

Attendance Monitoring based on Facial Recognition using LBPH algorithm

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Abstract- Face is the one of most important part in the humans body. We can define a particular person whether they are man or women and boy or girl by seeing their faces only. Well, in past days there is a method to take the students attendance by calling them one by one and note down the presents in a register. It is somewhat difficult and time consuming process. So, to avoid these difficulties we are introducing a new method called attendance monitoring based on facial recognition using LBPH algorithm. In, these method firstly, we have to capture the we can detect the face images and then we have to train that images. Later, by using local binary pattern histogram method we can detect the faces and can mark known and unknown. Next, applying grayscale for the RGB images to convert all the images into a binary format which can be denoted by 0's and 1's. Taking the attendance of each student by capturing the images and save their data with their Names, ID'S, Mail, etc., After finishing the previous step we have to save all the students data in a separate sheet for future use. Finally, we can say that this propose will gives a high security and quick access. Local binary pattern is one of the easiest method to detect the faces which gives a approximately 92% accuracy and also even works in low level images.

Index terms- Face detection, Recognition, LBPH, Monitoring, Attendance

I. INTRODUCTION

The main aim of this project is to develop the attendance monitoring based on the face recognition using LBPH algorithm. For these purpose we want to get a good results, we need to capture the student images neatly and perfectly without any blurs and low brightness images. Next, we want to train the captured images. Normally, the captured images are in RGB format so we need to convert the images to grayscale images, then we need to the train the images which are captured images also should be processed for the images captured with neatly. Firstly, we have to create a database to store all the students details like name, id, address, mail, etc., then we need to take the attendance of a student by clicking the take attendance then the images will show the student details that we are saved before and finally, we can save the attendance in a separate sheet.

Normally, these method needs a three major steps. They are face detection , training of images, Recognition of faces.

Face Detection - Normally, we can differ a person to person by seeing their faces. We can distinguish people's individual identities of faces by looking at their faces alone, regardless of whether they are male or female, old or young. Face detection involves identifying students' photos when they are being captured, and saving all of the images for later use..

Training of images- Next, we must train the photographs that are all taken since, when attendance is taken, students may move and be engaged in other activities. As a result, we must train all the easy-to-capture images and the ability to identify faces.

Recognition of faces-For this task, we must take pictures of each student's face in order to identify them. We use the LBPH model to quickly and easily recognise the student faces. In LBPH, images with faces are created using pixels and a combination of matrices and pixels. Using these, we can identify student faces, and then the attendance is taken. After that, we must record on a separate sheet the information about the pupils who attended or did not.

II. RESEARCH ELABORATION

The RFID (Radio Frequency Identification) card system, the fingerprint system, and the iris recognition system all have drawbacks, according to Arun Katara et al. (2017). The RFID card method is used because it is straightforward. As long as the user has their friend's ID card, they usually assist their pals with checking in. The

fingerprint system is efficient but not very quick because each user must stand in line and go through the verification process individually. The human face, however, is constantly visible and contains less data than the iris when used for facial identification. A more detailed iris recognition technology might violate the user's privacy. Although voice recognition is a possibility, it is not as precise as other approaches.

Arun Katara et al. claim that there are issues with the RFID (Radio Frequency Identification) card system, the fingerprint system, and the iris recognition system (2017). The simple nature of the RFID card approach makes it popular. The user normally helps their friends check in as long as they have their ID card. Because each user must wait in line and complete the verification process separately, the fingerprint technology is effective but not very rapid. When employed for facial recognition, the human face is less data-rich than the iris and is always visible. The user's privacy might be violated by iris recognition technologies with more specific data. Voice recognition is a possibility, however it is less accurate than other methods.

The most commonly used method to locate the face segment from a static image or video frame algorithm which was developed by viola and in 2001 the viola-jones algorithm is essentially composed of four pieces the first component is called the haar feature the second component is where the integral picture is formed the third component is where adaboost is implemented and the fourth component is the cascade process a given image is examined by jones of features of haar are made up of several rectangles mekha joseph et al 2016 various haar feature the attributes serve as window functions that map onto the picture by of students. Attendance was implemented in the third research publication fingerprint server to a system using a software and lab view kumar, singh singh pujari Mishra is to examine the face recognition of students and then the data is then passed from microcontroller 1 to microcontroller 2 which checks it against the database stored there following the discovery of a students match the information is transmitted via serial communication to the pc to be displayed this is a smart design since it speeds up development while keeping design flexibility and makes testing easier. This work can be one of the finest and need to take time while processing the system.

