IJCSE International Journal of Computer Sciences and Engineering Open Access
Research Paper Vol.8, Issue.5, May 2020 E-ISSN: 2347-2693

Face Recognition using OpenCV

Shivani Duggi[1*], Khajabani S.[2], Katha Harshitha [3], N.B. Shaguftha[4], M. Nagaraj[5]

[1,2,3,4,5]Dept. of Computer Science, RYMEC, Ballari, Karnataka. India

[*]*Corresponding Author: shiduggi@gmail.com Tel.: +91-9731435683*

DOI: https://doi.org/10.26438/ijcse/v8i5.187191 | Available online at: www.ijcseonline.org

Received: 13/May/2020, Accepted: 20/May/2020, Published: 31/May/2020

Abstract— The rate of computer power steadily doubles every 13 months, with this face detection and recognition has transcended from an esoteric to a popular area of research in computer vision and one of the better and successful applications of image analysis and algorithm based understanding. Because of the intrinsic nature of the problem, computer vision is not only a computer science area of research, but also the object of neuro- scientific and psychological studies, mainly because of the general opinion that advances in computer image processing and understanding research will provide insights into how our brain works and vice-versa. Considering the general curiosity and interest in the matter, we propose to create and develop a facial recognition based attendance management system, using Intel's open source computer vision project, OpenCV and Microsoft's .NET framework. The paper describes how to take student's attendance using face recognition. The face recognition is implemented with the help of Local Binary Patterns Histogram (LBPH) algorithm. The system will recognize the face of the student and saves the response in database automatically.

Keywords— Automatic, Database, Face Recognition, LBPH

I. INTRODUCTION

Maintaining the attendance is very important in all the institutes for checking the presence of students. The existing method that institutions use is, the faculty passes an attendance sheet or make roll calls and mark the attendance of the students, which causes disturbance to the class discipline and is then updated to an excel sheet by the admin department. This process is quite hectic and time consuming. Also, for professors or employees at institutes or organizations, the biometric system serves one at a time. The face recognition approach is for the automatic attendance of students in the classroom environment without student's intervention. Here, we are working on face recognition based attendance management system by using OpenCV (Python). One can mark their attendance by simply facing the camera, which can be considered as one of the most successful applications of image analysis and processing. The proposed system demonstrates how face recognition is used for taking attendance of a student automatically using LBPH algorithm, how to store the faces in the database and how to retrieve the absent list.

II. RELATED WORK

The first attempt to use face recognition was made in 1960's with semi-automated system. Xiang-Yu Li, proposed that recognition of face using hog features and pac algorithms. By applying recognition algorithm to cropped faces images we get similarity b/w taken image and database image. In this paper PAC algorithm is used for face detection and recognition. Arun Katara, shows that face recognition of different person or student, from recognition, attendances are upload to database using face detection and recognition of student or workers. From this, mutual work is decreased by human and automatically attendance system based on faces process is done. Adam Schmidt and Andrzej Kasinki, the authors have considered a system based on real time face recognition which is fast and which needs improvisation of images in various lighting environments

III. METHODOLOGY

The system uses the histogram approach for face recognition. The method analyzes and extracts histograms which are faces composed of feature vectors. The method also compares the grayscale faces to identify the presence of a person(face) and its identity. The method involves the following steps. As a first step the system should be initialized with a set of training faces. Next, when a face is detected the face area is first divided into small regions from which Local Binary Patterns (LBP), histograms are extracted and concatenated into a single feature vector. Then, the system compares the feature vectors of the current face and the stored face image and determines whether the face is identified or not. The final step (optional) is that if the unknown face is detected repeatedly the system may learn to recognize it.

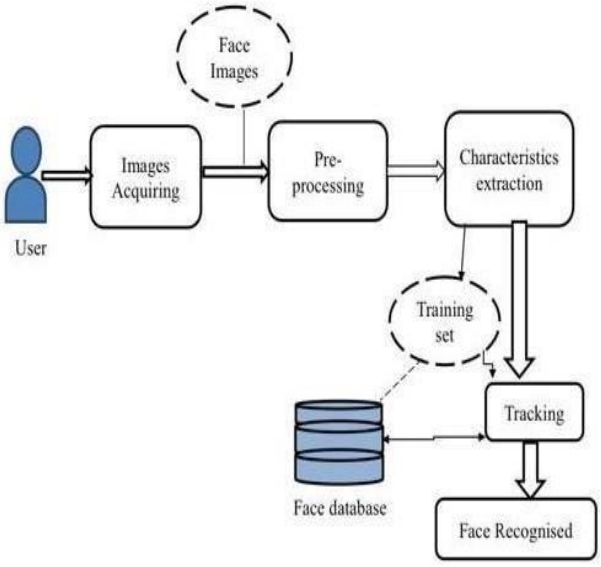

Fig 1 : System architecture

The main component used in the system are open source computer vision library (OpenCV) and Microsoft Visual Studio 2010 Professional Edition. OpenCV is a library of programming functions aimed mainly at real-time computer vision developed by intel Russia research center. The library is cross platform. The OpenCV's application areas includes 2D and 3D feature toolkits, facial recognition system, object identification and motion tracking. OpenCV library contains more than 550 functions. The interface for OpenCV used here is Microsoft Visual Studio 2010 Professional Edition.

