

Smart Group Attendance Monitoring System using Face Recognition

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Abstract - Database containing the train test images are compared with the captured images of students in the group of four to five is resized to be compared with individual test image. If the attendance has to be taken then they need to login into GUI interface for start capturing the image it's done that there is transparency in the attendance and there is clarity for each and every student. Including to the model, features like attendance percentage and message to the parent is sent if the student is not present for consecutive three days. A App is created for the updating of the student attendance and percentage and also the test scores is available with it. The system is more reliable than the older and existing systems and also has good time management with faster processing speed.

Keywords—SURF Algorithm, Image acquisition.

I. INTRODUCTION

Recognition of face technology is growing and becoming an major aspect in the research field of the Computer vision automated system. It has been playing a major role for the analysis around the world. Face recognition is mainly used in the field of Security, Authentication, Attendance marking. marking the attendance is a hectic job for the teachers in colleges and universities. Different institutes have adopted the different methods of attendance marking. The traditional way of attendance marking are calling the name of students, passing the attendance sheet to the students. The popular attendance marking system which are used are Radio-Frequency Identification and Detection (RFID), Iris recognition and fingerprint recognition. Since Iris recognition and fingerprint recognition requires the making of queue thus it is more time taking and hectic in nature. These methods are very short distance biometrics-based attendance marking system, but in our proposed system requires the person to be at a medium distance from the camera, which is fixed in the centre of the front wall facing all the students. The range of the camera covers all the students in the classroom. It carries the face recognition task through an image/video stream for the recording of attendance of lectures and maintaining the database in excel sheets and updating it online and interface with GUI system.

This model uses SURF descriptor for image enhancement and cropping of image to resize to individual image to store it in

database. The Face recognition based attendance monitoring system mainly focuses on the matching of individual and unique features in the face of the individuals.

Our proposed system take care of group attendance and accuracy of identifying the persons is tested using several test cases. The model takes into consideration of various scenarios like noise, processing of image and other various facial expression and change in human facial (absence or presence of spectacles) for processing of data.

II. METHODOLOGY

Individual student's picture is stored in the database. Using MATLAB software GUI is created for each student. When the program is run a tick will be sounded which indicates the user to hold student's photo. After a certain delay the image is captured is the test image. Again on one more tick, the user must hold the internal marks of a student and it is captured in the image format. The OCR function is called and the texts in the image are extracted. If the train and test images are matched then the corresponding student's GUI is opened. For the face recognition purpose again SURF detection and description technique itself is used. Also for image to text conversion purpose Optical Character Recognition (OCR) technique is used. The internal mark is stored there in text format. On clicking the average option the average of best two marks is obtained. Individual images of each student is captured and stored in the database called "Train images". These images are to be captured with a camera having good resolution and with proper illumination. On each day the capturing of the images in the class is done. This image will be a group image of many individuals. This image is stored in another folder called "Test image". Now for the marking of attendance Train images are compared with the Test images. The SURF algorithm is used for the matching purpose. SURF is a descriptor which detects the interest points in the Train images and searches for the same features in the test image. It then filters out few points and left with few interesting points. Based on the Euclidean distance, the points having minimum distances are matched.

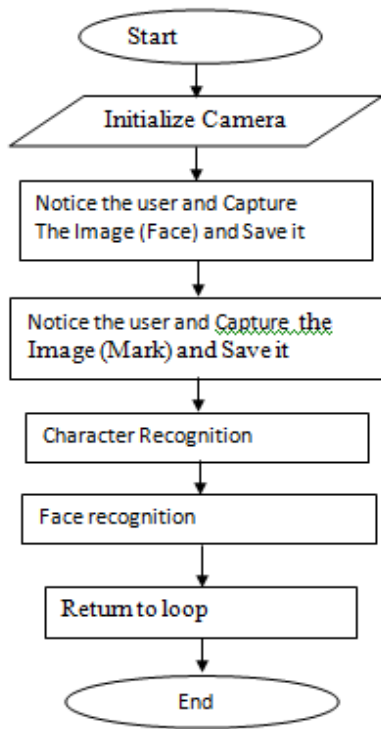


Fig -1: Flowchart of the experimental setup.

