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MARKING ATTENDANCE THROUGH FACE RECOGNITION

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ABSTRACT

The work presents an automated attendance system based on face recognition. The proposed system involves Face detection, Features extraction, and matching. The face detection is to detect faces based on Viola-Jones algorithm using vision toolbox. In the feature extraction stage, the binary format is used for the different extraction process. A DRLBP operator is used for obtaining the edge values for every position of the pixel and results in the code generation. The obtained results are matched with the previously stored images of an individual for verification.

Keywords: Face recognition, DRLBP, attendance marking system, feature extraction.

INTRODUCTION

The work aims to develop an attendance marking system using facial images. This paper exploits all the existing techniques for effective and good comparative study is done. In the proposed system, initially the faces of individuals are collected and stored in a database. Here a sensor is fixed at the entrance of the classroom which captures the video while the students are entering into the class. This system can be replaced with manual attendance which resolves the problem with proxies. In previous face recognition systems, there are several disadvantages. In order to overcome these issues, various features and algorithms are used. Then the faces detected are compared with the database.

LITERATURE SURVEY

Priyanka *et al*. proposed a system that describes the human attendance system as it is mandatory in every educational institution. The attendance of a student is marked by considering the facial picture of a student. Based on this concept, the application is designed in such a way that it uses SMTP Protocol to send the information to the faculty and parents after the attendance is being marked. Various approaches are used to determine the difference between facial images. The usage of this system gives more effective than the manual system. This gives the output effectively.

Hassahballah *et al*. describes that now-a-days biometric systems are prominently used for recognition of an individual. An individual is described by their unique features fetched from the gallery. There are various methods which are used as complement to the given method. The usage of video analysis has been gradually increasing. This results in redundancy and also increases robustness. Face recognition is a complex problem due to its usage in various fields.

Deepa *et al.* explains that, a face is a most peculiar and extensively used key to a person's congruity. Various accessions to face disclosure has been communicated in the articles over the last few years, ranging from the analytical summarization of projecting facial looks to the spread the computerized images of the face. The methodology proposed in this paper is head, it reshapes the given copy and the copy is changed into the gray copy and then, the peak of the image is recognized using a canny edge detector with minimal threshold value 0.1 and maximum threshold value 0.3.Genetic algorithm, established on the matching of the living model of evaluation and typical digenetic systems are spotted searching methods. To bring into play GA for face detection, an ellipse representation model is constructed and then carried through the entire image copy to find the presence where the better relevant match happens. This paper proposed an advanced representation base exploratory method based on genetic algorithms which detect a face. This model has given better results with bottom computing costs. Face recognition through genetic algorithm can identify faces in an acceptable time and beyond, the algorithm is booming to babble and blockage.

Preethi Mehta *et al*. explain that, enterprises and start-ups are taking the whole presence by adopting RFID approaches, Noodle stationed student recognition and fingerprint subjects. It takes added time for computation and to give the final report. Biometric time and existence model is the maximum accurate requirements in biometrics. But identification of individual dab from already stored database is a time consuming approach. All the above-mentioned attendance marking systems are mainly used for institutions to take attendance at several intervals. The structure is adaptable to the user, easy to exercise and gives good guard. This system matures the output with maximum certainty. Increase in faces decreases the closeness. Luu *et al*. provides an unusual age calculation method that associates (Asha *et al*.) active appearance models (AAM's) and supports vector machines (SVM's) to badly improve the certainty of age calculation over the popular techniques. Faces are restricted as adults and remaining is considered as children. Compared to proclaimed results, this method produces the head accuracy recognition progression, means exact error for several intervals of human evolution those are child age and adult age.

Zhao *et al.* explains about the LBP operator, a tool which changes an image into a cluster. These labels or statistics obtained from those labels are the most frequent circle graph, are then used for added image investigation. The most extensively used forms of the operator are modelled for regular stable images, but it has been spread

out also for colorant (multiple-channel) copies as well as broadcast data. This paper screens the altered versions of LBP operands in spatial scope. Sumita Chandak *et al.* talks about mechanised attendance check that uses image processing as a trending technology which is frequently used for marking attendance. In this paper, they provide an output for marking attendance in any case to check whether the student is present. Individuals have a discrete collection of facial features which can minimize the accuracy of facial identification. Grey scale image copies from the video camera must be of the same size so in order equate the histograms. This equalization is very important for better performance. The identification of faces is viable because of Viola-Jones algorithm which does not consider the pixel intensity, but uses the deviation among the pixels. Mayank Agarwal *et al*. explain the stages of feature extraction that are based on PCA. In this procedure, information that best determines a face is fetched from the whole face image. These are known as "Eigen faces". ANN is helpful in classifying images. Neural Networks are trained to perform complex functions. The image of an individual is constructed by performing feature vector analysis, then obtained networks are monitored and their resources are revised.