The student needs to be in front of a camera at a minimum distance of 15 inches. The system will detect the image of the student according to LBPH, for 60 secs, converts it into a grayscale and stores it in an xml file. When the student reappears before the camera, faces are recognized by comparing the Eigen faces of current and stored images. Then the names of the detected faces are stored in Microsoft Access Database.

The Local Binary Pattern Histogram (LBPH) algorithm, can recognize both front face and side face and is a simple solution on face recognition problem. The face image is first divided into small regions to extract Local Binary Patterns (LBP), histograms and concatenate them into a single feature vector. This feature vector is used to measure similarities between images and forms an efficient representation of the face

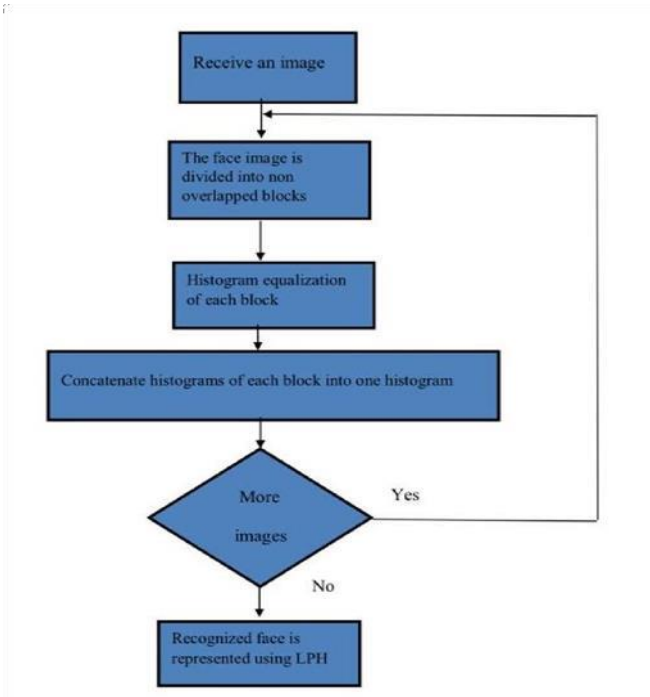

Fig 2 : Process involved in the system

These basic steps are used for implementing the proposed system.

1. Detect and extract the face image and save the details in an xml file.
2. The face area is first divided into small regions to extract Local Binary Patterns (LBP), histograms and concatenate them into a single feature vector.
3. Recognize the face and match it according to histogram extracted and feature vectors stored in xml file [1].
4. Store the name of the face displayed in Microsoft Access Database.

IV. RESULTS AND DISCUSSION

The analysis process involves the following steps:
Step 1: Face Detection and Extraction: Images can be captured with the help of webcam on the user side.
Start:
The captured image should be processed and extracted. The captured image should be compared with the existing face images in the database If there is a match recognition step will be done. Otherwise, the face image will be notified as unknown.
Quit.

Step 2: Face Recognition: The basis for the face recognition is LBPH algorithm the following steps would be followed for face recognition:
Start:
The details about the matched face image can be found from the database. Along with the date, the name field in the face recognition module is added to the MS Access. Database to make the completion of attendance for each student.
End.

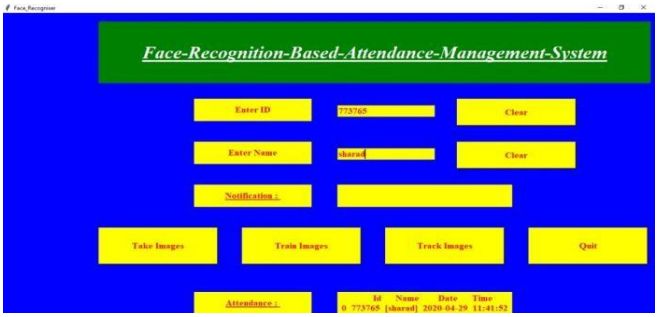

Fig 1: Appears on the screen when the code is run.

This is the page that appears when the user runs the code.

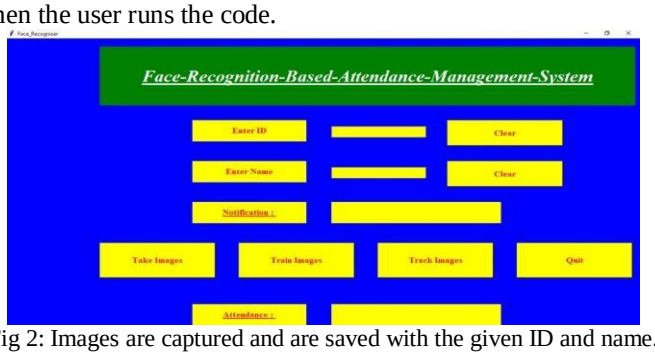

Fig 2: Images are captured and are saved with the given ID and name.

After entering the ID and name of the students, when we click on take images button, images are captured for 60 seconds. After the images are captured, it shows a notification that the images are saved for that particular ID and name.

