Analysis of Implementing An Attendance Management System Based on Real Time Face Recognition Using Artificial Intelligence

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Abstract- *This assignment gives a complete knowledge of the attendance system of real time face recognition using artificial intelligence.The attendance maintaining system is difficult process if it is done manually. The smart and automated attendance system for managing the attendance can be implemented using the various ways of biometrics techniques. Face recognition is one of them. By using this system, the issue of fake attendance and proxies can be solved. In the previous face recognition-based attendance system, there were some disadvantages like face spoofing, the intensity of light problem, and the head pose problem. Therefore, to overcome these issues, various techniques like linear binary pattern histogram, linear discriminant analysis, and Principal component analysis are used. The major steps in this system are detecting the real faces and recognising them. LBPH face recognizer is to identify the face of the person in real time. LBPH face recognizer to overcome this problem. This system compares the image of the test and the training image and determines who is and is not present. The attendance data is stored in an excel sheet that is automatically updated in the system. This smart system will be an effective way to maintain the attendance and records of students.*

Keywords- face spoofing, LBPH algorithm, face detection, face recognition.

I. INTRODUCTION

The traditional method of marking attendance is a tedious task in many schools and colleges. It is also an extra burden on the faculties, who should mark attendance by manually calling the names of students, which might take 5 minutes of the entire session. To verify the student attendance record, the personnel staff ought to have an appropriate system for approving and maintaining the attendance record consistently. By and large, there are two kinds of student attendance frameworks, i.e., Manual Attendance System (MAS) and Automated Attendance System (AAS). Practically in MAS, the staff may have experience difficulty both approving and keeping up with every student's record in a classroom all the time. In a classroom with a high teacher-to-student ratio, it turns into an extremely dreary and tedious process to mark the attendance physically and cumulative attendance of each student. Consequently, we can implement a viable framework that will mark the attendance of students automatically via face recognition. AAS may decrease the managerial work of its staff. Especially, for an attendance system which embraces Human Face Recognition (HFR), it normally includes the students' facial images captured at the time he/she is entering the classroom, or when everyone is seated in the classroom to mark the attendance. Generally, there are two known methodologies to deal with HFR: the feature-based methodology and the brightness-based methodology. The feature-based methodology utilizes key point features present on the face, called landmarks, such as eyes, nose, mouth, edges, or some other unique attributes. In this way, out of the picture that has been extracted beforehand, just some parts is covered during the calculation process. Then again, the brightness-based methodology consolidates and computes all parts of the given picture. It is also called holistic-based or image-based methodology. Since the overall picture must be considered, the brightness-based methodology requires more handling time and is likewise more complicated. There are different advances that are made during the process of this face recognition framework, yet the essential steps of these are face detection and face recognition. Firstly, to mark attendance, images of students' faces will be required. This image can be captured by the camera and stored in the database. This image will be considered an input to the system. For efficient face identification, the picture should be upgraded by utilizing some image processing methods like grayscale conversion and histogram equalization. After an image quality upgrade, the image will be passed on to perform face detection. The face identification process is followed by the face recognition process. With the assistance of the element extractor, different face highlights are extracted. Utilizing these faces as Eigen features, the student is recognized, and by coordinating with the face database, their attendance is marked. Developing the face database is required for the end goal of comparison.

II. EXISITING WORK

Computer technology has impacted many aspects of people's lives and work in this era of Internet explosion. The occasions where people come into contact with computers are gradually expanding. The frequency with which people use computing is also increasing. One of the most challenging projects in the field has a broad application prospect because of its huge sense of innovation. As an important identity label for people to distinguish different individuals, face recognition technology has gradually entered people's lives. Face recognition is a combination of artificial intelligence and computers[6]. Because of its hugely challenging innovations and broad application prospects, it has become the most challenging topic in this field. In recent years, the face recognition application system has developed rapidly as a computer security technology in the world, and especially today, when terrorist activities are rampant, this technology has received more and more attention. Face recognition technology has many typical applications in the fields of public safety, civil economy, and home entertainment. The pipeline of general enterprises needs to record the attendance of personnel, which has become a basic requirement of the company. However, when these attendance systems are formulated, unnecessary errors often occur. Taking the current fingerprint attendance system as an example, the study has found that the fingerprint attendance system has an error rate of about 5%, and that there will be a phenomenon where fingerprints cannot be hit, which seriously affects the efficiency of attendance, especially in large attendance sites, which are more likely to cause congestion. However, the card attendance system has the phenomenon of employees swiping cards for someone else, and it is difficult to achieve the purpose of real-time attendance. Compared with the two attendance systems, the face recognition system has higher accuracy and stability because there are more points for face recognition, which is more accurate than other systems. It is difficult to congested now that it has greatly improved. Although China's research on face recognition technology started late, our scientific researchers have caught up, and some leading figures have established their own industry positions in the field of face recognition. With the advent of the era of big data in today's world and the commercial value of face recognition technology, the prospect of this technology research is very bright and has great market demand. Faces in surveillance videos often suffer from serious image blur, posture changes, and occlusion. In order to overcome the challenges of video-based face recognition (VFR), Ding C proposed a comprehensive framework based on convolutional neural network (CNN)[1]. First, in order to learn a fuzzy and robust face representation, Ding C artificially blurs the training data composed of clear still images to make up for the lack of real video training data. Using training data composed of still images and artificial fuzzy data, CNN is encouraged to automatically learn fuzzy insensitive features. Second, in order to enhance the robustness of CNN features to pose changes and occlusion, CNN has proposed a trunk branch CNN model (TBE-CNN), which extracts complementarity from the overall face image and the patches around the face parts Information. Scholars such as Nemirovskiy V B have studied the featureless face recognition problem. The recognition is based on clustering the proximity between the cardinal distributions of the luminance clusters of the divided images. As a proximity measure, Nemirovskiy V B uses three types of distances: Euclidean distance, cosine distance, and Leibler distance. Recursive neural network software model is used for image segmentation and proximity measure clustering.