PCA is used for face recognition and SOM is used for space representation. It explains the performance result of two algorithms when combined together. The main purpose of PCA is to reduce the data space. SOM is an unsupervised learning algorithm.PCA is successful technique and a statistical method used for face recognition and compression. In PCA, the pixels of each image is taken at a time and joined to form an individual vector consisting of all the indices of image. The stored images are rebuilt with the help of weighted matrices. The Eigen faces represent the faces efficiently using PCA (Retno Anggraini *et al*.)

Samiksha Sukhadeve *et al*. show the implementation of face recognition and creating an application which will run on the Android platform for use on mobile devices. In this, there will be a hardware specification. So, we should implement a lightweight algorithm. Image processing can be done to acquire the features of the image. Actions performed on the image are cropping, increasing scaling, acquiring the RGB format of an image grey scaling it. Image recognition is a classical problem for image processing. Colour feature identification is very much useful in feature extraction technique. The image is broken down into red, green, blue values and these values are stored in a matrix form. The components of an image are extracted and separated into three different forms of an array then calculated the total number of red, green, blue pixels and average is calculated individually. Averages are stored in the first half of the element array and coefficients are stored in the second half. By combining average RGB, clustering and indexing can make the output of the project more accurate.

Himani *et al.* built a GUI with graphical objects. Applications that provide GUI are easy to learn. The groundwork affords an ability to adapt to identify unique faces. It also shows the creation of GUI s with MATLAB. The method of executing GUI contains two jobs. They are implementing GUI factors, formulating GUI components. Face identification procedure provides three phases face unmasking, face separation, and face identification. The Viola-Jones procedure is used in unmasking of faces. It can be trained to identify the distinct object. The object detection framework selects the better characteristics and trains them using various methods. The recollection and image computation is peculiar form. Transferring given information into a firm of characteristics is called feature fetching. There are two common functions for face identification. They are recognition and verification. The Eigenface approach provides the best back-up for current methods. It shows best in its rapidity, easiness and results in better recognition performance.

Fatma Zohra *et al*. explained that the tracking of the face or collection of different faces in a particular copy is a stimulating job. When the image is fetched, its grey shape and size are classified. The utmost important factors of automatic face recognition (AFR) of facial features. Each face represented by a set of grey scale images or a graph. PCA has been described and used widely for several applications. The collection of all size and gap measurements contains the last feature vectors for division. The advantages of the performing factor by factor comparing are improved strength. It avoids any iterative search and computing. They support a programming method for monitoring the importance of distinct facial characteristics. The data store is classified into two groups. Yun Fu *et al*. has done a research about human faces that reveals distinctive measures for modelling automated age evaluation models through facial image investigation. The achievement of several studies may lead to the development of several creative tools useful for applications. This paper demonstrates that aging formats are used in extent to fetch from the distinct algorithms. From the above approach of analysis on facial copies, the dimensions and of the native image reduced with facial processing. Himani *et al*. author proposed that the face recognition procedure is generally separated into three steps in order to detect the face which is recorded either in a digital camera or any other. The three classifications proposed are face evaluation, face fetching, and face identification. The major process of the detection process is finding out whether an individual is present or not. After extracting each and every face, the final step is to find the identical faces. The two common functions are identification and verification. A human face acts as a signal for various interpersonal communications in everyday life.