III. WORKING OF LBPH MODEL

A. Proposed model

A local binary pattern is a method of approaching the image and afterwards examining the face in it i guess it was founded in 1990 it is a single model for both face detection and identification it has a simple algorithm that mostly uses the concept of an objects pixels and scatterplots it is possible to acknowledge faces in photographs and it will use 3x3 pixel matrices to reflect the majority face and classify the entire image this is one of the easiest techniques for segmenting an image the attendance logs student photographs are identified using a method known as local binary pattern profile lbph so that they can be updated face detection and face recognition using a created and trained dataset are the main elements of the proposed system.

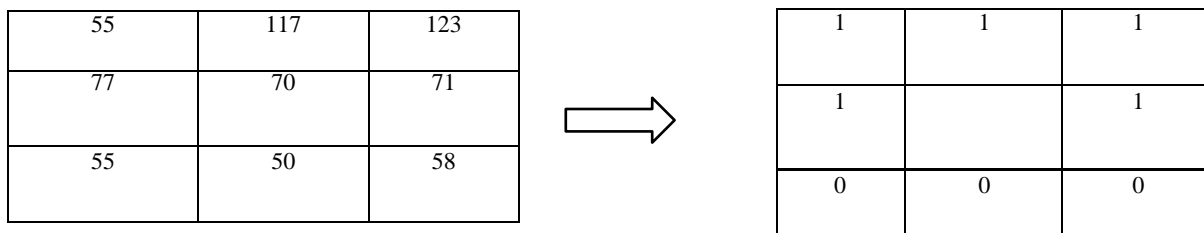


Fig 3.1 Pixels of an image

After getting the binary values , we need to note down the values binary numbers from left to right weight (2^p).i.e

$$\text{Threshold} = 1*1+1*2+1*4+1*8+0*16+0*32+0*64+1*128$$

= 144

The values is getting 31 so that value is placed in the place of 94 then again need to repeat the process.

The retrieved picture characteristics are built after the binary pattern lbp pattern for each pixel is calculated it is calculated the likelihood of the input vectors image before applying a distance classifier however as histogram representations only incorporate discrete information and not spatial information it loses spatial information in order to address this problem the supplied vectors image is then divided into pieces the histogram for each region

INPUT IMAGE-

Second, the photographs that were obtained in the previous stage were used as input images and must be processed in the following upcoming steps..

FACE DETECTION-

In these situations, it's important to identify any faces present in the supplied image. Simple definition of detection is the process of defining the faces in photos, followed by training. It will detect faces of students in images.

Creating & Training dataset- After identifying the image of the students with faces then we need to create and train a dataset separately for processing of images. It will train the multiple images to quick recognizing of students faces without any late

is made separately every bin in a distributed reflects a pattern and records the frequency with which that pattern occurs in the region the extracted features for the entire image is then created by concatenating the localized histograms in the series this histogram which keeps the regional spatial information represents the identification of a single image.

