

AUTOMATIC ATTENDANCE SYSTEM USING IMAGE PROCESSING

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ABSTRACT

The face is an individual's identification. With the invention of image processing techniques, the approaches to take advantage of this physical function have seen a substantial improvement. Both schools, universities, and libraries have the attendance. Professor calls student name & attendance record is a traditional approach for attendance. The method outlined in this journal seeks to distract from these conventional model and incorporate a modern talk to using image processing to take an attendance. This paper explains how an Automatic Attendee Program functions in a classroom setting. First the classroom video clip is taken and this video is transformed into frames / images, then we apply Face recognition techniques such as algorithms to detect the face in frames / images and then the Local Binary Pattern Histogram (LBPH) algorithm extracts features from the detected object. The program initially stores the students' faces in the database. Compared to faces saved in DB through the face recognition citation, identified faces in the video clip re. When the machine recognizes faces, the attendance is automatically labelled with recognized faces.

Keywords – Image processing, Face Detection, Facial Recognition, Python, Python libraries, Local Binary Pattern Histogram (LBPH), SQLite, Machine Learning, Automation database.

1.INTRODUCTION

Students will attend the classes regularly to enhance the standard of the education. This can be preserved by the participation of students. Traditionally, students are required to attend classes in order to receive participation points that play a critical role in the final grade of the student [1]. This approach involves more efforts from the teachers to ensure that they correctly identify the students attendance

Maintaining student's attendance is mandatory to test student's performance. Every and every organization has its own way of holding the attendance. Others use conventional manual approaches that are file system based and use

biometric techniques to automatically attend. A lot of automated methods are available i.e. System Biometrics. Fingerprints, voice recognition, iris recognition, RFID scanner, etc. are some of the biometric systems. The drawbacks of finger printing system are that it requires a lot of room [2]. RFID system's drawbacks are fake attendance.

Those systems are expensive and Consumes the time required to wait. Implementation of the biometric program is unlikely in each and every class. Our system uses Face Detection System to detect the students' faces and recognize the faces through Face Recognition System[3]. The students attendance printed in the Excel Sheet and the data will then be stored in the SQLite database.

2.PROPOSED METHOD

This device includes camera recording the students' video in the classroom and automatically marking the students attendance. The data are pictures of the students for the database. The images are pre-processed and, using Local Binary Pattern Histogram (LBPH), the facial gestures are generated[4]. The student's photographs are then stored in the SQLite database after all the operations. The video is analyzed for the attendance.

The video's faces and they interact with the database. If the face features match the DB's face, the attendance will be noted. The camera seizes the video to the specified timing automatically. Manually the timing for taking the attendance is given. It saves a consummate in this procedure, and is a strongly protected citation where anybody may label false presence[5]. Camera dominate the video to detect all the students in the classroom. This approach makes the detection process more effective and reliable

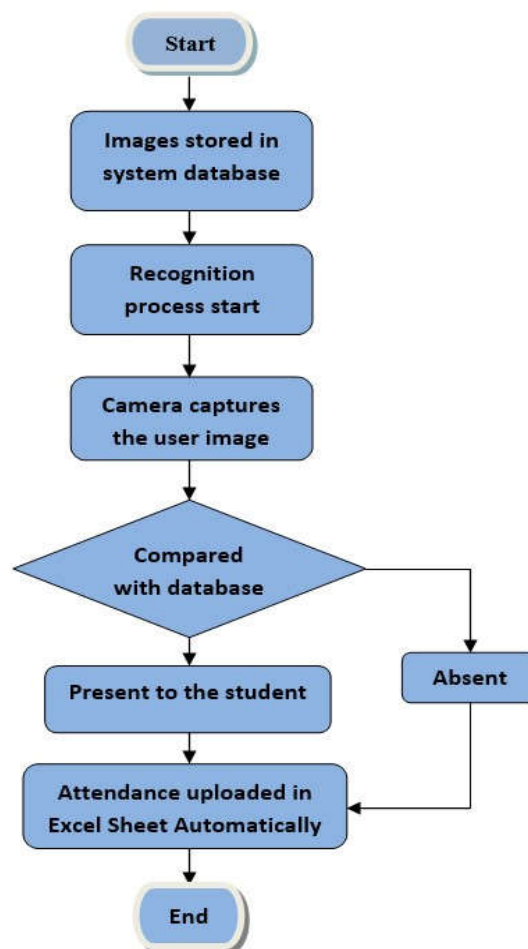


Fig:2-Architecture

3.ALGORITHM

This section describes the Algorithm for Software to the program. The algorithm is composed of following steps:

- Checking face
- Establishing Database
- Form Database
- Face inspection
- Setup Experimental
- Document