Song Wang *et al*. explained that the recent studies of convolution neural network (CNN) had become a powerful tool for image classification. In contrast, if the model is too small, the accuracy may be much lower than what we can actually achieve (based on the same training data). The complexity of the training data of each classification is evaluated. On the other hand, ability scores of CNN models of different structures are also evaluated. The parameters of the matching function are determined through experiments. The image classification

tasks mainly vary from the following two aspects. First, the class number of the task is various. To test the reliability in our evaluation approach for complexity score, a variety of image classification databases were used. The proposed system can evaluate the complexity score of the classification task as well as the classification ability score of the CNN model. Etemad *et al*. explained the human facial images which are analyzed in spatial domains. Each and every facial feature has distinct power for finding whether a person exists. There are several studies about features which are used in experiments. Though we take a number of samples of each subject for the training process, only one should be used for the testing process. For example, if we consider a view-based method, we retain output for each example taken. The above method is more difficult than other approaches as it needs processing of each and every example. The effectiveness of this approach is compared with Eigenfaces.

Pantic *et al*. explains that there are three main steps in analysis of facial expressions. Before a facial expression is analyzed, it must be detected. This model is developed for observers to identify the unconnected slight difference in facial looks. Most of the studies on automated expression analysis work on the performance of emotional classification. The first phase is to implement a representative mechanical facial appearance. The final stage of facial detection is to divide the facial appearance fetched by the face. If the original method is activated, the confronted facial expression is matched to the templates determined for every group. Analysis of facial expressions is a difficult task where humans solve with quite ease. Finally, the aspects of the issues are face recognition, facial looks, and facial identification classification.

Yaccob *et al*. proposed a method that explains the components, the primary performance of these factors, and motion ideas. The factors are determined effectively and correspond to the facial expressions. The approach proposed or optical flow computation is mainly correlation-based and was recently proposed by Abdel. Only the six universal emotions and blinking are considered for facial recognition. The face is analyzed from a near front view in the entire sequence. This results in the avoidance of increase in ambiguity. Teddy *et al*. clearly explains the biometric studies which are helpful in identifying facial expressions. This results in developing an effective attendance system using facial images. The facial recognition process is classified into three steps which are face identification, face looks, and face recognition. Matching is a process of comparing the features from already stored images with current copies. This results in effective attendance marking without any human involvement. The above paper granted the general biometric technologies during the test and the advantage of using mixed fingerprint and face recognition are determined. The present technologies are used for identifying over the massive population.

Ehsan Sadeghipour *et al.* explain the Eigen face algorithm, which is used for reducing the size of pixels in the image. The primary need is that each and every copy is taken as a vector. The given image is first changed using matrix or vectors. The image comparison is a process of image detection and acts as an important part of the entire system. However, image fetching operand (Nigel *et al*.) is the dominant drawback of the system. The maximum calculation complexity, it can be controlled in feature images. Evolution in the past few years have activated the human to mechanically do recognition.

Overview of existing system

From the overall existing system, we consolidate these methods:

a) Fingerprint based automation:

The disadvantages associated with this method are,

- Process will be Q basis.
- This does not take into consideration if the person physically changes.
- Expensive
- This system may lead to false rejections.
- This system also leads to false acceptances.

b) Iris based recognition:

The disadvantages associated with this method are,

- Expensive (5 times more than fingerprint automation)
- Face scanning is possible only if the person is in still position.

PROPOSED SYSTEM

In order to overcome the drawbacks associated with the existing system, the proposed system has been designed in which the Face recognition that is based on, classroom automation with multi-face feature comparison and recognition system. Initially, a database is created consisting of all the students in a particular class with the required number of samples. When the students enter the class the camera captures the picture of the student and matches the faces with the already-created database. If the trained pictures match with the tested picture then he/she is marked present.

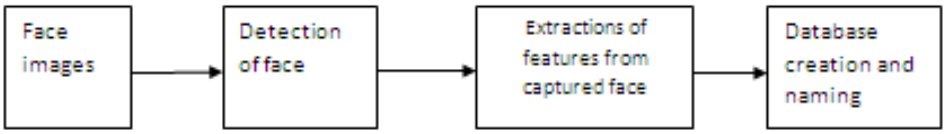

Figure-1. Architecture diagram.

Firstly we will take the samples of each and every student in a particular class. A minimum of 5 samples should be taken. Now the detection of a face is done where required regions of the face are being detected. Then the extraction process is done in order to obtain trained images from the captured pictures and unwanted regions are cropped. Finally, all the extracted images are stored in a database under the student name. Likewise, this process is done for all the students (Figure-1).

