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Automated Attendance System using Haarcascade : A Face Recognition Approach

Abhish Ijari¹, Anand Mannikeri², Vinod Kumar Gulmikar³
^{1,2,3}Dept of ISE, KLEIT Hubballi, Karnataka, India

Abstract: Students Attendance system is smart way of marking attendance. This work describes the methodology where attendance is recorded by using camera attached inside the classroom that is capturing images of students, detect faces and match with the database and mark attendance. The phases involved are enrolment phase, in which unique features of person is stored in the database. Face recognition and verification phase where faces detected are compared with the database for verification, if matched attendance will be marked for that person.

Keywords: Capture, Haarcascade, Facial Recognition, Surf, Brute Force Matcher

I. INTRODUCTION

A face recognition system is computer application capable of identifying a person from a digital image. One of the ways to do so is by comparing selected facial features from image and a facial database. Face recognition is used in different areas, to name a few, The Australian and New Zealand customs services have an automated border processing system called SMARTGATE that uses facial recognition. The system compares the face of the individual with image in the e-passport microchip to verify that the holder of passport is rightful owner. Properly designed systems installed in airports, multiplexes and other public places can identify individuals among crowd, without passers-by even being aware of the system. Other biometrics like fingerprints, iris scans and speech recognition cannot perform this kind of mass recognition. Another area includes ATM and check cashing security. The software is able to quickly verify a customer's face. After a customer consents, the ATM captures a digital image of him. The facelt software then generates a face print of the photograph to protect customers against identity theft and fraudulent transactions. Thus by face recognition software there is no need for a picture ID, bankcard or personal identification number(PIN)To verify customers identity. But it is good enough to be already implemented in different vertical markets such as commercial sectors, healthcare and hospitality. However, effectiveness of facial recognition software in cases of railway and airport security is questionable as it struggles to perform under certain conditions such as lightning, sunglasses, long hair and other objects partially covering the subjects face. Also if the face is pointing the camera at an angle.

II. LITERATURE SURVEY

A. Automated Attendance Management System using Face Recognition By Mrunmayee Shirodkar ,Varun Sinha, Urvi Jain, Bhushan Nemade.

Automated Attendance Management System performs the daily activities of attendance analysis, for which face recognition is an important aspect. The prevalent techniques and methodologies for detecting and recognizing face like PCA-LDA, etc fail to overcome issues such as scaling, pose, illumination, variations, rotation, and occlusions. This system provides features such as detection of faces, extraction of the features, detection of extracted features, analysis of students' attendance and monthly attendance report generation. This system integrates techniques such as image contrasts, integral images, Ada-Boost, Haar-like features and cascading classifier for feature detection. Faces are recognized using advanced LBP using the database that contains images of students and is used to recognize student using the captured image. Better accuracy is attained in results and the system takes into account the changes that occurs in the face over the period of time. This is implemented using Viola Jones face detection method & Local Binary Pattern algorithm for face recognition and Yale database techniques, which yields overall efficiency of 83.2%.

B. Smart Attendance using Face Recognition with Percentage Analyzer By Jyotshana Kanti , Anubhooti Papola.

It is a smart way of marking attendance. It makes use of face recognition technique for marking attendance. In this, a new method which uses PCA(Principal component Analysis) with Artificial Neural Network for the purpose of face recognition in Attendance management & in addition ,there is a function which will analyze the percentage of attendance for a student and help him manage his leaves. In this work, artificial neural network architecture is implemented which will determine the orientation of the face and

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then recognize the face. Thus the system which will design will recognize those faces also in which side view of face is visible. Also an added percentage analyzer feature will help the students to monitor their attendance. The proposed system which yields overall accuracy of 81.3%.

C. Efficient Attendance Management using Face Recognition By Naveed Khan Balcoh , M. Haroon Yousaf, Waqar Ahmad and M. Iram Baig.

The attendance is recorded by using a camera attached inside the classroom which captures the images of students, detect the faces in images and compare the detected faces with the database and mark the attendance. camera takes the images to detect and recognize all the students in the classroom. In order to avoid the false detection we are using the skin classification technique ,through which we can enhance the efficiency and accuracy of detected faces which yields overall efficiency of 82.3% .