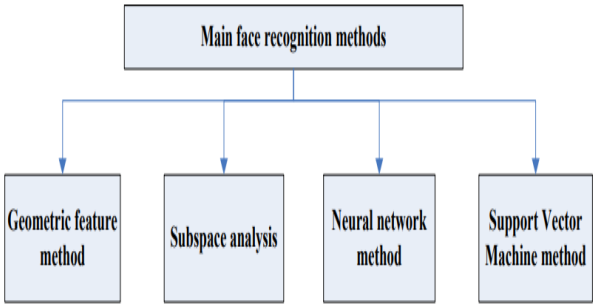

Figure 1:FACE RECOGNITION METHODS

The design of face recognition attendance system with real-time video processing is conducive to the development of enterprises and has a positive effect on the development of enterprises in the future. This article aims to design a face recognition time and attendance system based on real-time video processing. In this experiment, four investigation experiments were carried out. Among them, the accuracy rate of the face recognition system in actual check-in; the stability of the face recognition time and attendance system with real-time video processing; analysis of the skip rate of face recognition attendance system using real-time video processing; interface settings of face recognition attendance system using real-time video processing. The experimental results prove that the time and attendance system achieve the expected time and attendance results through face recognition technology and with the help of a computer, which fully reflects the feasibility design of the overall algorithm. The students who completed the attendance sign-in system quickly completed the tasks, got rid of the complicated sign of roll call, and soon realized its operation and function. The future system time and the form of attendance system conversion have made tremendous innovations, greatly improving the attendance rate and the reliability of face

recognition technology. It is worthy of further exploration and realization by our scientists.

III. PROPOSED WORK

Face detection, face feature extraction, and face recognition are the three stages of our proposed approach. The first stage is completed with the use of a Haar-like filter. In the second stage, the Haar algorithm is employed to extract the featured face. The final stage is carried out with the help of a neural network. This section delves into the specifics of each level. This article's proposed method is described in detail. Face detection This article uses Haar-like a feature or Haar cascade classifier to detect the face region. The operating system, allows an application to run on public nodes. Haar-like feature is a rectangular feature that is indicated specifically on the image. The idea of the method is to recognize the object based on the simple value of the feature.It is not based on the pixel value of the entire image. The Haar-like feature is a rectangular feature that gives a specific indication to an image. The Haar-like feature recognizes an object based on a simple feature that is not a pixel image. The method only processed a pixel in the rectangle area, not the whole image. Because the process of the Haar-like feature is done on many levels it is known as the Haar cascade classifier[8]. if the rectangle area cannot find the face region, the image is defined as not a face image otherwise it is defined as a face image. The face images are then stored in the database

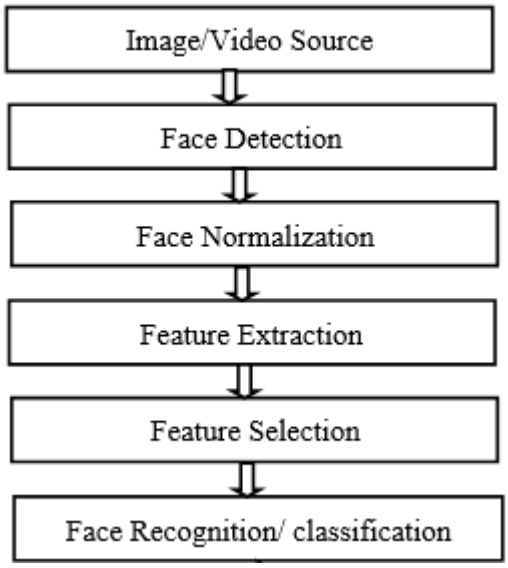

FIGURE 2. PROCESS OF FACE RECOGNITION

A. Image/video Source

In the initial stage, face detection is performed in the received image independent of scale and space. An advanced filtering process is applied using precision classifiers to isolate the locations where faces are exposed and filtered. All translation, scaling and rotational transitions occur in the face detection phase. For example, changes in facial expressions and hairstyle or faces with smiling and frowns are considered significant changes in the pattern recognition stage.

B. Face Detection

Under this process certain patterns are detected within the image for face detection. It is a scheme in which the locations and sizes of human faces in arbitrary images are verified. Facial recognition may or may not include face detection [9].

