Project Id: ……

Synopsis
on

Face Recognition Attendance System
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of

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In

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By

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OBJECTIVE

The main objective of this work is to make the attendance marking and management system efficient, time saving, simple and easy.

PROBLEM STATEMENT

- Traditional method of attendance recording has proven to be stressfull and in-effective.
- Traditional method of storing and maintaining students data has also proven stressfull and in-effective.

ABSTRACT

The existing attendance system requires students to manually sign the sheet every time they attend a class. This includes the more time consumed by the students to find their name on sheet, some students may mistakenly sign another student's name and sometimes the sheet may got lost. For avoiding the sheet problem, we used RFID technology, RFID card capture the attendance by flashing their card and save all data but sometimes RFID card may got lost.
APPROACH: For avoiding the problem in sheet and RFID, we used face recognition and authentication using web cam and Machine Learning. After having images from Web-Cam, the image is cropped into square shape. We also focus on the special characteristics of human facial aspects such as eye, nose (HAAR FEATURES). In this recognition different control point are detected. The input image goes through the recognition system for facial identification. In some cases where the input image from the Web-Cam does not exist in the database, the user will get some error. However, in cases where the image exists in the database, that image will be computed for similarity measurement using Distance between control point measures from the input image.
RESULTS AND CONCLUSION: The result of our experiment indicates that the recognition process of number of images in the database and some images from the Web-Cam provides 100% accuracy in terms of recognition.

INTRODUCTION

The most common means of tracking student attendance in the classroom is by enforcing the students to sign the attendance sheet, which is normally passed around the classroom while the lecturer is conducting the lecture. There are numerous disadvantages of using such system. For instance, lecturers with a large class may find the hassle of having the attendance sheet being passed around the class and the manual signing of attendance by students are burdensome and most likely distract them from teaching .
Besides, as the attendance sheet is passed around the class, some students may accidentally sign another student's name. The first case leads to a student missing out their name, while the latter leads to a false attendance record. Another issue of having the attendance record in a hardcopy form is that a lecturer may lose the sheet.