Technical Requirement

Hardware Requirements

- 1.Pentium 4 and onwards.
- 2.RAM - 1GB and more.
- 3.HDD - 80GB and more.
- 4.Camera.

Software requirements

- 1.MATLAB
- 2.Speeded Up Robust Features (SURF).

III.ALGORITHM OF THE PROPOSED SYSTEM

This section describes the SURF software algorithm for the system. Speeded Up Robust Features (SURF) is a scale and in-plane rotation invariant feature. The Face recognition based attendance mainly focuses on the matching of individual and unique features in the face of the individuals. SURF has two main parts that is detector and descriptor where detector gives out the main focus points in the images and descriptor gives the information about the features of shapes and all details of the interest points. SURF algorithm uses Hessian approximation. The SURF has major 2 working points . The key point of circular where the main focus of the image like eyes are formed and other rectangular for descriptor for in formation of shapes .

The algorithm consists of the following steps stages:

- 1.Image acquisition
- 2.Image processing
- 3.Distinctive characteristic location
- 4.Template creation
- 5.Template matching

In this model, the camera attached at the wall captures image of the student in group of three to four and then it resizes and cropped into individual student images to compare with the train image stored in the database.

Image Acquisition

The camera attached to the wall capture images of students in different angles and every 6 minutes and it is processed and resized and cropped and then sent to the GUI

Creation of Students Database

20-25 photographs of each student are captured in different angles with some modification and gestures. The images are cropped and converted into grey scale for the reduction in the time of computation. All the images are put into the folder named “Student Database”, each folder is further divided into sub-folders, subfolder is named on the name of the student. Sub-folder contains multiple images of each student.

Face Detection and Eye Detection:

In the wake of introducing the camera in the classroom, it catches the edges containing the characteristics of all understudies sitting in the class. SURF is connected on this edge, which identifies the appearances in the edge. To guarantee that the identified question is confront, each distinguished protest is edited and additionally handled for eye location and if eyes are recognized they are considered as faces else are rejected.

Browse image

The image is browsed from the local disk of the system. This image is a group image of all trained faces.

GUI (Graphical User Interface)

. It consists an area for the 2-dimensional image which is going to be either captured from the webcam or browsed from the local disk of the system as shown in fig 2.

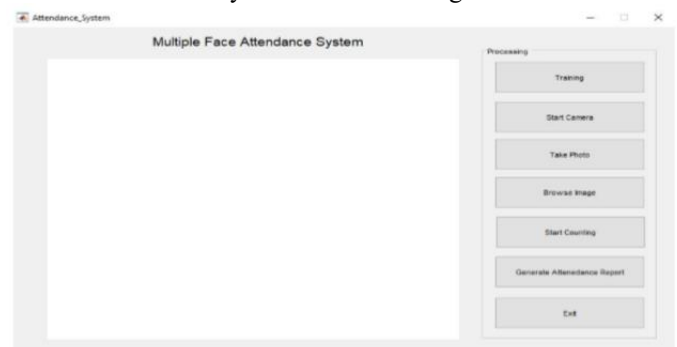


Fig -2: GUI of Real Time face recognition-based attendance monitoring system

IV. SOFTWARE SPECIFICATION

1. MATLAB: MATLAB is a high level language used in image processing and high level application for security.

2. SURF: Speeded Up Robust Features is a algorithm which in the image processing and image comparsion .It uses detector and descriptor

