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EFFECTIVE ATTENDANCE MARKING USING FACE RECOGNITION AND AUTOMATIC EXAM MONITERING SYSYTEM

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ABSTRACT—*Automation has played a major role in the growth, advancement, and modernization of our daily work processes. The main purpose of this paper is to develop a safe and secure attendance marking using face recognition and behavior monitoring in examination. This project deals with the effective attendance marking using face recognition, behavior monitoring and performance analysis. In order to conduct TOEFL exams and monitoring the students is difficult task for management. At the same time our current examination system is pretty old and they cannot find any malpractice during examination. Our main aim of the project is to detect any malpractice is happening in the examination hall, face recognition based student verification system, automatic valuation system in the examination. Camera is initiated and face recognition is processed using MATLAB. Sensors are connected to the controller to watch malpractice. After verification, random set of questions are generated to the users, time limit for each questions is monitored. If any malpractice is found alarm will ON. Finally the result is displayed on the phone screen, and also sent to the mobile via SMS. If any student is present for the exam it is also intimated to parents through SMS. Data is stored in the cloud server.*

Keywords— face recognition, attendance marking, MATLAB, sensors.

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1, INTRODUCTION

Face Recognition as it is often referred to as, analyses characteristics of a person's face image input through a camera. Facial recognition or face recognition as it is often referred to as, analyses characteristics of a person's face image input through a camera. Confirmation or distinguishing proof can be fulfilled from two feet away or more, without requiring the client to sit tight for drawn out stretches of time or do much else than take a gander at the camera. Traditionally student’s attendance is taken manually by using attendance sheet, given by the faculty member in class. The Current participation checking strategies are dull and tedious. Manually recorded attendance can be easily manipulated. Moreover, it is very difficult to verify one by one student in a large exam hall. Hence the paper is proposed to tackle all these issues. The data or images obtained by the camera are sent to a computer programmed system for further analysis. The obtained images are then

compared with a set of reference images of each of the employees or students & mark the corresponding attendance. The system also provides for continuous monitoring of the classroom by an operator if needed. The camera module can be a wireless or wired system. Now, the student will login for the exam. Random set of questions will be displayed on the screen. During examination, behavior of the students is also monitored simultaneously to avoid any malpractice. Malpractice is detected using ultrasonic, capacitive and voice detector sensors.

After face recognition attendance will be marked automatically and then random set of questions will be generated. Time limit for answering every question is monitored. The final result is displayed on system screen and also sends to the parents. If any student is absent for the exam, will be intimated to parents via SMS.

2, FACE RECOGNITION – BEHAVIOR MONITORING

Recognizing a face means to identify that particular face from a list of faces on a database**.** Behavior of the student is monitored automatically using sensors continuously.

2.1 Face Recognition

It is necessary in working the proper Recognition of face. MATLAB software is used for face recognition. One of MATLAB goals is to provide a simple-to-use computer vision infrastructure that helps people build fairly sophisticated vision applications quickly. MATLAB library contains many functions that span over many areas of vision. The user stands in front of the camera keeping a minimum distance of 50 cm and his image is taken as an input. The frontal face is removed from the picture then changed over to dim scale and put away. The Principal component Analysis (PCA) algorithm is performed on the images and the Eigen values are stored in a file. At the point when a client demands for acknowledgment the frontal face is removed from the caught video outline through the camera. The Eigen value is re-calculated for the test face and it is matched with the stored data for the closest neighbor. Uigetfile command is used for adding an image in the database. Dialog box is used to write messages as required. If the person is a student of the class, message displayed in the dialog box is “OK”, if the person is not a student of the class message displayed is “NOT OK”.

It is constructed in three modules:

- Image capturing
- Face Detector and
- Face recognizer.

A) IMAGE CAPTURING

Pictures are caught utilizing a module that is an advanced camera whose connection is incorporated to the application that is created utilizing the proposed thought. After an image is captured, using web services transfers the image on server for processing. Together with the image, the web service accepts the course code. Using this course code, the LMS is aware of which students are enrolled in that exam hall and do face matching

only for those students The camera ceaselessly takes pictures on a given interim (of course every five minutes), until all countenances recognized are effectively distinguished or until the framework is told to stop. This means that in some cases, e.g., when a face cannot be successfully identified, the camera keeps taking pictures until the class finishes.

B) FACE DETECTION

In view of processor escalated employment of the face location calculation, this device is server based. Detecting a face is in essence an object detection task; where the object of interest in this case is the face In any case, many components can meddle with the face recognition calculations, variables, for example, confront posture, scale, position, turn, light, picture hues and so on. The same problems arise when one wants to identify (recognize) a face, with addition to some other obstacles which is discussed shortly.