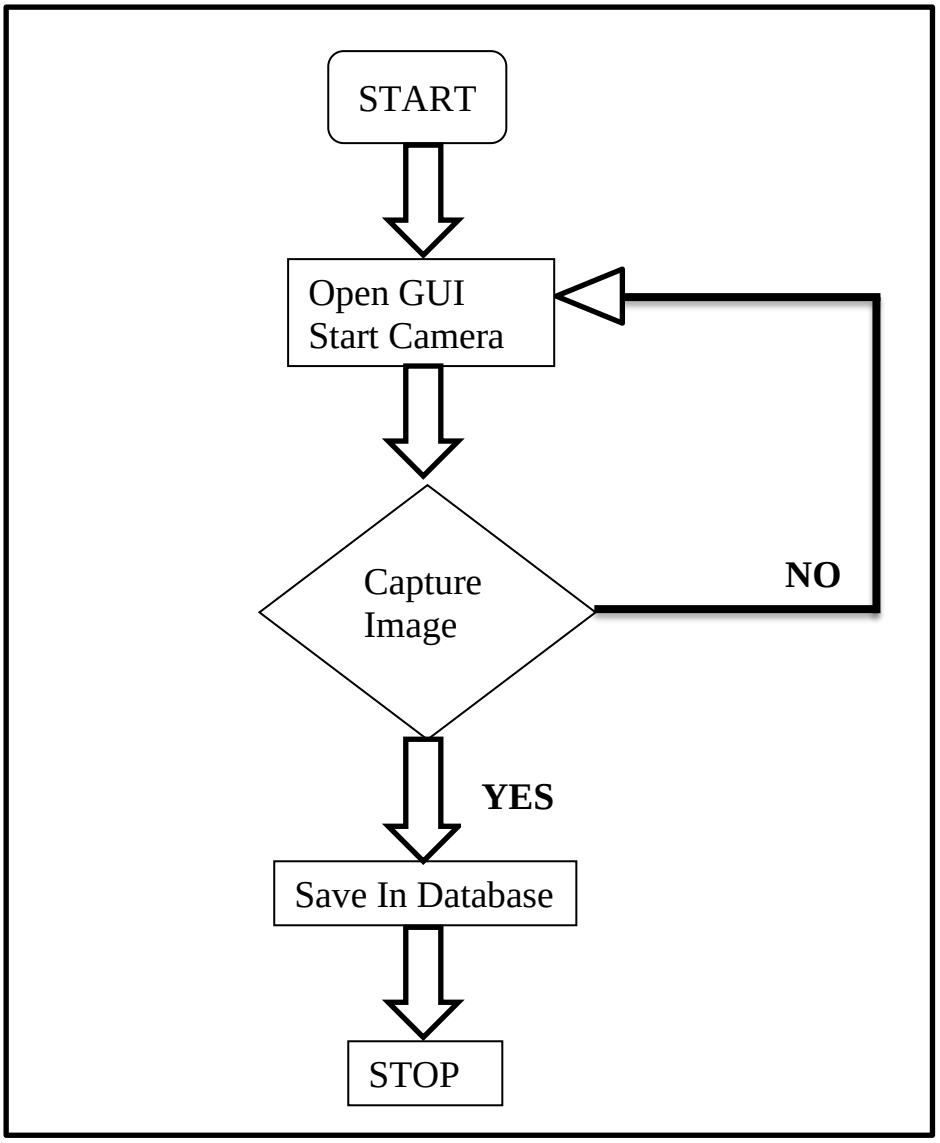
As a consequence of that, lecturer can no longer trace the students overall attendance record throughout the particular year. Apart from that, a lecturer also has limited access to the single-copy record. In terms of attendance analysis, the lecturer also has to perform manual computation to obtain the student's attendance percentage, which normally consume a lot of time. The limitations imposed by the conventional attendance recording system, we propose a solution in the form of an attendance tracking system based on RFID technology. The main idea behind the system is to capture student attendance in a semi-automated way where the students are required to flash their card at the RFID reader upon entering the classroom. But the RFID based student attendance system requires students to manually handle the RFID card every time they attend a class. The RFID card may got lost. Face recognition helps to recognize the facial image in more efficient and accurate in order to match with the identity stored in the database. Having said the limitations imposed by the RFID attendance recording system, we propose a solution in the form of an attendance tracking system based on Face recognition and authentication technology.

As such, the objective of our project is to implement a still-image based face recognition algorithm by using web cam and Machine Learning.

There are various advantages of developing an software using face detection and recognition in the field of authentication. Face detection is an easy and simple task for humans, but not so for computers. It has been regarded as the most complex and challenging problem in the field of computer vision due to large intra-class variations caused by the changes in facial appearance, lighting and expression. Face detection is the process of identifying one or more human faces in images or videos. It plays an important part in many biometric, security and surveillance systems, as well as image and video indexing systems. Face detection can be regarded as a specific case of object-class detection. In object-class detection, the task is to find the locations and sizes of all objects in an image that belong to a given class. The project titled 'Face Detection and Recognition System, is to manage all the front end back end system of

finding or detecting particular region in human face. This software helps the people looking for more advanced way of image processing system. Using this software they can easily find or detect faces in image and also recognize the face after saving that. Face-detection algorithms focus on the detection of frontal human faces. It is analogous to image detection in which the image of a person is matched bit by bit. Image matches with the image stores in database. Any facial feature changes in the database will invalidate the matching process.

FLOWCHART



- **FACE DETECTION**

The problem of face recognition is all about face detection. This is a fact that seems quite bizarre to new researchers in this area. However, before face recognition is possible, one must be able to reliably find a face and its landmarks. This is essentially a segmentation problem and in practical systems, most of the effort goes into solving this task. In fact the actual recognition based on features extracted from these facial landmarks is only a minor last step. There are two types of face detection problems: 1) Face detection in images and 2) Real-time face detection

- **HOW DOES FACIAL RECOGNITION WORK?**

Many people are familiar with face recognition technology through the FaceID used to unlock Phones (however, this is only one application of face recognition). Typically, facial recognition does not rely on a massive database of photos to determine an individual's identity. It simply identifies and recognizes one person as the sole owner of the device, while limiting access to others.