V. SYSTEM FLOWCHART

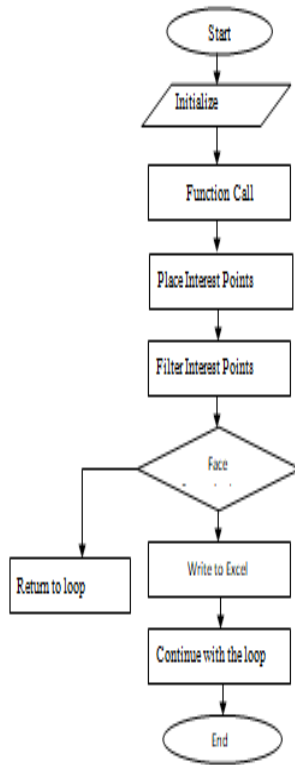


Fig -3: System flowchart

VI.RESULT

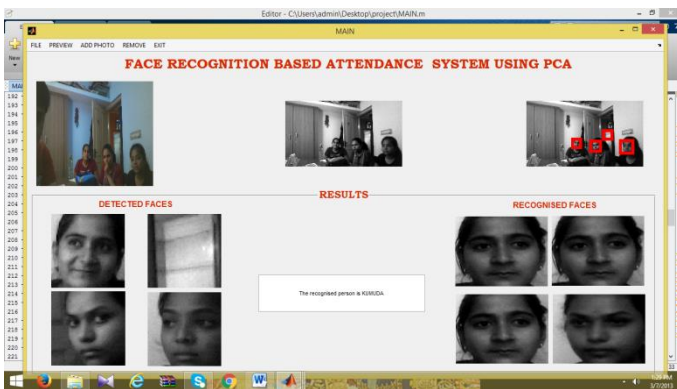


Fig -4: Face Detection

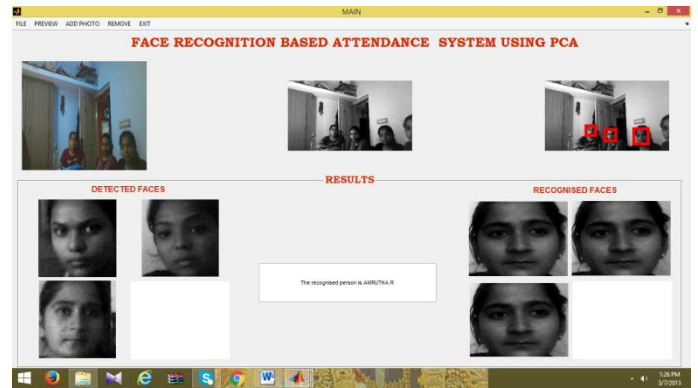


Fig -5: Images stored in the database.

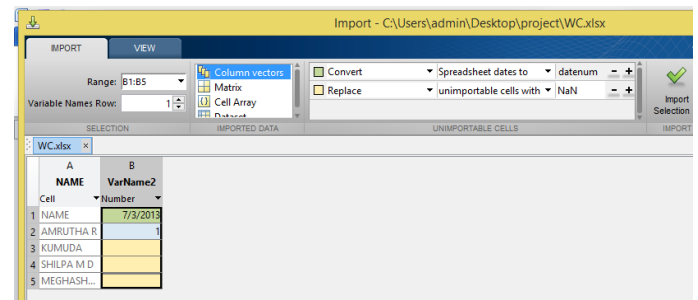


Fig -6: Updation of attendance into MS EXCEL

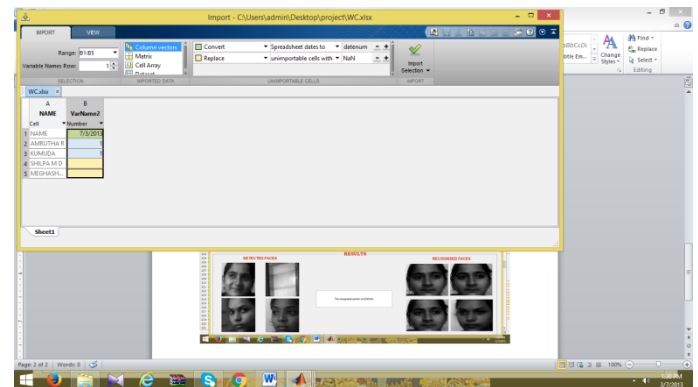


Fig -7: face recognition and attendance

VII.CONCLUSION

This model uses SURF algorithm for detection of images and then it is compared with the test image and then stored into database and the information is shared through the app for the teachers, parents and also students.