THE VIOLA/JONES FACE DETECTOR

It's a widely used method for real-time object detection. Training is slow, but detection is very fast. Training Data – 5000 faces, all frontal – 300 million Non faces, 9400 non-face images. The course question locator utilizes the Viola Jones Calculation to distinguish individuals' confronts noses, eyes, mouth, or, on the other hand abdominal area. The Viola-Jones algorithm uses Haar -like features, that is, a scalar product between the image and some Haar-like templates. More precisely, let I and P denote an image and a pattern, both of the same size N × N, The feature associated with pattern P of image I is defined by

$$\sum_{1\le i\le N}\sum_{1\le j\le N} \mathrm{I(i,j)}^{1}_{\mathrm{P(i,j)is\ white}} - \sum_{1\le i\le N}\sum_{1\le j\le N} \mathrm{I(i,j)}^{1}_{\mathrm{P(i,j)is\ black}}$$

FEATURE EXTRACTION

Feature extraction a type of dimensionality reduction that efficiently represents interesting parts of an image as a compact feature vector. This approach is useful when image sizes are large and a reduced feature representation is required to quickly complete tasks such as image matching and retrieval. Include discovery, highlight extraction, and coordinating are regularly joined to understand normal PC vision issues, for example, question discovery and acknowledgment, content based picture recovery, confront location and acknowledgment, and surface grouping.

GLCM (Gray Level Co-occurrence Matrix) Features

The GLCM is a well-established statistical device for extracting second order texture information from images. GLCM is a framework where the quantity of lines and segments is equivalent to the quantity of particular dim levels or pixel values in the picture of that surface. GLCM is a matrix that describes the frequency of one gray level appearing in a specified spatial linear relationship with another gray level within the area of investigation. Given a picture, each with a power, the GLCM is a classification of how frequently extraordinary blends of dark levels co-happen in a picture or picture area. Texture feature

calculations use the contents of the GLCM to give a measure of the variation in intensity at the pixel of interest. Normally, the co-event grid is figured in view of two parameters, which are the relative separation between the pixel combine measured in pixel number and their relative introduction.

HOG (Histogram of Oriented Gradient)

Histogram of Oriented Gradients (HOG) features are a trending topic in object detection. HOG features are a robust way of describing local object appearances and shapes by their distribution of intensity gradients or edge directions, and have been used successfully as a low level feature in a number of object recognition tasks. Human faces are generally considered interesting and important to detect in many applications such as surveillance, recognition systems, biomedical, and video. HOG descriptors have been shown to significantly outperform existing feature sets for human detection.

GABOR FILTER BANK

The Gabor channels (GF) are ideally confined in both space and spatial recurrence and getting an arrangement of sifted pictures which compare to a particular scale and introduction part of the first surface. In this work 5 scales and 6 orientations are used in terms of Homogenous Texture Descriptor. The Gabor function defined for Gabor filter banks is written as

$$G_{PS1,\mathrm{r}}(\omega,\theta) = \exp\left[\frac{-(\omega-\omega_{\mathrm{r}})^2}{2\sigma_{\omega\mathrm{r}}^2}\right] \times \exp\left[\frac{-\left(\theta-\theta_{\mathrm{r}}^2\right)}{2\sigma_{\omega\mathrm{r}}^2}\right]$$

Where $Gp_{s,r}$ (ω, θ) is Gabor function at the s^{th} radial index and r^{th} angular index $\sigma_{\omega s}$ and $\sigma_{\theta r}$ are the standard deviations of the Gabor function in the radial direction and the angular direction, respectively.

FACE RECOGNITION

Recognizing a face means to identify that particular face from a list of faces on a database. Our university, upon enrollment takes pictures from every student, and those images are stored in a database. Same as in face detection, there are many existing algorithms used to identify a face. This algorithm has many drawbacks: it depends on scale, pose and the color of the compared images. However the algorithm is very fast, and can compare only to images, thus we do not NEED to have multiple images of a person to train our system.

Since our framework is setup to catch just frontal pictures the stance of the face in not an issue. When a face is captured during the face detection phase, it is converted into gray scale. The same conversion is applied to faces on our student image database. We also do background subtraction on our images so other objects do not interfere during the process. Another issue is that faces are subject of change during time (facial hair, eyeglasses etc). Whenever we successfully identify a face, a copy of that face is stored in the database of faces for that student. Together with the image we store the time and date

when this image was taken. This way even if a student gradually changes his appearance (e.g., grows a beard) the system is still capable to identify him, since it has multiple images of the same person. On each consequent scan for a student, the recognition module starts comparing images from this database, sorted by date in descending order. This approach was chosen since the latest image of a student on our database is most likely to be more similar to the current captured image. Of course, a drastic change on a student's look causes the system to not identify that particular student

. To solve this issue, we have included a module, which lists all unidentified faces and the teacher is able to manually connect a captured face with a student from the list. This image is also stored on our database, as an updated picture of this particular student. This manual recognition process is performed only once. In a subsequent scan, this student is identified automatically by our system To accelerate the face acknowledgment handle we just analyze pictures caught in a classroom, with the database of understudies enlisted for that course as it were. This ensures that we process only a small subset of images available on our central data base.