D. Limitations

In the literature survey few of the observations were made like, Although the system had developed to be work in computerization, but it still require computer operator to manage the storing and retrieving of information frequently. So, the proposed system had only converted the traditional attendance system to computerization but everything still have to be done manually such as key-in student attendance which are considered as the limitations .It only reduces the cost used for paper work but the system does not save much time .

III. PROPOSED METHODOLOGY

The system consists of a camera that captures the images of the classroom and sends it to the image enhancement module. After enhancement the image comes in the Face Detection and Recognition modules and then the attendance is marked on the database server. This is shown in experimental setup.

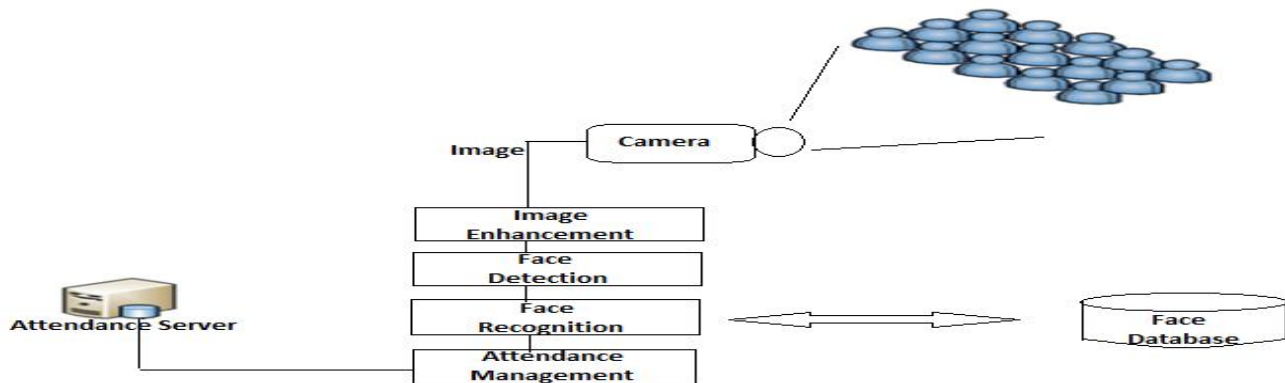


Fig. 1 Methodology for student attendance using face recognition

If any face is recognized the attendance is marked on the server from where anyone can access and use it for different purposes. A time table module is also attached with the system which automatically gets the subject, class, date and time. Teachers come in the class and starts the attendance process and the system automatically gets the attendance without even the effort of students and teacher. In this way a lot of time is saved and this is highly secure process no one can mark the attendance of other. Attendance is maintained one the server the admin who is one among faculty, can access it for it purposes like administration and parents themselves. Camera takes the images continuously to detect and recognize all the students in the classroom. Face Database is the collection of face images and extracted features at the time of enrollment process and the second attendance database contains the information about the teachers and students and also use to mark attendance.

IV. REQUIREMENTS

A. Hardware Requirements

- 1) Processor: Intel Core i3-2370 CPU @ 2.40GHz
- 2) Installed Memory(RAM): 4.00 GB or higher
- 3) System Type: 32 bit operating system or higher
- 4) A camera with the Resolution: 512 by 512 pixels.

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B. Software Requirements

- 1) Programming Language: Python
- 2) Windows XP or higher

V. OBJECTIVES

- A. Generate the database for students.
- B. Mapping of the class time table with respect to each semester.
- C. Recognizing faces of the students and updating student attendance pertaining to respective class lecturing.
- D. Auto mapping of subject and faculty for a class if the staff is on leave or in the case of mutual exchange.

VI. CONCLUSION

To develop an Automated Attendance system using face recognition. In a web application, faces are captured by the camera and are recognised with the faces that are stored. It is a smart way of marking attendance. It makes use of face recognition technique for marking attendance. In this, a new method which uses PCA (Principal component Analysis) with Artificial Neural Network for the purpose of face recognition in Attendance management & in addition, there is a function which will analyze the percentage of attendance for a student and help him manage his leave.

VII. ACKNOWLEDGEMENT

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