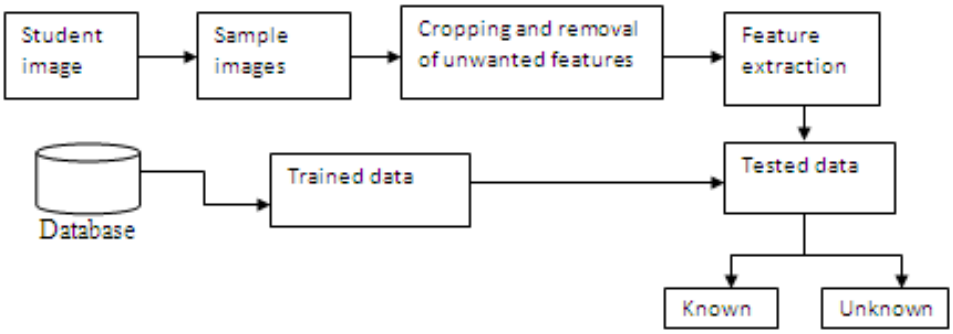

Figure-2. Attendance marking system.

After the creation of the database the extracted data and current data are matched. When the student enters the class a video clip is recorded and then divided into single frames. Each frame is converted to pixel values and then performs matching with the trained features available in the database (Figure-2). If both features match with each other then the individual is given present else absent. Thus, we can develop an effective attendance marking system.

Module description

- Face detection:

Face detection is a process in which an input image is detected using some criteria. Here, MATLAB vision toolbox will be utilized to detect the face from the input and it uses Viola-Jones algorithm. It returns the face boundary vector [X min, Y min, Width, and Height] to crop the desired region for further texture analysis.

- DRLBP features:

For LBP code in case for (x, y) is as follows: (1) B is used for obtaining the total number of adjoining pixels. There are two patterns for object recognition. The uniform pattern is marked between 0 and 1 and the rest are non Uniform pattern. Bin is reduced from 256 to 59. It is designed to classify objects. It retains the variation for objects to be modelled. It reduces the variation and simplifies the object model. So rotation-invariant is not used in the paper. Since LBP results in fluctuation, this lead to the formation of the LTP to resolve the problem. The LTP code for (x, y) is as follows: (2) LTP has two thresholds so it under go three state when compared with the LBP which has only two states. It proposes 3^B bin blocks of histogram for B=8 and has 6561 bins. An object has two distinct ideas for differentiation of the object, such as the surface of an object and shape of an object. Boundary shows the higher contrast. Since the boundary contains shape information that is discriminated for other discriminative data. Then Neural Network Classifiers are used to classify them and finally match making happens.

Advantages:
- Non Contact Process
- Fast
- Accurate
- Face matching is reliable.

RESULTS AND DISCUSSIONS

The work has been implemented using Matlab. Figure-3 explains the detection of multiple faces. The face region is captured with the help of the rectangular boxes.

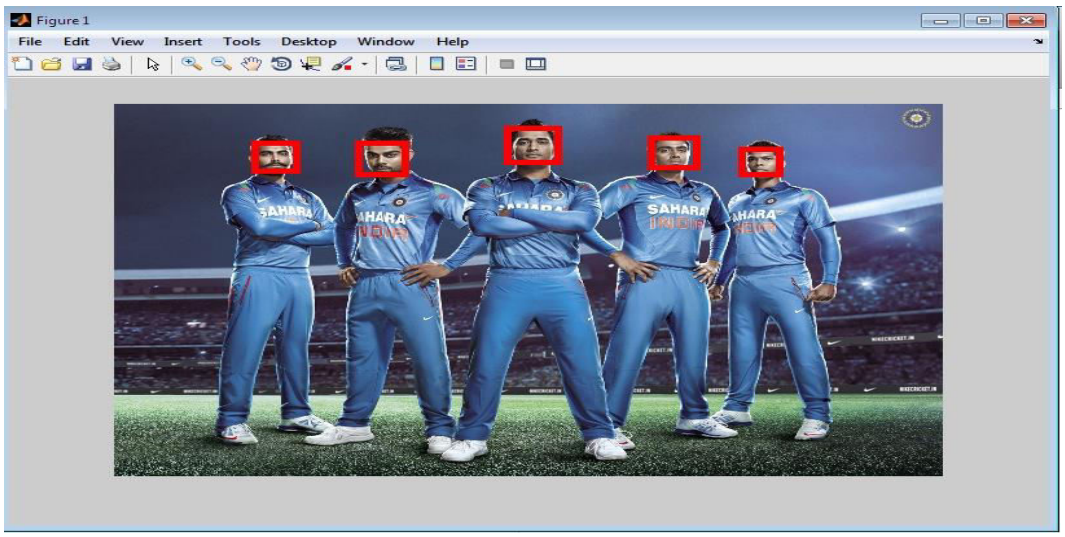

Figure-3. Detection.