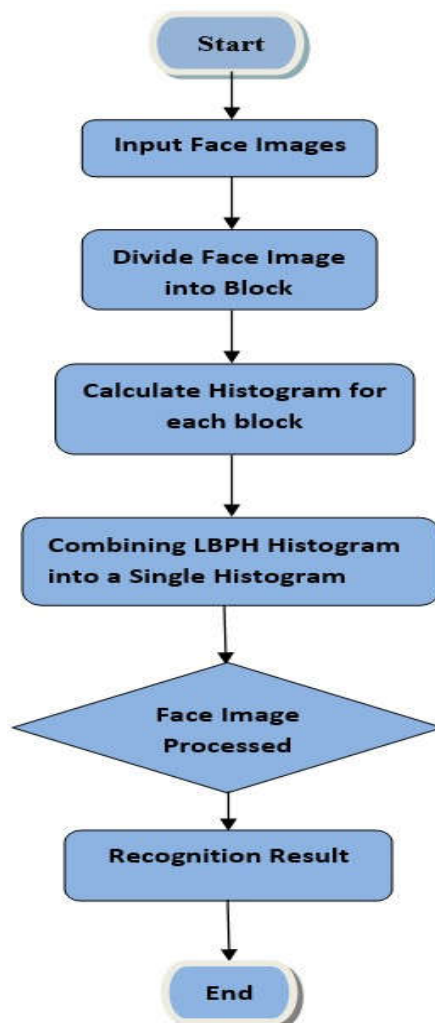


Fig:3-Algorithm Flow

3.1.Checking Face

Face detection is basically computer technology used to detect people face in computerized vision in a variety of applications[6]. OpenCV is used for face detection which implements a Haar Cascade Classifier. The Haar cascade classifier utilizes the AdaBoost algorithm to pinpoint various objects of photographs. Using the camera, it initially takes an input image and transforms the image to a black and white image. Before that, it warhead the Haar

cascade classifier to decide whether or not the image includes any faces inside the frame. Other facial features are tested when any face is identified, and a box frame drawn at the face. Else, other images continue learning.

3.1.1 Local Binary Pattern Histogram

Local Binary Patterns (LBP) is a perceptible type of the descriptor used in computer vision classification. LBP is the specific case of the model Texture Spectrum, proposed in 1990[7, 8]. The first time LBP was represented was in 1994. This has since been used as a solid feature for texture classification. In particular, once LBP has been combined with the descriptor histogram of the directed gradients(HOG). Obviously it increases recognition execution on other datasets.

For encoding features the image is divided into cells (4 * 4 pixels). This is contrasted by using a bearing of surrounding pixel values in clockwise or counter-clockwise direction.

The value of strength of each neighbor is compared to that of the central pixel. Depending on the difference the position is assigned a 1 or 0, or greater than or less than 0. The result gives an 8-bit value for one single cell

The final result is equal to the previous result if the illumination state of the image is modified. Histograms are used in larger cells as well as the frequency of values that render the device resilient. Edges can be detected by dissecting the results into the cell as changes in efficiency[9]. Function vectors can be obtained by measuring the values of all the cells and connecting the histograms. Pictures can be grouped by the handling methods connected to the ID. Using the same process, the input images are categorized and the data collection contrasted and separation is obtained. Setting a limit value is very well understood if it is a known or unknown image. Details are shown in Figure 4.

A more actual definition of the LBP operator may be given by:

$$LBP(X_c, Y_c) = \sum_{p=0}^{p-1} 2^{ps} (ip - ic) \quad p=0$$

Here the (X_c, Y_c) as with intensity of pixel I_c ; and in being the neighbor pixel intensity. S is the sign function defined as:

$$S(x) = \begin{cases} 1 & \text{if } x \geq 0 \\ 0 & \text{else} \end{cases}$$

For a given point (X_c, Y_c) , neighbor position (X_p, Y_p) , $p \in P$ can be calculated by:

$$X_p = X_c + R \cos(2\pi p/P)$$

$$Y_p = Y_c - R(2\pi p/P)$$

Where R is the radius of the circle and P is the number of sample points.

The OpenCV implements the bilinear interpolation:

$$f(x, y) \approx [1 - x] [f(0, 0) f(0, 1)] + [1 - y] [f(1, 0) f(1, 1)]$$

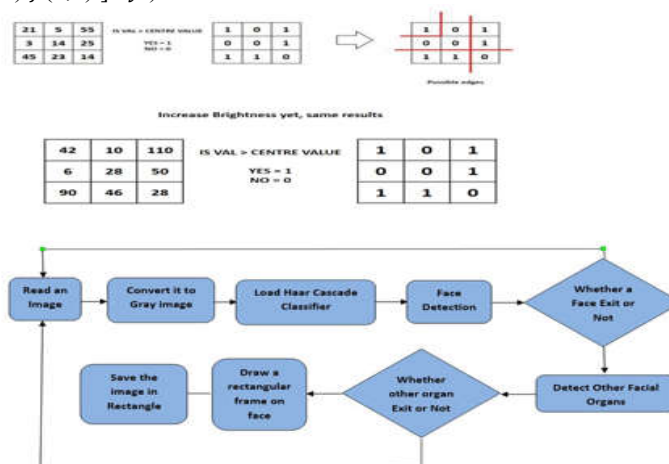


Fig 4: Block Diagram

3.2 Establishing Database

For comparing face images with photograph to be diagnosed database, face reputation is necessary.

