

Face Recognition Based Attendance System Using Machine Learning

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ABSTRACT

The identification of person from the facial features is referred as face recognition. Automatic face recognition (AFR) technologies have seen dramatic improvements in performance over the past years, and such systems are now widely used for security and commercial applications. An automated system for human face recognition in a real time background which can be useful for a college to mark the attendance of their students . So using Real Time Face Recognition is a real world solution which comes with day to day activities of handling various activities. The task is very difficult as the real time background subtraction in an image is still a challenge . To detect real time human face are used and a simple fast Principal Component Analysis has used to recognize the faces detected with a high accuracy rate. The matched face is used to detect accurate user .Our system maintains the collection of user facial features as datasets and use them for verification.

Keywords : Face Recognition, Automatic Face Recognition (AFR), automated system.

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1. INTRODUCTION

Maintaining the attendance is very important in all the institutes for checking the performance of employees (1). Every institute has its own method in this regard. Some are taking attendance manually using the old paper or file based approach and some have adopted methods of automatic attendance using some biometric techniques. But in these methods employees have to wait for long time in making a queue at time they enter the office(3). Many biometric systems are available but the key authentications are same is all the techniques. Every biometric system consists of enrolment process in which unique features of a person is stored in the database and then there are processes of identification and verification. These two processes compare the biometric feature of a person with previously stored template captured at the time of enrollment. Biometric templates can be of many types like Fingerprints, Eye Iris, Face, Hand Geometry, Signature, Gait and voice. Our system uses the face recognition approach for the automatic attendance of employees in the office room environment without employees' intervention(2).

Face recognition consists of two steps, in first step faces are detected in the image and then these detected faces are compared with the database for verification(4)(5). A number of methods have been proposed for face detection i.e. Ada Boost algorithm, the Float Boost algorithm, the S-Ada Boost algorithm Support Vector Machines (SVM), and the Bayes classifier. The efficiency of face recognition algorithm can be increased with the fast face detection algorithm. In all the above methods SURF is most efficient (6). Our system utilized this algorithm for the detection of faces in the office room image. Face recognition techniques can be Divided into two types Appearance based which use texture features that is applied to whole face or some specific Regions, other is Featurebased which uses geometric features like mouth, nose, eyes, eye brows, cheeks and Relation between them. Statistical tools such as Linear Discriminant Analysis (LDA), Principal Component Analysis (PCA), Kernel Methods, and Neural Networks, Eigen-faces have been used for construction of face templates. Illumination invariant algorithm is utilized for removing the lighting effect inside the office room (7).

PROJECTFEATURES

The traditional approach has many problems such as time consuming, slow and inefficient.

This project aims to make the process of attendance taking in real time easier.

- SIMPLE AND SMART – Easy for everyone to use.
- ROBUSTNESS – Sustain during invalid scenarios.
- COST EFFECTIVE – Priced low for everyone to use.
- LIGHTER AND EFFICIENT – Low load on the hardware/resources.

2. LITERATURE SURVEY :

As one of the most successful applications of image analysis and understanding, face recognition has recently received significant attention, especially during the past several years. At least two reasons account for this trend: the first is the wide range of commercial and law enforcement applications, and the second is the availability of feasible technologies after 30 years of research. Even though current machine recognition systems have reached a certain level of maturity, their success is limited by the conditions imposed by many real applications. For example, recognition of face images acquired in an outdoor environment with changes in illumination and/or pose remains a largely unsolved problem. In other words, current systems are still far away from the capability of the human perception system (8)(9). This paper provides an up-to-date critical survey of still- and video-based face recognition research. There are two underlying motivations for us to write this survey paper: the first is to provide an up-to-date review of the existing literature, and the second is to offer some insights into the studies of machine recognition of faces (10). To provide a comprehensive survey, we not only categorize existing recognition techniques but also present detailed descriptions of representative methods within each category. In addition, relevant topics such as psychophysical studies, system evaluation, and issues of illumination and pose variation are covered (11)(12).

Face recognition is a technique of biometric recognition. It is considered to be one of the most successful applications of image analysis and processing; that is the main reason behind the great attention it has been given in the past several years.

Sujata G. Bhele [15] presents face detection systems reviews. This paper is mostly focused on the soft computing methods like SVM, ANN etc. to detect the face. These approaches may give better results. This paper discussed the different features extraction algorithms like PCA, LDA and ICA. In this paper some problems are also mentioned which reduce accuracy like image quality, pose variations and illumination changes.

Riddhi Patel [16] proposed a summary of face recognition & discusses the method and its working. It also compares different techniques of face recognition. It highlights the techniques that gives good efficiency for illumination changes and different environmental conditions.

3.FACE RECOGNITION SYSTEM:

The proposed methodology for face recognition is based on machine learning algorithms. Fig. a describe the proposed data flow diagram.

Data Flow Diagram can also be termed as bubble chart. It is a pictorial or graphical form, which can be applied to represent the input data to a system and multiple functions carried out on the data and the generated output by the system.