Figure-4. Identification.

Here individual face is detected from multiple faces where each one is recognized separately (Figure-4).

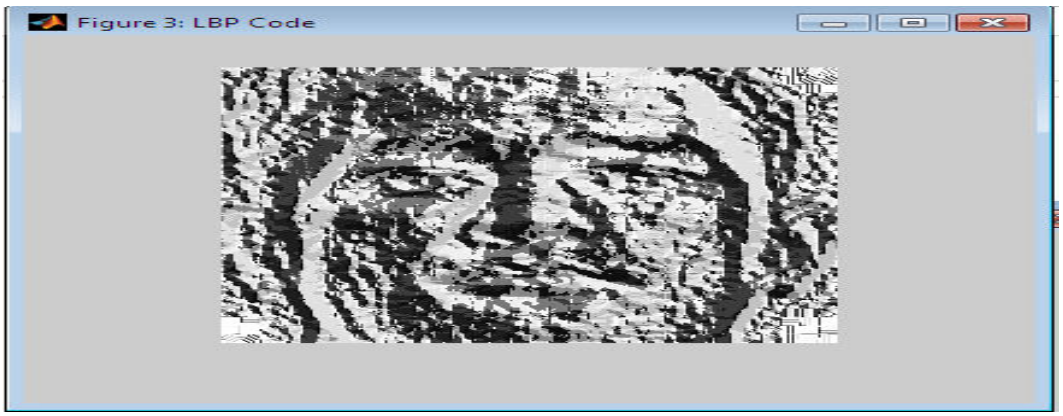

Figure-5. Conversion to LBP.

The detected face is now converted to LBP code where feature extraction is done with the help of DRLBP algorithm (Figure-5).

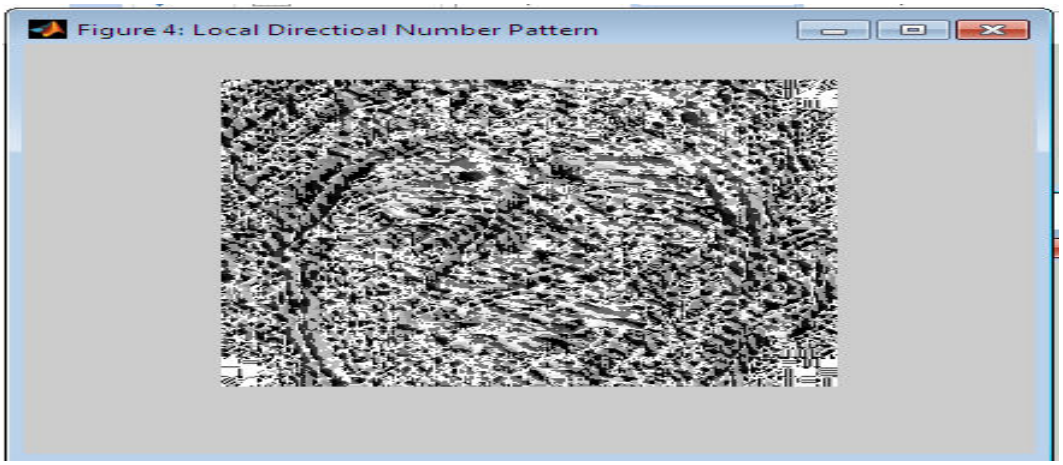

Figure-6. Extraction.

Complete feature extraction is done and stored to the database (Figure-6).

Figure-7. Matching.

When the face detected is matched with the database then it is given as know. The decision is made in this part (Figure-7).

CONCLUSION

Now-a-days, proxies, and bunking are common problems in educational institutions. In order to overcome the problem the above-discussed attendance marking system will be of great use. This does not require any human involvement. It is an automated system which recognizes an individual and mark him/her as either present or absent by comparing them with the database created initially. It is very challenging technique, but is used with high efficiency.

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