FACE RECOGNITION ATTENDANCE SYSTEM USING EHD AND LBPH ALGORITHM

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ABSTRACT: *Here propose a Live Attendance System using Face recognition project. This system will enable the department to mark the attendance of students automatically by recognizing their faces. Here, propose Edge histogram descriptor (EHD) and Local Binary Patter Histogram (LBPH) for face recognition. The system is based on the face detection and recognition algorithms and automatically recognizes a student whenever he/she comes across the camera module. Further after the recognition it automatically updates his/her attendance in the database. Moreover in order to evaluate and enhance the performance which provide the capability to capture and recognize the images even in dull and low light places. The live attendance system is much more efficient to traditional attendance systems both in saving time and in maintaining the database.*

Keywords: *LBPH, EHD, Face recognition, Live attendance system.*

1. INTRODUCTION

Face recognition is a major challenge encountered in multidimensional visual model analysis and is a hot area of research. The art of recognizing the human face is quite difficult as it exhibits varying characteristics like expressions, age, change in hairstyle etc. Although many methods have been proposed to detect and recognize human face developing a computational model for a large database is still challenging task. That is why face recognition is considered as high level computer vision task in which techniques can be developed to achieve accurate results. Few popular methods known for face recognition are neural network group based tree, neural nets, artificial neural networks and principal component analysis. The recognition of the face from videos has numerous applications in Video Computer Vision. The main challenge of detecting face

image in videos is the pose and the illumination variations and sudden changes in the movement of the object. The main challenges of designing the robust face recognition algorithms are pose variation, self occlusion of facial feature. The use of Multi view data to handle the pose variation and its challenges. Multi-camera network commonly used for biometric and surveillance system, multiple view point overcome the drawback of single view point. For example multiple view point increases the position of the person in different pose. The proposed system analyzes and recognizes the exact face image from the video even though there are pose variation and illumination

variation while the existing systems deals with the recognition of the face images.

In this modern era of automation many scientific advancements and inventions have taken place to save labour, increase the accuracy and to ameliorate our lives. Automated Attendance System is the advancement that has taken place in the field of automation replacing traditional attendance marking activity. Automated Attendance Systems are generally bio-metric based, smart-card based and web based. These systems are widely used in different organizations. Traditional method of attendance marking is very time consuming and becomes complicated when the strength is more. Automation of Attendance System has edge over traditional method as it saves time and also can be used for security purposes. This also helps to prevent fake attendance. An Attendance Management System which is developed using bio-metrics, in our case face, generally consists of Image Acquisition, Database development, Face detection, Pre-processing, Feature extraction, and Classification stages followed by Post-processing stage. The subsequent sections in this paper are literature survey, detailed description of various stages in the proposed model, results and conclusions and scope for improvement.

Organization

The rest of this paper is organized as follows. Section II presents Related work. Section III is Methodology. Section IV. Conclusion.

II. RELATED WORKS

In [7] author proposed Recognizing faces in unconstrained videos is a task of mounting importance. While obviously related to face recognition in still images, it has its own unique characteristics and algorithmic requirements. Over the years several methods have been suggested for this problem, and a few benchmark data sets have been assembled to facilitate its study. However, there is a sizable gap between the actual application needs and the current state of the art. In this paper they describe a novel set-to-set similarity measure, the Matched Background Similarity (MBGS). This similarity is shown to considerably improve performance on the benchmark tests.

In [16] author proposed novel convolutional neural network (CNN) design for facial landmark coordinate regression. We examine the intermediate features of a standard CNN trained for landmark detection and show that features extracted from later, more specialized layers capture rough landmark locations. This provides a natural means of applying differential treatment midway through the network, tweaking processing based on facial alignment. The resulting Tweaked CNN model (TCNN) harnesses the robustness of CNNs for landmark detection, in an appearance-sensitive manner without training multi-part or multi-scale models. Our results on standard face landmark detection and face verification benchmarks show TCNN to surpasses

previously published performances by wide margins.

In [31] author proposed Fog Computing extends the Cloud Computing paradigm to the edge of the network, thus enabling a new breed of applications and services. Defining characteristics of the Fog are: a) Low latency and location awareness; b) Wide-spread geographical distribution; c) Mobility; d) Very large number of nodes, e) Predominant role of wireless access, f) Strong presence of streaming and real time applications, g) Heterogeneity. In this paper we argue that the above characteristics make the Fog the appropriate platform for a number of critical Internet of Things (IoT) services and applications, namely, Connected Vehicle, Smart Grid , Smart Cities, and, in general, Wireless Sensors and Actuators Networks (WSANs).

- In Existing system, detect the face using the image processing techniques and then pass the detected face to CNN for recognition.