If the ward is absent for continuous days, then an mail and message is dispatched to the parent. This system has fast image processing than existing method.

VIII. ACKNOWLEDGEMENT

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IX. REFERENCES

- [1] V. Shehu and A. Dika, "Using Real Time Computer Algorithms in Automatic Attendance Management Systems." IEEE, pp. 397 – 402, Jun. 2010.
- [2] K. Susheel Kumar, S. Prasad, V. Bhaskar Semwal, and R. C. Tripathi, "Real Time Face Recognition Using AdaBoost Improved Fast PCA Algorithm," *Int. J. Artif. Intell. Appl.*, vol. 2, no. 3, pp. 45–58, Jul. 2011.
- [3] S. Z. Li and A. K. Jain, Eds., *Handbook of face recognition*. New York: Springer, 2005.
- [4] N. Mahvish, "Face Detection and Recognition," Few Tutorials, 2014. .
- [5] Anil K Jain, Lin Hong, Sharath Pankanti, and Ruud Bolle, *Biometric Identification*. IEEE, 2004.
- [6] A. L. Rekha and H. K. Chethan, "Automated Attendance System using face Recognition through Video Surveillance," *Int. J. Technol. Res. Eng.*, vol. 1, no. 11, pp. 1327–1330, 2014.
- [7] I. Kim, J. H. Shim, and J. Yang, "Face detection," *Face Detect. Proj. EE368 Stanf. Univ.*, vol. 28, 2003.
- [8] E. Shervin, "OpenCV Computer Vision," 03-Oct-2010.
- [9] T. Matthew and A. Pentland, *Eigenfaces for Recognition*, vol. 3, Volume 3, Number 1 vols. Vision and Modelling Group, The Media Laboratory, MIT: *Journal of Cognitive Neuroscience*, 1991.
- [10] Y.-Q Wang, "An Analysis of the Voila-Jones Face Detection Algorithm," *Image Process. Line*, vol. 4, pp. 128- 148, Jun.2014.
- [11] Suyash bharambe, shubham patil, omkar dixit, vyaqti vikas singh, santwana gudadhe "Survey-Student attendance management system RFID-GSM," vol-3, issue-2, 2017.
- [12] Ikuomola Aderonke Justina "fingerprint-based authentication system for time and attendance management" article from DOI:10.9734/BJMCS/2015/8731.
- [13] "Smart electronic be conscious Board and Attendance tracking the use of zigbee" Dr.D.Mohana Geetha1, M.Vishali2, M.Visali3, P.Divya lakshmi4, Vol. Five, trouble three, March 2017
- [14] "On line university college students' Attendance tracking device in take a look at room the usage of Radio Frequency identity technology: A Proposed tool Framework" Rajan Patel1, Nimisha Patel2, Mona Gajjar3 extent 2, problem 2, February 2018
- [15] "Web-Server primarily based definitely student Attendance machine the usage of rfidtechnology" Abdul Aziz Mohammednumber 1, Jyothi Kameswari U, studies pupil, ECM branch, ok L university, A.P., India Volume4Issue5- may also 2014
- [16] "Smart Attendance manage gadget" Sanjay Badhe ENTCT DYP COE Ambi, Talegoan, Pune MH
- [17] "Automatic Attendance monitoring device the usage of Android Platform" A department of laptop Engineering, adequate. J. Somaiya college of Engineering, Mumbai, India. Vol.four, No.2 (April 2018)