Automated Attendance System Using HOG Feature

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***Abstract*- Automated face recognition technologies have seen dramatic improvement in performance over the past years and such systems are widely used for security and commercial applications. As students are increasing day by day it is difficult task for colleges or universities to maintain the records of students. Conventional methods of taking attendance is time consuming and required more efforts, therefore in this paper we used face recognition technology for marking attendance of students automatically. There are some automated systems available which involve biometrics like fingerprint and iris which are well developed in recent years but are intrusive and also cost required for development on large scale is more, to overcome these issues face recognition is used. HOG feature is used for acquire desired result. This paper proposes a design to detect faces real time using HOG descriptor. The problems like proxy attendance and time of manual attendance system is solved by this system.**

***Index Terms*- Histogram of Oriented Gradients (HOG), HOG descriptor, Face recognition, Haar cascade.**

I. INTRODUCTION

Maintaining the attendance is very important in all institutes for checking performance of students or employees, this is very difficult to maintain all records. 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 students or employees have to wait for long time in making a queue at time they enter. This requires more time and intrusive in nature also cost for develop on large scale is more. Automated attendance system using face detection technique is most suitable solution in which system is both time and cost effective. Our system uses face recognition approach for the automated attendance. 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.A number of methods have been proposed for face detection. This paper proposes a design to detect faces in real time using hog descriptor.

The rest of the paper is organized as follows. Section II represents literature survey. Section III describes implementation details. Section IV gives details about result, section V concludes the paper.

II. LITERATURE SURVEY

Existing methods of taking attendance in institutes require more time and amount of manual work also gets increased significantly. The automated systems like IRIS [1], FINGERPRINT [2], RFID [3] provide better accuracy but have some limitations like intrusive nature and time consuming. Iris is the another bio-metric that can be used for attendance systems. In [1] the authors have proposed Daugmans algorithm based Iris recognition system. This system uses iris recognition management system that does capturing the image of iris recognition, extraction, storing and matching. [3] This system registers the user and accepts biometric input through use of mobile network, and all records will be saved for subsequent operations. Since input image is accepted through mobile, it provides greater portability and reduces need for any specific biometric hardware. [2] A number of works related to Radio Frequency Identification (RFID) based Attendance Systems exist in the literature. In the authors have proposed RFID based system in which students carry a RFID tag type ID card and they need to place that on the card reader to record their attendance. This system may give rise to the problem of fraudulent access. Un authorized person may make use of authorized ID card and enter into the organization. In [4] authors

have proposed a system based on real time face recognition whichis reliable, secure and fast which needs improvement in different lighting conditions. Increasingly, systems are being developed to detect faces that are not full frontal. This paper proposes a design to detect faces in real time using hog descriptor. Taking HOG of the image and calculate the weights which contributes for the facial features. Positive weights with facial features like eyes, nose, and mouth are marked completely to visualize a face.
In this paper we proposed system that overcome issues of existing system.This is a paradigmatic scheme for real time face detection andrecognition. The system consists of a camera, installed in the classroom capturing the video frames followed by the detection of multiple faces. These faces are cropped and converted to grayscale causing reduction in the number of bits to be processed. These faces are then compared with the database faces and displays the result and marks the attendance.

III. IMPLEMENTATION DETAILS

The system is proposed for real time face detection and recognition. Following fig. shows overall working of System with the flow.

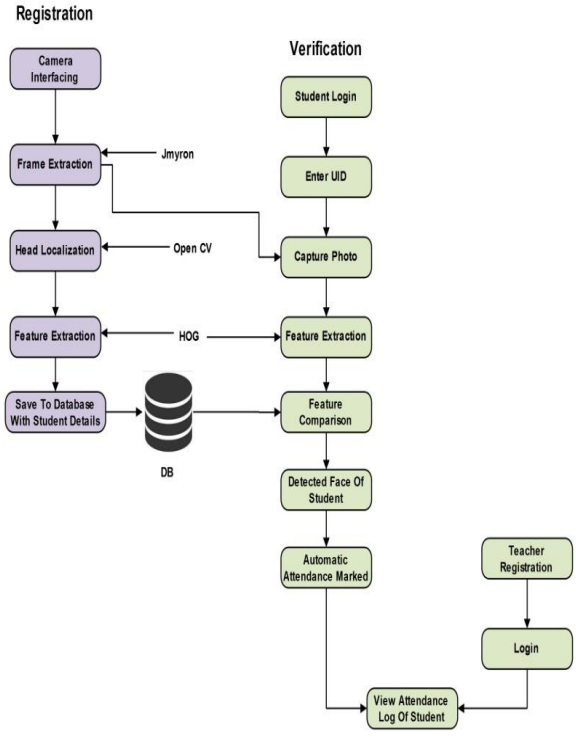

Fig: Face detection using HOG Descriptor

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3.1 Face Database Creation:
For creation of database pictures of all students are captured in different angles with the different gestures i.e. each student has 8-10 pictures angled at different positions. Subfolders are created each subfolder contains multiple faces of single person and corresponding name is given to subfolder. These subfolders are placed in the folder named database.

3.2HOG Feature**:**
Histogram of oriented gradients(HOG) is a feature descriptor used to detect objects in computer vision and image processing. The HOG descriptor technique counts occurrences of gradient orientation in localized portions of an image.

3.2.1Feature Descriptor:
A feature descriptor is a representation of an image or an image patch that simplifies the image by extracting useful information and throwing away extraneous information. Implementation of HOG descriptor algorithm is as follows:

- Divide the image into small connected regions called cells, and for each cell compute a histogram of gradient directions or edge orientations for the pixels within the cell.
- Discretize each cell into angular bins according to the gradient orientation.
- Each cell's pixel contributes weighted gradient to its corresponding angular bin.
- Groups of adjacent cells are considered as spatial regions called blocks. The grouping of cells into a block is the basis for grouping and normalization of histograms.
- Normalized group of histograms represents the block histogram. The set of these block histograms represents the descriptor.

3.3Face detection:
Camera installed in the classroom captures the frames containing the faces of all students sitting in the class. Captured frame is processed for detecting the faces of

multiple students and are used for testing purpose. All the detected faces are stored in the folder named as test, which is used to compare with the database folder. Using HOG feature, features of all faces in the test folder are extracted.

3.4Face Recognition:
In recognition process feature of captured faces of test folder is compared with the features stored in the database. Matched face is identified and used for marking attendance.

IV. RESULTS

The attendance management system is simple and works efficiently. Face detection in real time implemented using HOG descriptor and it results in improved the performance of existing attendance system by reducing time and efforts. The enrolment of the new student can be done by teacher or administrator. The images of the students are also uploaded by teacher .The system has authentication system built in it and needs user name and password for access. System ensures that only authenticated person is using the system.

V. CONCLUTION

Automated attendance system developed for the purpose of reducing the errors like proxy attendance in the traditional attendance taking system. The aim is to automate and make system cost effective and useful to the organization such as an institute. This method is secure, reliable and easy to use. No need for specialized hardware for installing the system in the classroom or labs. It can be constructed using camera and computer.

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