A graphical tool accustomed describe and analyze the instant of knowledge through a system manual or automatic together with the method, stores of knowledge, and delays within the system (13). The transformation of knowledge from input to output, through processes, is also delineate logically and severally of the physical elements related to the system. The DFD is also known as a data flow graph or a bubble chart.

MODULES:

User module:

In this module user will open camera and track images of every student to whom he want to take attendance through this application. For each tracking process it will take 300 images and then user should close training process. Once the process is done data will be stored in a folder 0,1,2..etc for each user new folder is created.

Training Process:

Once taking images process is done images from folder and for each image training process is done using opencv and yml file is stored in folder. This yml file is used for testing new images.

Detection Process:

In this process when user opens camera it will track live images of user and convert user image to gray colour and check with face recognition model and then boxes are drawn on

each face and features are verified with trained model and output is displayed with age and gender.

Graphical User Interface(GUI)

A graphical user interface or GUI, is a type of interface that allows users to interact with electronic devices through graphical icons and visual indicators such as secondary notation, as opposed to text-based interfaces, typed command labels or text navigation (14). GUIs were introduced in reaction to the perceived steep learning curve of line interfaces (CLIs), which require commands to be typed on the keyboard.

- The frontend consists of what the user sees.
- A GUI is preferred as it makes it easier to use.
- This is done with the help of Matlab's **guide** command.

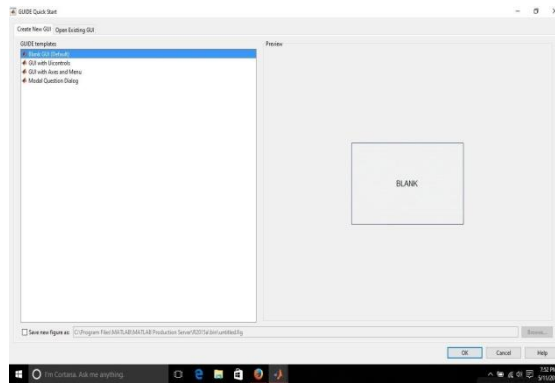


Fig 1 : OPENED WINDOW USING GUIDE COMMAND

Creation of GUI:

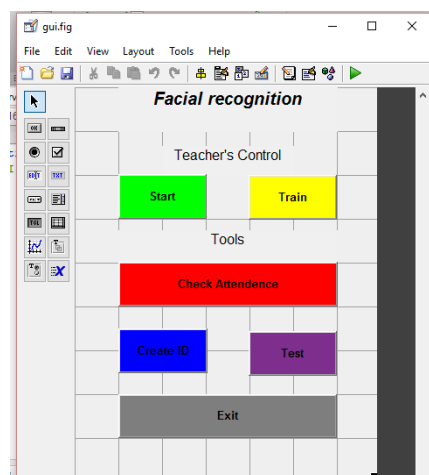


Fig 2 : GUI is being Created

ASAMPLE GUI:

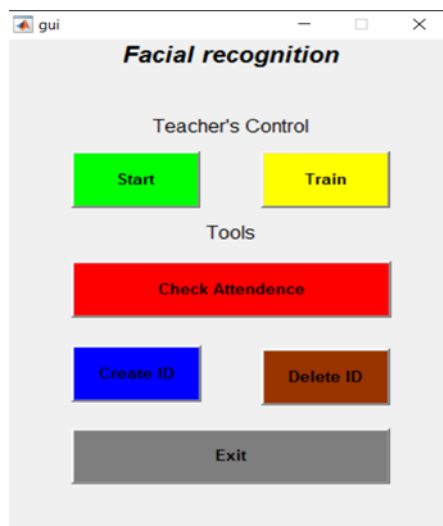


Fig 3 : ASAMPLEGUI



Fig 4 : FACE RECOGNITION GUI

4.CONCLUSION AND FUTURE WORK:

In this system we have implemented an attendance system for a lecture, section or laboratory, etc by which lecturer or teaching assistant can record student's attendance. It saves time and effort, especially if it is a lecture with huge number of students.

Automated Attendance System has been envisioned for the purpose of reducing the errors that occur in the traditional (manual) attendance taking system. The aim is to automate and make a system that is useful to the organization such as an institute. The efficient and accurate method of attendance in the office environment that can replace the old manual methods. This method is secure enough, reliable and available for use. No need for specialized hardware for installing the system in the office. It can be constructed using a camera and computer.

The current designed system can recognize upto two persons in a frame. In the future with better hardware and software requirements and enough funds, we can design a better system that can eliminate the light variations observed & there by reducing the error rates and increasing the recognition rate. Also we can replace the local area network (LAN) connection between the smart phone and laptop with Cloud which can store the data and upon the request

of the user the data can be acquired and displayed. In fact by employing cloud storage, large amounts of data can be stored safely from unauthorized access and also the data can be accessed from remote locations.

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