Beyond unlocking phones, facial recognition works by matching the faces of people walking past special cameras, to images of people on a watch list. The watch lists can contain pictures of anyone, including people who are not suspected of any wrong doing and the images can come from anywhere, even from our social media accounts. Facial technology systems can vary, but in general, they tend to operate as follows:

Step 1: FACE DETECTION

The camera detects and locates the image of a face, either alone or in a crowd. The image may show the person looking straight ahead or in profile.

Step 2: FACE ANALYSIS

Next, an image of the face is captured and analyzed. Most facial recognition technology relies on 2D rather than 3D images because it can more conveniently match a 2D image with public photos or those in a database. The software reads the geometry of your face. Key factors include the distance between your eyes, the depth of your eye sockets, the distance from forehead to chin, the shape of your cheekbones, and the contour of the lips, ears, and chin. The aim is to identify the facial landmarks that are key to distinguishing your face.

Step 3: CONVERTING THE IMAGE TO DATA

The face capture process transforms analog information (a face) into a set of digital information (data) based on the person's facial features. Your face's analysis is essentially turned into a mathematical formula. The numerical code is called a faceprint. In the same way that thumbprints are unique, each person has their own faceprint.

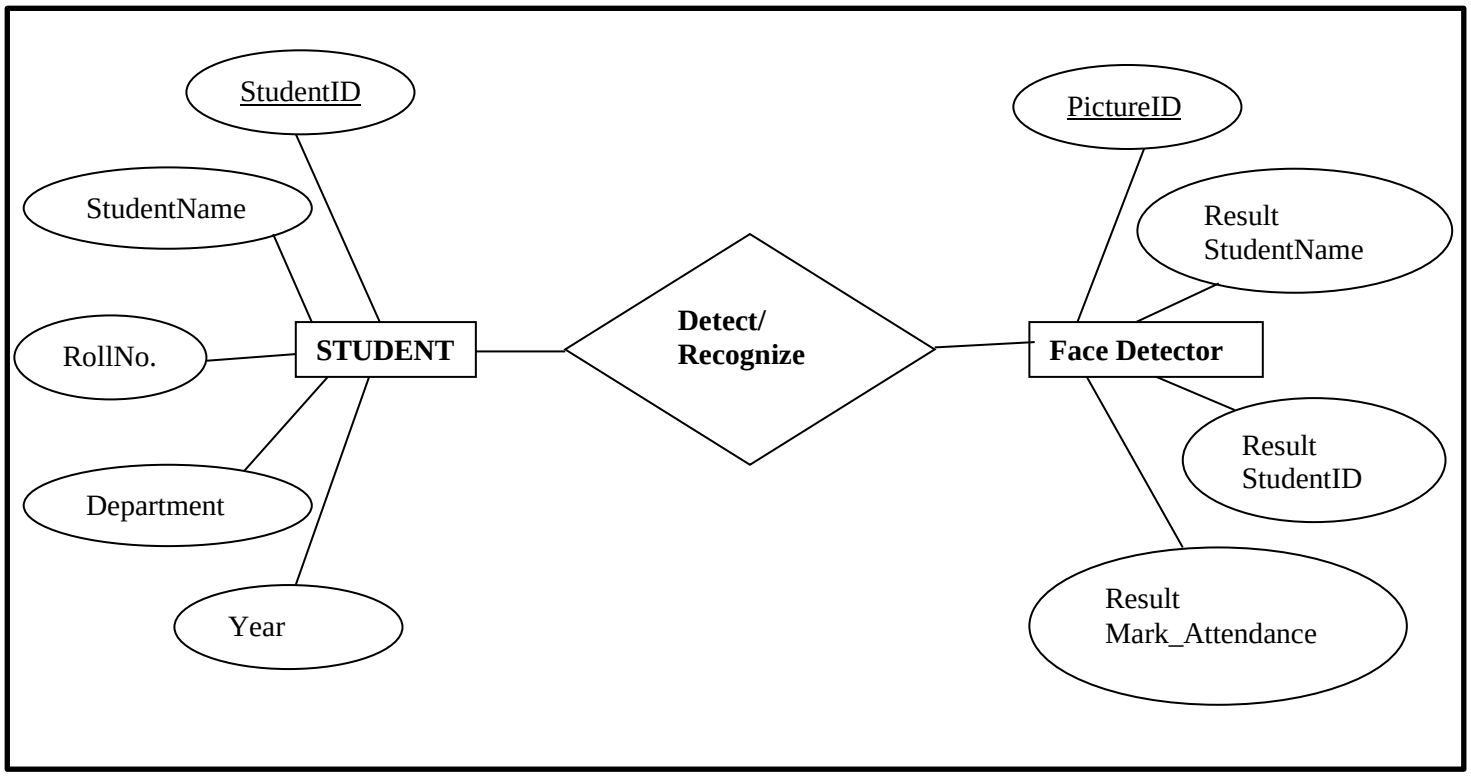
Step 4: FINDING A MATCH
Your faceprint is then compared against a database of other known faces. For example, the FBI has access to up to 650 million photos, drawn from various state databases. On Facebook, any photo tagged with a person’s name becomes a part of Facebook's database, which may also be used for facial recognition. If your faceprint matches an image in a facial recognition database, then a determination is made.

