classification, noise removal, face detection and face recognition methods. So by using these steps we detect the faces and then compare it with the database. The attendance gets marked automatically if the system recognizes the faces. The work described in

Ashish Choudhary1 et.al [4] aims at automating the whole process. The camera installed will take a picture of the whole classroom, followed by detecting individual faces in the image, recognizing the students and then updating their attendance. The image will be captured twice-once at the beginning of the class and once at the end to ensure that the student has attended the whole class.

The face recognition method proposed in [5] was very sensitive to face background and head orientations. Changes in the illumination did not cause a major problem to the system. Besides, presence of small detail such as dark glasses or masks was too far from being a real challenge to the system. There exists a trade-off between the correct recognition rate and the threshold value. As the threshold value increases, numbers of misses begin to decrease, possibly resulting in misclassifications. The Eigen method is used here to detect face. The system proposed in [6] consists of a high resolution digital camera to monitor the classroom or office room. It is embedded on a micro-controller based motor system which enables it to rotate in left & right directions. The data or images obtained by the camera are sent to a computer programmed system for further analysis. The obtained images are then compared with a set of reference images of each of the employees or students & mark the corresponding attendance. The system also provides for continuous monitoring of the classroom by an operator if needed. The camera module can be a wireless or wired system.

This system [17] can be implemented for better results regarding the management of attendance and leaves. The system will save time, reduce the amount of work the administration has to do and will replace the stationery material with electronic apparatus and reduces the amount of human resource required for the purpose. Hence a system with expected results has been developed but there is still some room for improvement.

II. PROPOSED SYSTEM ARCHITECTURE

2.1 Input image:

Camera captures image of note and is feed as input to the MATLAB for further processing.

2.2 Pre-processing:

Pre-processing images commonly involves removing low-frequency background noise, normalizing the intensity of individual particles images, removing reflections, and masking portions of images. Image pre-processing is the technique of enhancing data images prior to computational processing.

2.3 Feature extraction:

Feature extraction involves reducing the amount of resources required to describe a large set of data. When performing analysis of complex data one of the major problems stems from the number of variables involved. We are using Wavelet transform to extract features like RMS value, average, entropy of image.

2.4 Classification:

Image classification refers to the task of extracting information classes from two or many class of image.

2.5 Output is displayed on the Mobile App

Python is connected to Android App. When the system detects a face, the attendance of that person will be updated automatically on Android app.

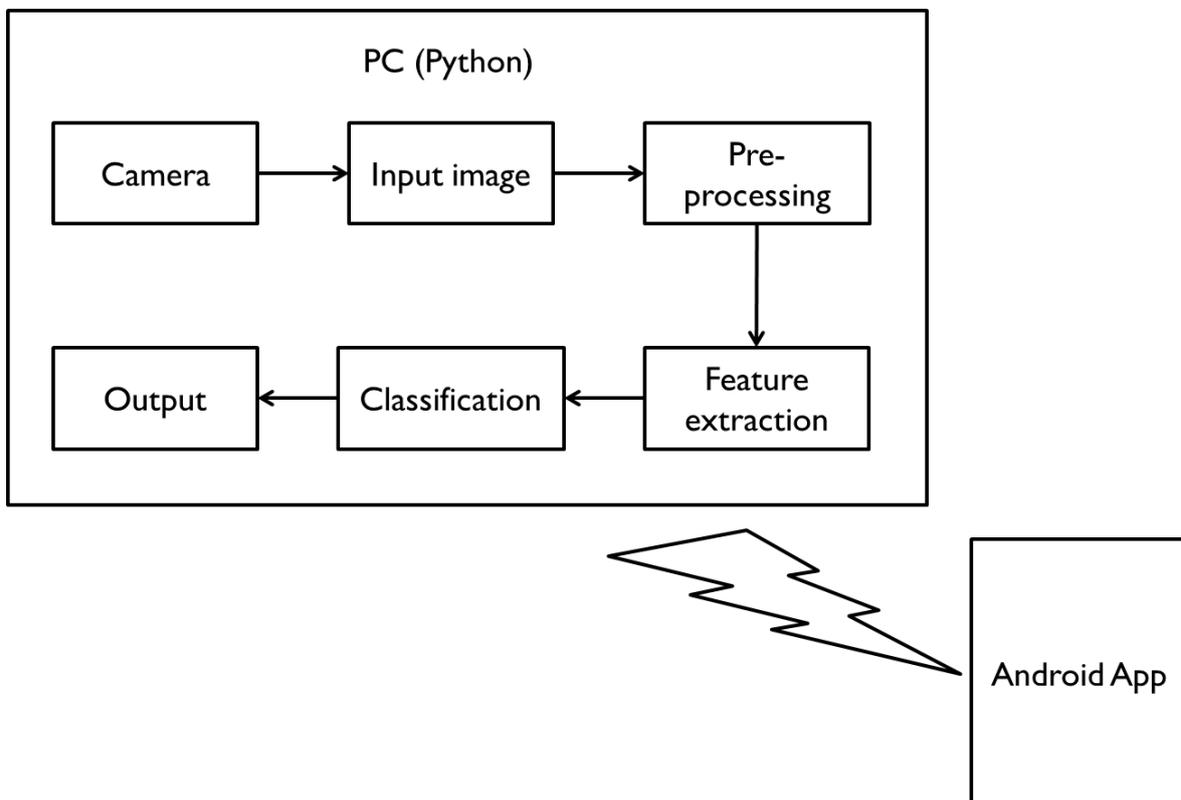


Fig. No 1 - System Architecture



III. METHODOLOGY

3.1 SOFTWARE SYSTEM DESIGN:

Pre-processing:

1. Image pre-processing is an essential step of detection in order to remove noise such as hair clothing and other artifacts and enhance the quality of original image.
2. The main purpose of this step is to improve the quality of skin image by removing unrelated and surplus parts in the back ground of image for further processing.
3. Good selection of pre-processing techniques can greatly improve the accuracy of the system.

Segmentation:

1. Image segmentation is a technique to determine the shape and size of the border.
2. It separates the object from its background based on different features extracted from the image.
3. After removing the noise and hair from the lesion area, the lesion needs to be separated from the skin.

Feature Classification:

1. Selected features are used for the recognition and classification of benign and malignant lesions.
2. A wide range of classifiers can be built and used for this purpose.
3. Classifiers such as SVM, C4.5 can be used for this purpose.

Feature Extraction:

1. A feature is a piece of information which is relevant for solving the computational task related to a certain application.
2. Feature extraction is the process of extracting this information from an image.

IV. CONCLUSION

It can be concluded that a reliable, secure, fast and an efficient class attendance management system has been developed replacing a manual and unreliable system. This face detection and recognition system will save time reduce the amount of work done by the administration and replace the stationery material currently in use with already existent electronic equipment. There is no need for specialized hardware for installing the system as it only uses a computer and a camera. The camera plays a crucial role in the working of the system hence the image quality and performance of the camera in real time scenario must be tested especially if the system is operated from a live camera feed. The system can also be used in permission based systems and secure access authentication (restricted facilities) for access management, home video surveillance systems for personal security or law enforcement.

V. FUTURE SCOPE

The joint efforts of the whole face recognition research community have made few applications of real-world face recognition achievable, but there are still several challenges to address and opportunities to explore for designing mature face recognition systems that can work in highly challenging environments and with images typically found within the social media environment. Hence, significant new research is required to address the aforementioned technical challenges of face recognition. To address these issues, either invariant features should be extracted to describe face image or devolve modern machine learning algorithms for learning robust representation of the face.

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