- However, the proposed architecture used the Convolution Neural Network for both detection and recognition purpose.

So, our proposed system not only detects the appropriate number of faces from the frame, but also recognizes the detected faces.

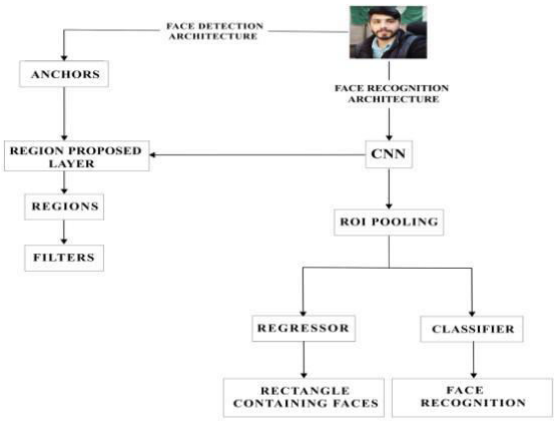

Fig. Network flow diagram.

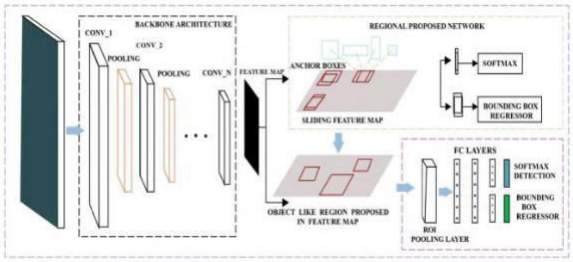

Fig. Network architecture.

In order to measure the validity of the proposed algorithm, a web application of a group–based face attendance system is developed. The input to the proposed system is in the form of the image. The image can be uploaded either from the directory or by capturing through device's camera. Two types of users faces have been used; First one is the student, who can add and update his record. The second one is the teacher. Teacher has privilege to add, update as well as mark attendance functionality based on the images of the group of students. The teacher can also view the reports of class attendance based on the specific subject id, and date.

III. METHODOLOGY

- Face Detection is the process where the image, given as an input (picture) is searched to find any face, after finding the face the image processing cleans up the facial image for easier recognition of the face.
- Edge histogram descriptor (EHD) and Local Binary Patter Histogram (LBPH) is proposed for feature extraction and classification of face recognition.
- After the completion of detecting and processing the face, it is compared to the faces present in the students' database to update the attendance of the students.
- It helps in increasing the accuracy and speed ultimately achieve the high-precision attendance.

The development of the device is as shown in system architecture Based on the face recognition algorithm, the proposed mechanized participation management system. At the point when a person enters the classroom, the camera at the entrance cap tures picture. Then the facial district is stripped and pre-treated for further planning. Since there is less effort, the face detection algorithm will reach the classroom at a time than two people. When the head of the student is remembered as being assisted for post-processing. The machine count is mentioned. The entities are as shown in system architecture in the proposed Automated Assistance Management System.

LBPH AND EHD ALGORITHM

- In LBPH, the histogram of the region is created by counting the number of similar LBPH values in the region.
- After creation of histogram for each region all the histograms are merged to form a single histogram and this is known as feature vector of the image.
- LBPH compare the histograms of the test image and the images in the database and then it return the image with the closest histogram.
- Edge Histogram Descriptor algorithm (EHD algorithm) which is used in shape detection.
- The texture of the face is captured in different angles and illumination conditions.

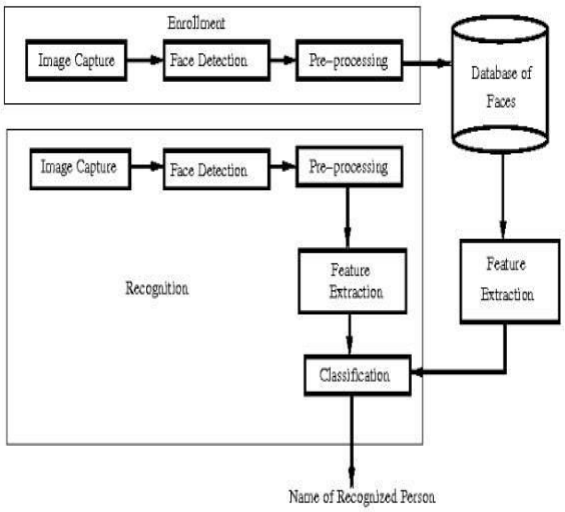

Fig. SYSTEM ARCHITECTURE

FACE RECOGNITION- LBPH

The notion of LBP is to recapitulate the local region in an image by comparing every pixel value with its neighbours. Steps occurring in LBPH in Open CV are:

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1. Dataset image is given to the recognizer which is created by using the function.