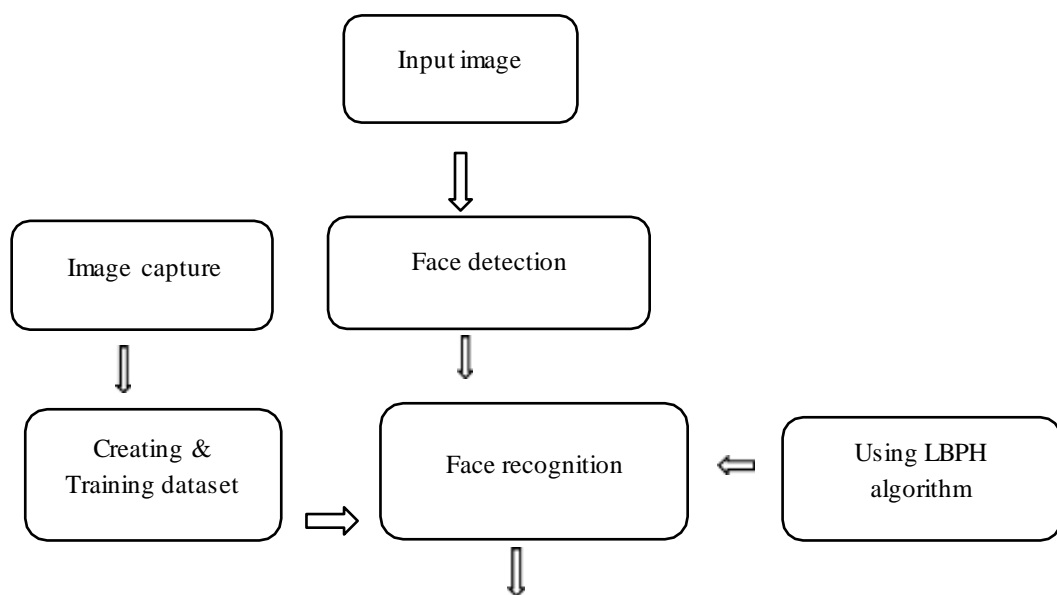
144	117	123
77	70	71
55	50	58

➔

117	123	113
70	71	75
55	58	50

Fig 3.2 Notedown the threshold values in first box

The proposed system has block diagram which is shown as



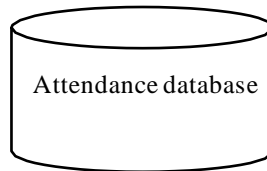


Fig 3.3 Block diagram of proposed method

CAPTURE IMAGE-

It is the first step, in these we have to capture the images of students using a webcam or digi cam and one more point the images should be steady state position and blur free images should be taken .

CONVERT TO GREYSCALE-

The system often captures photographs in a variety of colours, but since RGB images aren't understood by the system, we can convert them to greyscale images.

There are some methods to calculate the images

Average method- $\text{Greyscale} = (R+G+B)/3$

Weighted method- $\text{Greyscale} = 0.299R + 0.587G + 0.114B$

RESIZE IMAGES-

The photographs could then be resized, especially those in the 4x4 format, to make them easier to identify after being converted to greyscale.

CONVERT IMAGES TO NUMPY ARRAY-

The captured images should be in different formats like .jpg, .jpeg, .png as well the system that is can't understand that format. So, we need to convert them to a .py format.

DETECT IMAGE-

In these step we should detect the faces that are present in the images after the train of images. It will declare whether an image is in male or female.

ASSIGN ID TO IMAGES-

We should assign the id's to each and every image with a separate numbers to identify the student fast and quick.

TRAIN FACES WITH ID-

Finally, we need to train the faces with the given numbers which cant be exchanged the one ID to another ID.

FACE DETECTION & RECOGNITION

After the completion of train of images we need to detect and recognize the student faces in the system.

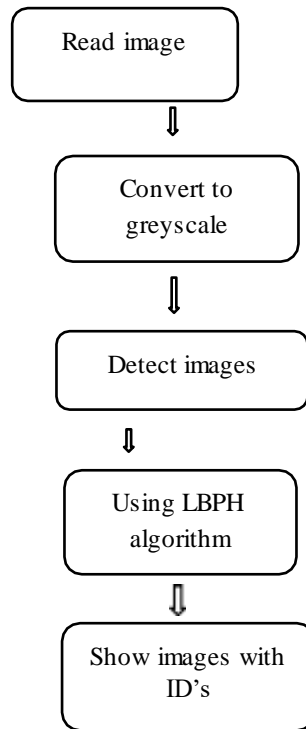


Fig 3.5 Flowchart of face detection & recognition

In this thing the above steps like read image and convert to greyscale image and then need to detect the images using LBPH model. As we are all known that working of LBPH model previously so, by using the model we candetect the images and then they can recognizable.

Later, we should save the attendance in a separate sheet.

B. Simulation software

Python is a software which are used to do this project. Python is a general purpose language developed by the Guido van Rossum that becomes a very popular. In these we need to install the required libraries to run the program.