EUCLIDEAN DISTANCE METHOD

In image analysis, the distance transform measures the distance of each object point from the nearest boundary and is an important tool in computer vision, image processing and pattern recognition. In the distance transform, binary image specifies the distance from each pixel to the nearest non-zero pixel. The Euclidean distance is the straight-line distance between two pixels and is evaluated using the Euclidean norm. The city block distance metric measures the path between the pixels based on a four connected neighborhood and pixels whose edges touch are one unit apart and pixels diagonally touching are two units apart.

2.2, BEHAVIOR MONITORING

In this section of the paper, we will be discussing the different functional aspects of the system which include, automated tracking the behavior of the system using ultrasonic sensor, capacitive sensor and voice detector sensor. To accelerate the face acknowledgment handle we just analyze pictures caught in a classroom, with the database of understudies enlisted for that course as it were. It works on the area above the frequency of sound waves from 40 KHz to 400 KHz. The distance between the sensors is calculated by multiplying half the time used by the ultrasonic signal in the way of a series of TX to RX is received by the circuit, with the speed of propagation of ultrasonic signal propagation on the use of media, namely air. In behavior monitoring capacitive sensor will monitor the student availability in the seat. Voice detector sensor will detect any sound in the examination. If any sensor is detected alarm will ON.

3. SYSTEM IMPLEMENTATION

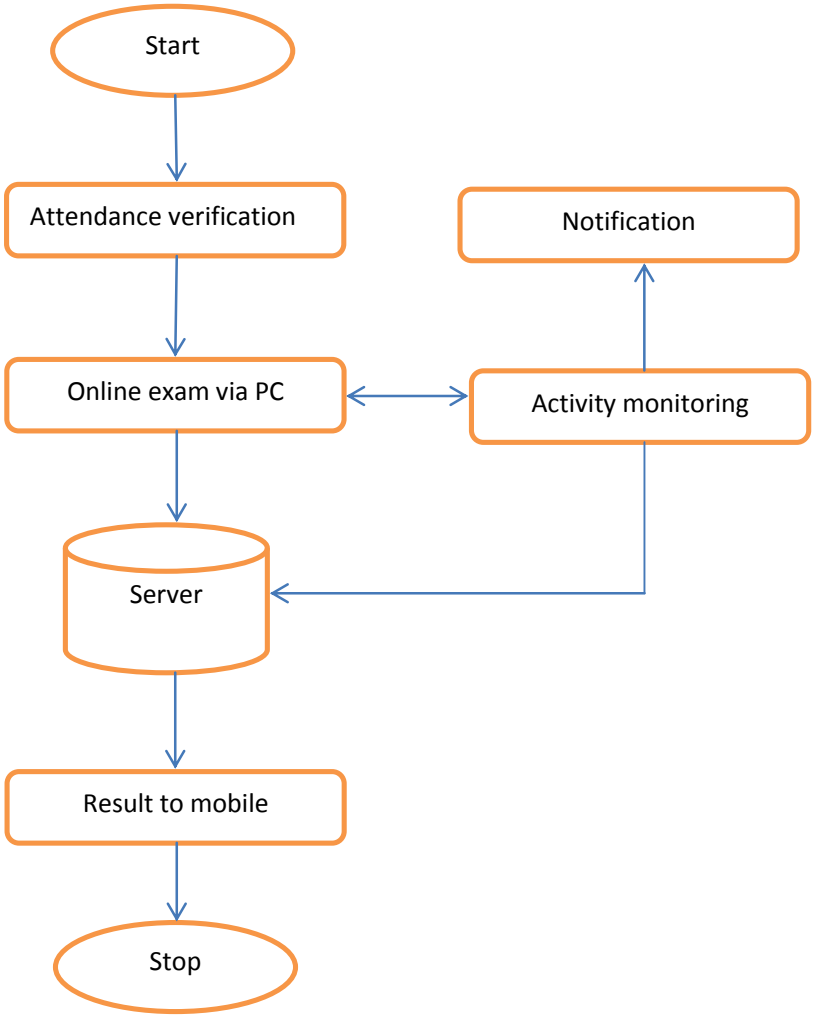

Fig 1: Process Flow Chart

Initially the student will enter the exam hall. Attendance is verified using face recognition and availability of the student is monitored using capacitive sensor. After attendance verification it will lead to the online exam. Simultaneously the student's activity is monitored using ultrasonic sensor and voice detecting sensor. If any violation is detected, the alarm will ON. After completion the result will be displayed on the screen and it is also sent to their parents via SMS. If the student is absent for the exam it will also be intimated to the parents**.**

5. CONCLUSION

This paper presented a multifactor authentication system for access control of services and restricted areas, which combines face recognition and token-based authentication for the sake of improved accuracy, reliability. For every education institution, universities there are many students and many sections for every branch. In order to conduct exam and

monitoring the students is difficult task for the management. At the same time our current examination system is pretty old based on written test and also they cannot find any malpractice during the examination. Our main aim of the project is to detect any malpractice is happening in the examination hall, and face recognition based student verification system, automatic Valuation system.

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