C. Face Normalization

In the detected face, different images of the same person may vary in terms of rotation, brightness, and size. Those properties do not depend on facial features and have a substantial effect on detection rates. Normalization of detected faces is the only technique to deal with this problem. Its main objective is to reduce the impact of insufficient and unnecessary information to improve the recognition process. The centre points of the eyes are positioned to select the basic feature points to normalize the face.

D. Feature Extraction

This stage involves extracting the crucial information from the image of a face. During this operation, dimensions are reduced, relevant features are extracted and the most optimum features are chosen. The output of feature extraction is the low dimensionality, transformation of the data, and the selection of the appropriate subspace in the original feature space[5].

E. Feature Selection

This stage aims at selecting the subsets of extracted features to reduce classification error. There are many existing feature extraction methods, like Principal Component Analysis, Kernel PCA etc.

F. Face Recognition / Classification

The extracted properties are used to recognize the face. It depends on the user application. The photograph provided for the subject is compared with all the biometric templates that are stored on the database to be recognized. In

case of its implementation for verification purpose, the biometric template of the claimed identity is recovered and compared with the given image [7].

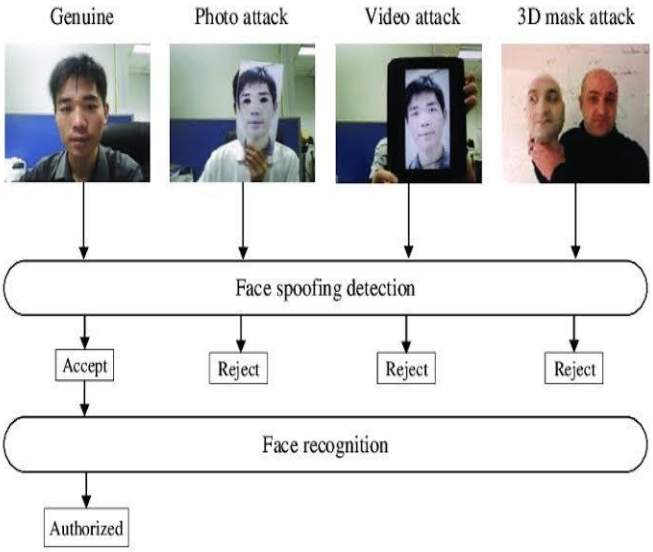

FIGURE 3 FACE SPOOFING DETECTION LBPH

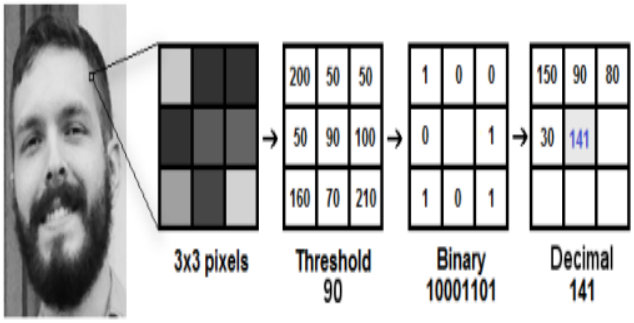

FIGURE 4 FACE SPOOFING RECOGNITION LBPH

LBPH (Local Binary Pattern Histogram) is a Face-Recognition algorithm it is used to recognize the face of a person. It is known for its performance and how it is able to recognize the face of a person from both front face and side face. Before starting the intuition behind the LBPH algorithm, let's first understand a little bit about the basics of Images and pixels in order to understand how images are represented before we start the content about Face-Recognition. So let's get started understanding images and pixels[2].

After detecting a face from the camera, the obtained face is compared with all other faces in the dataset to find a closest match using a suitable face recognition algorithm. The system uses Local Binary Pattern Histogram (LBPH) algorithm for face recognition[3].LBPH is a simple yet very efficient texture operator that labels the pixels of an image by thresholding the neighbourhood of each pixel and considers the result as a binary number.

IV. CONCLUSION

Using face recognition algorithms, this system tries to provide an effective class attendance system. The suggested technology will be able to track attendance using facial recognition. It will use the webcam to detect and recognize faces. It will mark the recognized student's attendance and update the attendance record after recognition. Face recognition technology has progressed significantly with the advancement of science and technology, but there is still potential for improvement in terms of practical use. There may be a specific camera for face recognition in the future, which can increase image quality and solve image difficulties.The strategy dependent on the examination of development of eyes. for inserted face acknowledgment framework. The fundamental supposition that will be that in view of flickering and uncontrolled developments of the students in eyes, there ought to be huge shape variations. Firstly, centre point of both eyes is recognized in input face image. Using identifying both eyes, face region are normalized and eye regions are extracted. After extracting eye regions, each binarized eye regions are compared and variation is noted. In the event that the outcome crosses the limit, the information picture is perceived as live face, if not, it is segregated to the photo. For detecting of the eye regions, the authors used the fact that the intensity of the eye region is lower than the face region if the image is taken as a 3D curve.

Automated attendance systems are more fast, reliable, rigid, and efficient than the traditional attendance systems and other biometric attendance systems, leading to better productivity and output of both the teachers and students, as well as better consumption of time.

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