The required libraries are opencv, pandas, matplotlib, python tkinter GUI, opencv-python.

These are all the libraries we have to install to the python software to run the code and need perform the execution well and defined manner.

IV. RESULTLS

Step1 Firstly, we have to open the program which we are have a path and then we need to select the path of theprogram and write the command “cmd” to open the command prompt.

Step2 Next we want to write a online command to open the python GUI. For these we have to write a py.train.py command to process the next steps.

Step3 Then the student attendance system has opened which is look like a

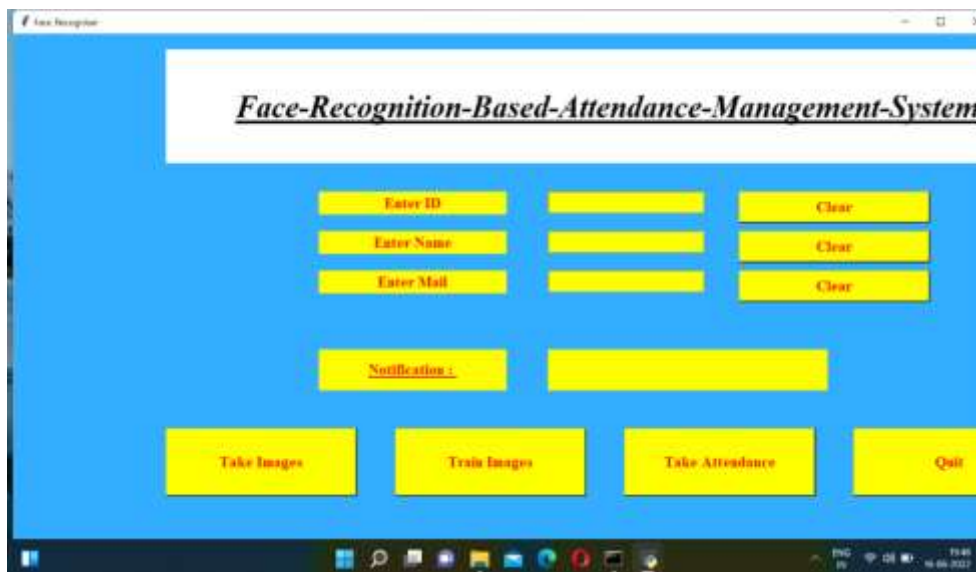


Fig 4.1 Interface of Attendance system.

Step4 Next we want to enter the details of the students like name, id, mail, etc.,



Fig 4.2 Enter student details

Step5 In these one we need to take student images then after we gave train the images.

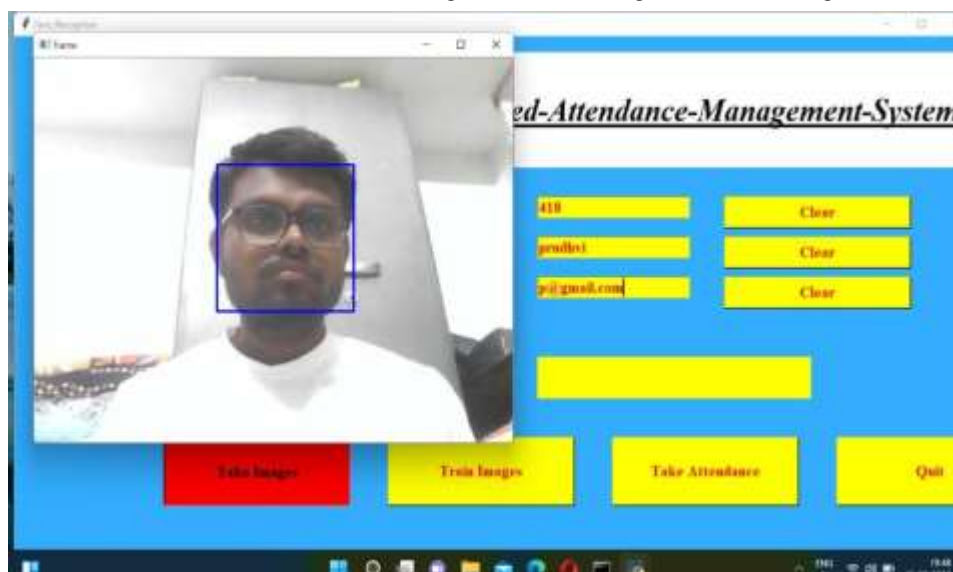


Fig 4.3 Capturing the student.