Of all the biometric measurements, facial recognition is considered the most natural. Intuitively, this makes sense, since we typically recognize ourselves and others by looking at faces, rather than thumbprints and irises. It is estimated that over half of the world's population is touched by facial recognition technology regularly.

Literature Survey

Author	Year	Proposed
Smitha Pavithra S Hegde, Afshin	2020	Haar Cascade model & Local Binary Pattern Histogram
Mayur Surve, Priya Joshi, Sujata Jamadar, Meenakshi Vharkate	2019	Haar Cascade and adaboost classifier
Clyde Gomes, Sagar Chanchal, Tanmay Desai, Dipti Jadhav	2020	Haar Cascade model & Local Binary Pattern Histogram
Nandhini R Duraimurugan N, S.P. Chokkalingam	2019	Voila jones Algorithm
Dr. Gayathri S, Vipin Rai, Virupaksha H	2017	Adaboost training, Cascading Classifier.
Dulyamit Prangchumpol	2020	Linear Discriminant analysis, Euclidean distance
K.Senthamil,P.chitrakala, A.Antony jenitha	2014	Skin classification technique.
Faizan Ahmad, Aaima Najma , Zeeshan Ahmed		Local binary pattern Histogram Algorithm

ENTITY RELATIONSHIP DIAGRAM



TOOLS AND TECHNOLOGY

TOOLS:

- Microsoft Visual Code

TECHNOLOGIES:

- Python
- MySQL
- Machine Learning(openCV)

REFERENCES

1) N.Sudhakar Reddy, M.V.Sumanth, S.Suresh Babu, "A Counterpart Approach to Attendance and Feedback System using Machine Learning Techniques",Journal of Emerging Technologieand Innovative Research (JETIR), Volume 5, Issue 12, Dec 2018.

2) Dan Wang, Rong Fu, Zuying Luo, "Classroom Attendance Auto-management Based on Deep Learning",Advances in Social Science, Education and Humanities Research, volume 123,ICESAME 2017.

3) Akshara Jadhav, Akshay Jadhav, Tushar Ladhe, Krishna Yeolekar, "Automated Attendance System Using Face Recognition", International Research Journal of Engineering and Technology (IRJET), Volume 4, Issue 1, Jan 2017.

4) V. Shehu and A. Dika, "Using Real Time Computer Algorithms in Automatic Attendance Management Systems." IEEE, pp. 397 – 402, Jun. 2010.

5) K. Susheel Kumar, S. Prasad, V. BhaskarSemwal, 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.

6) Prof. P.K Biswas, Digital Image Processing.

7) S. Z. Li and A. K. Jain, Eds., Handbook of face recognition. New York: Springer, 2005.

8) N. Mahvish, "Face Detection and Recognition," Few Tutorials, 2014.

9) Shireesha Chintalapati, M.V. Raghunadh, "Automated Attendance Management System Based On Face Recognition Algorithms", IEEE International Conference on Computational Intelligence and Computing Research, 2013.

10) B. K. Mohamed and C. Raghu, "Fingerprint attendance system for classroom needs," India Conference (INDICON), Annual IEEE, pp. 433–438, 2012.