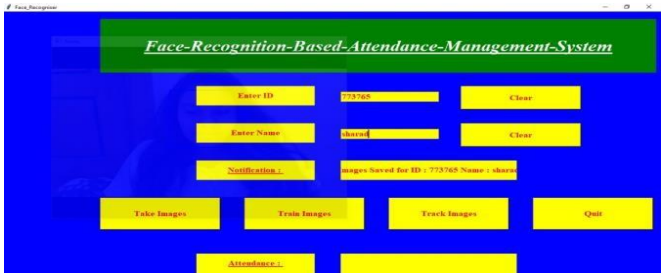

Fig 3: Notification "Image Trained" upon clicking "Train Images"

After the images are saved, we need to train the images so that the images can be tracked. So when we click on train images button, it shows a notification that the images are trained.

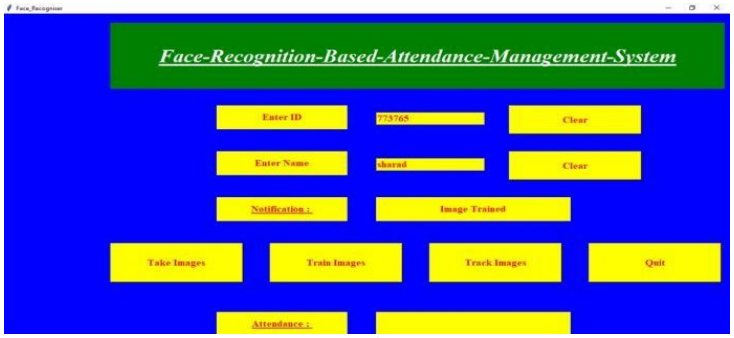

Fig 4: Tracking the image. When the image is tracked, attendance of the person is marked with date and time and is stored in the excel sheet.

After the images are tracked, we need to track the images so the attendance of the person is marked. When the image is tracked, the attendance is marked. And it shows notification with ID, name, date and time.

Fig 5: When non-numeric value is entered for ID.

When the person enters a non-numeric value, for e.g., alphabet, symbols, it shows that you need to enter numeric ID.

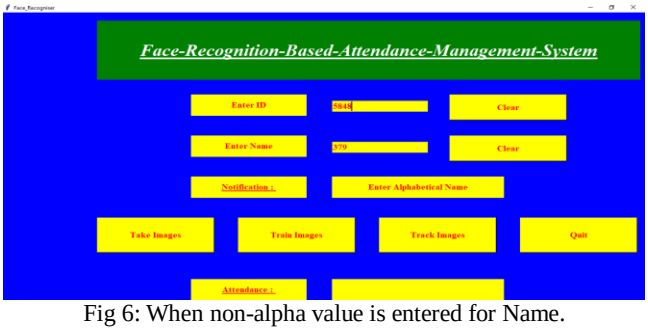

Fig 6: When non-alpha value is entered for Name.

When the person enters a non-alpha value, for e.g., number, symbols, it shows a notification that you need to enter alphabetic name.

V. CONCLUSION AND FUTURE SCOPE

In order to reduce the faculty effort and to manage the time effectively the authors proposed automated attendance system based on face recognition in schools and colleges and colleges. The system takes attendance for particular about a minute and when the time expires the system automatically stops capturing images. The result of the experiment shows improved performed in the estimation of attendance compared to traditional pen and paper type attendance system. The current work is mainly focused on face direction and extraction by LBPH algorithm.

In further work authors are intended to improve face recognition by comparing 3D face images with 2D face images (Real time). Also, the authors are intended to improve on multiple face recognition at the same time so that the effectiveness of time can still be managed and try to improve on the portability of the system

REFERENCES

[1] Baron, R.J. "Mechanisms of human facial recognition", International Journal of Man Machine Studies, 15:137-178, 1981.
[2] Mr. Dipesh Sharma, "A study of various Face Detection methods".
[3] Xiang-Yu Li (&) and Zhen-Xian Lin, "Face Recognition based on HOG and Fast PAC Algorithm".
[4] Adam Schmidt, Andrzej Kassinki, "The performance of the Haar Cascade Classifiers Applied to the Face and Eyes Detection".
[5] Arun Katara, Mr.Sudesh, V.Kolhe, "Attendance System Using Face Recognition and Class Monitoring System",
[6] Beymer, D. and Poggio, T., "Face Recognition from One Example View", A.I. Memo No. 1536, C.B.C.L. Paper No. 121. MIT, 1995.
[7] Craw, I., Ellis, H., and Lishman, J.R., "Automatic extraction of face features", "Pattern Recognition Letters", 5:183-187, February, 1987.
[8] Goldstein, A.J., Harmon, L.D., and Lesk, A.B. "Identification of human faces", in Proc. IEEE, Vol. 59, page 748, 1971
[9] de Haan, M., Johnson, M.H. and Maurer D. (1998) Recognition of individual faces and average face prototypes by 1- and 3- month-old infants. Centre for Brain and Cognitive
[10] Heisele, B. and Poggio, T., "Face Detection", Artificial Intelligence Laboratory, MIT, 1999.