Step6 Next, we have to train the images and to take the attendance. By training of images we should take attendance fast and quick.



Fig 4.4 Images trained of student

Step7 in these step we have to take the attendance of the students.

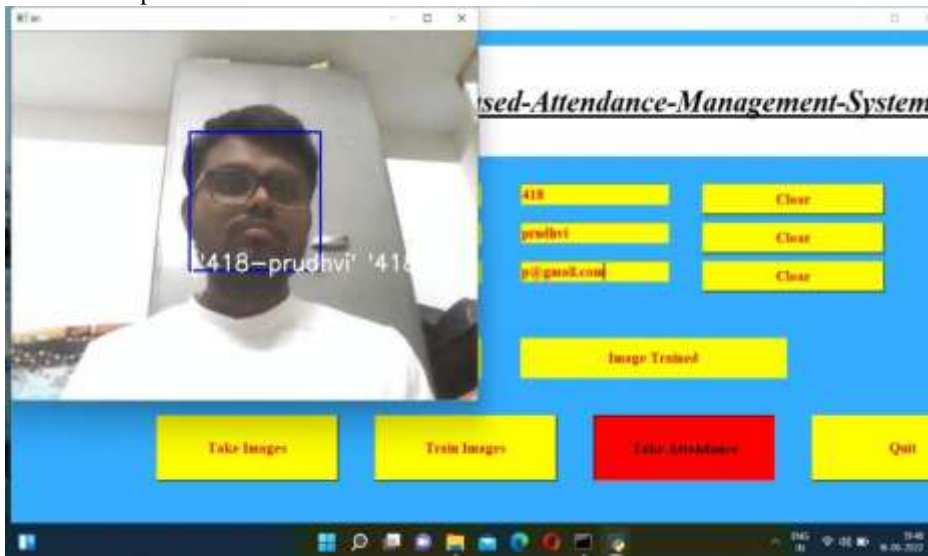


Fig 4.5 Taking the attendance of student

Step8 Finally, we can save the attendance in a separate sheet.

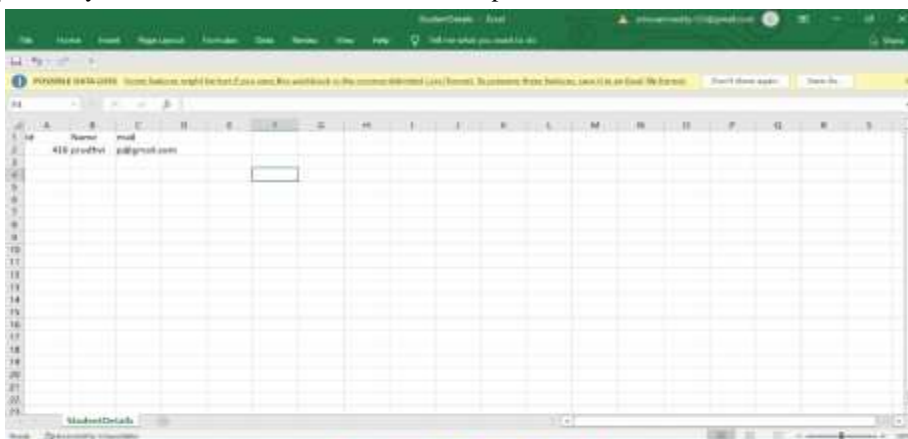


Fig4.6 saving attendance

V. CONCLUSION

Thus, we had implemented the attendance monitoring system which can be most accurate and well defined. By using face recognition we can clearly understand how the algorithm works and use of helpful for the students. The automatic attendance system will clearly defines the how the method works and processing of images would be understandable clearly and easy. In these project all the images are detected and recognized with LBP algorithm, and the conversion of images also having good accuracy with maximum efficiency of results.

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