Face photographs are cropped and transformed into gray pictures at some point of the photograph acquisition process, then these images are stored in the equal folder to form face databases for extraction tasks[10]. After that, the standardization method is carried out to all pictures to lessen noise and set the correct photograph scaling role in order that the result of popularity is quick obtained.

3.3 Form Database

Recognition is achieved by contrasting the face that is to be identified with a few known faces training sets. Within the training set we provide the faces algorithm tells which person they belong to. If you ask algorithm to recognize any unknown image, it will use training set to make the identification.

There are three face recognition methods: Eigenfaces, Fisherfaces, and Histograms of Local Binary Patterns (LBPH). Each of the three methods mentioned makes different use of training set. Eigenfaces and Fisherfaces find an athenmatic description of most prevalent training set features as a whole. LBPH analyzes each face independently and autonomously within the training package. Figure 5 shows the flow chart.

3.4. Face Inspection

It is a biometric way of identifying an individual by comparing digital image data with that person's stored record. Local Binary Pattern Histogram algorithm is applied for the object detected operation. The LBP operator uses this patterns to minimize a face image 's local spatial distribution. The LBP operator collects the binary pixel value ratios in the center at regular intervals Pixel intervals of around eight pixels.

$$LBP(X_c, Y_c) = \sum_{n=0}^{2^n-1} S(i_p - i_c) 2^n$$

Where i.e. the value of index of the pixel in middle (X_c,Y_c) shows 8 close surrounding pixel data.

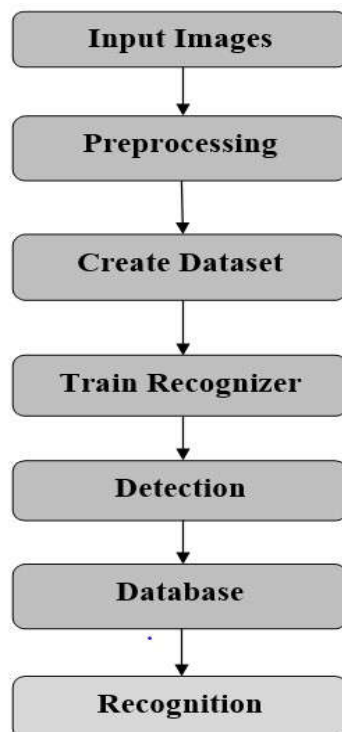


Fig. 5 : Flow Chart

3.5. Setup Experimental

Python programming language is used to build this framework. This system uses OpenCV library, and other Python IDLE and SQLite tools. SQLite is a programming library containing RDBMS. It is contrary to other information management systems. It's built into the software at the finishing point.

The project has three equal parts such as facial identification, face image preparation and last face detection. These all three operations are done in Python IDLE, and info is saved in the SQLite database about a individual.

3.6. Document

This window lists the marked attendance report. Attendance is marked in excel document along with the date and time for each student for that specific lecture.

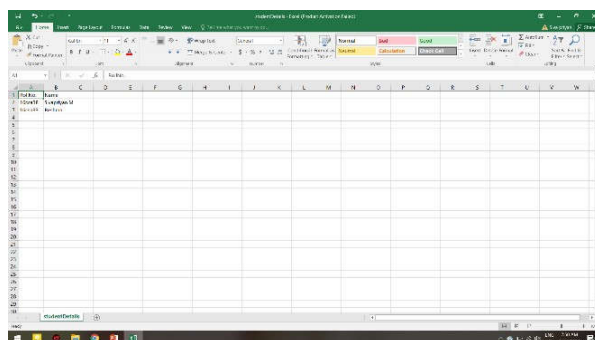


Fig. 6: Output of Proposed System

4. CONCLUSION

To the errors that exist in the conventional (manual) attendance system, our proposed project "An Automated Attendance System" emerge as envisaged. The purpose is to automate and render an organizationally beneficial program. The digital camera plays a critical role inside the system's functioning, consequently the digital camera's image incredible and overall performance in actual time scenario must be tested very well before real implementation.

This technique is fairly safe, accurate and to be had for use. There is no need for expert hardware to put within the device within the classroom. It can be created the usage of every a virtual digicam and a computer.

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