2. The recognizer does the training process by recognizer. train () and histogram gets generated which is stored in a Trainner.yml file by using recognizer. write(). It stores image data corresponding to each name and ID of student in a text readable file.

3. Once the training is complete it will be informed to the user with display of message on the GUI screen saying “Image Trained”.

4. After the training is completed in the same way for all the students the system is ready for marking attendance using face recognition. The attendance can be taken by clicking on Track Image button and thus the camera gets activated. These pre-processed images are used for making the prediction about the Id. It will obtain continuous image feed which is compared with the stored data and returns the ID which best matches with the stored information.

5. If a student is present it is marked in name of the student and also the date and time are noted in the notepad. This is very easy to manage and the data remains easily accessible for future reference.

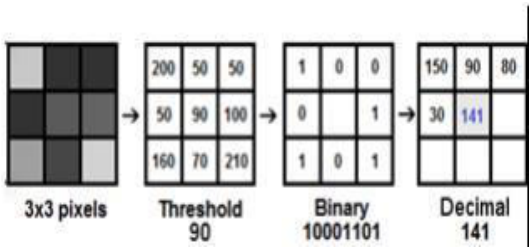

Fig. Working of LBPH

LBPH working is explained above in which there is an image with pixel intensities and here there is a 3*3 window. The number of neighbours to be considered can be changed. After getting the binary number the centre pixel is replaced by the decimal value for the binary. LBPH algorithm is an idea of sliding window, based on the constraints neighbours which is represented by P and radius which is represented by R and thus an LBP operator is represented as LBPP,Ru2,u2 stands for usage of uniform patterns only and other remaining patterns with a predefined single label. Different examples of taking the windows is given in Variations of LBPH windows and neighbourhood.

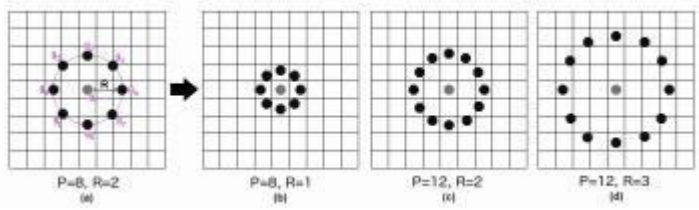

Fig. Variations of LBPH windows and neighbourhood.

EDGE HISTOGRAM DESCRIPTOR

The edge histogram descriptor (EHD) is one of the widely used methods for shape detection. It basically represents the relative frequency of

occurrence of 5 types of edges in each local area called a sub-image or image block. The sub image is defined by partitioning the image space into 4x4 non-overlapping blocks as shown in figure 1. So, the partition of image definitely creates 16 equal-sized blocks regardless of the size of the original image. To define the characteristics of the image block, we then generate a histogram of edge distribution for each image block. The Edges of the image block are categorized into 5 types: vertical, horizontal, 45-degree diagonal, 135-degree diagonal and non-directional edges. Thus, the histogram for each image block represents the relative distribution of the 5 types of edges in the corresponding sub-image.

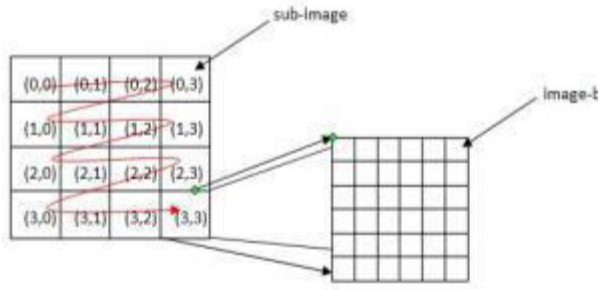

Fig. Definition of Sub-image and Image-block in the EHD

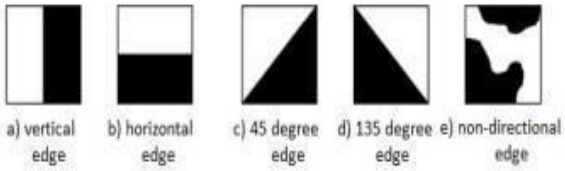

Fig. Five Types of Edges in the

EHD **IV. CONCLUSION**

Face Recognition is a field which will always have face recognition is a very complex process with very little details getting changed from face to face. Humans have perfected after centuries of evolution and still face difficulty if the face to be recognized was seen long back. This project is an effort to use techniques i.e. Normalization &Face Alignment and LBPH and use the application for Attendance System in large institute. Attendance is always complicated when so many students are skipping classes and manipulating paper records of attendance sheets. The technique proposed attempts to increase the accuracy of the LBPH recognizer and EHD provided by OpenCV library.

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