FACE RECOGNITION ATTENDANCE SYSTEM USING RPA

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Abstract - *Students attending classes is crucial within the learning process. To track student attendance, many ways that is done. One in all them is through student signatures. The method has many shortcomings, like requiring a protracted time to form attendance; the attending paper is lost, the administration must enter attending information one by one into the pc. To overcome this, the paper projected a web-based student attendance system that uses face recognition. Within the projected system, Siamese Neural Network (CNN) is employed to notice faces in pictures, deep metric learning is employed to supply facial embedding, and to classify student's faces. Thus, the computer will acknowledge faces. From the experiments conducted, the system was ready to acknowledge the faces of students agency did attend and their attending information was automatically saved. Thus, the university administration is alleviated in recording attending information.*

Key Words: (**Siamese Neural Network (CNN), RPA**)

1. INTRODUCTION

Most of the colleges round the world apply the group action system to capture student's promptness. However, this paper/manual group action system has several challenges. Passing associate degree group action sheet from one student to the opposite to sign takes time furthermore as causes distraction. Because of such issues, some lecturers delay the group action until the top of the category, nonetheless some students may well be in an exceedingly hurry to go away the category right away, therefore they could miss linguistic communication the group action sheet. Moreover, there area unit some students United Nations agency ne'er return to the category however sign group action by proxy. In some cases, lecturers decision by names one by one to mark the group action however this technique conjointly consumes innumerable time. Yet one more drawback is a few students return to category late particularly the morning categories. Hence, the manual group action system isn't secure and reliable. It allows us to take associate degree example of application to the idea we have a tendency to area unit proposing here.

Taking group action within the colleges and faculties is being a waste of your time and energy for each the scholars and lectures furthermore. Today biometric is additional usage they're fingerprint recognition face recognition biometric authentication recognition voice recognition biometric authentication etc. one among that biometric class is face detection and recognition. Supported the image we have a tendency to take security safety, attendances and a few time it helpful for call conjointly. Largely this facial detection and recognition is decrease the manual work for human. Image capturing from camera or cc camera someday this is often conjointly a streaming video from camera. Type that offline or on-line information, we have a tendency to capture the image subsequently applying the face detection techniques. Face detection is detective work the face location and presence of face in pictures. During this face detection we have a tendency to largely see the nose, hair, ears, mouth, eyes and conjointly completely different create of faces in pictures. Numerous Face detection techniques, few of them is Viola Jones Face Detection algorithmic rule, (LBP), and Ada-Boost for Face Detection, smqt options and snow Classifier technique. When applying face detection techniques we have a tendency to detected the faces or objects in image and crop that image apply Face recognition technique. numerous ways in which to acknowledge the faces by applying Hog options, Haar options, Machine learning, deep learning, classification technical schoolniques another tech conjointly used for recognition of the faces. Recognition of face we'd like coaching information sets. Instances taking camera capture currently make certain image to information pictures. Face recognition of various peoples supported the connected pictures of that person image we'd like take pictures for before face recognition. Just in case if the image isn't within the information then we have a tendency to store that image as a replacement person within the information. Next time constant image of that new image person seems within the image and recognition of the face alternatively taken as a replacement image and keep within the information method is continual. This needs a high finish specification of a system so as to urge the higher results.

It won't run on all the little specification systems. So, this will run solely atiny low information and compare them with the face needed. The technology aims in conveyance tremendous information directed technical innovations of late. Deep Learning is one in all the attention-grabbing domains that permits the machine to coach itself by providing some datasets as input associate degreed provides an applicable output throughout testing by applying completely different learning algorithms. Today group action is taken into account as a vital issue for each the scholar furthermore because the teacher of an academic organization. With the advancement of the deep learning technology the machine mechanically detects the group action performance of the scholars and maintains a record of these collected information.

Manual Student group action Management system may be a method wherever a coach involved with the actual subject has to decision the scholars name and mark the group action manually. Manual group action could also be thought-about as a long method or typically it happens for the teacher to miss somebody or students might answer multiple times within the absence of their friends.

Face recognition is a vital application of Image process because of its use in several fields. Identification of people in a corporation for the aim of group action is one such application of face recognition. Maintenance and observance of group action records plays an important role within the analysis of performance of any organization. The aim of developing group action management systems is to computerize the normal approach of taking group action.

There area unit 2 forms of face recognition, 2 Dimensional face recognition, this kind has some challenges that embrace variations in illumination, create face expression, nice occlusion and image resolution. The second kind is Three-dimensional face recognition that recently in contestible their superiority particularly in illumination and poses variations

2. LITERATURE SURVEY

Various papers handling face recognition, detection and templet matching square measure mentioned during this section. The paper [1] introduces Associate in nursing approach to discover and establish somebody's face from the time period video that tracks a face and compares it with hold on information of known people. Our approach acknowledges a private at intervals a fraction of a second that utterly ignores any background result. It conjointly shows extra data that individual. Besides, this methodology conjointly works on totally different lighting conditions that create it appropriate to execute its purpose during a wide selection of environments while not encountering any important error. During this paper, they have enforced work employing a Raspberry Pi. Even though usage of raspberry pi is advantageous, there's a time quality is a lot of. There's lag whereas capturing the photographs.

[2].This paper suggests Identifying a student with an image has been popularized through the mass media like cameras. This system monitors the images inside the vehicle and identifies the students and their movements inside the bus. The system recognizes the student faces and their counts are also monitored. The system will also raise an alarm to get the attention of the public if it is so essential. Technologies are available in the Open-Computer-Vision (OpenCV) library and implement those using Python. [3]This paper presents a real-time face detection system using a moving camera. The proposed system consists of three modules, including (1) detection of face candidates: Face candidates are generated using the information of skin color, edges, and face area, (2) verification of face candidates: HOG (Histogram of Oriented Gradient) features are generated from face candidates and a two-class C-SVM (Support Vector Machine) classifier with pretrained face samples is employed to determine whether face candidates are real faces or not, (3) face tracking: Overlapping area of two face targets in current and previous frames is estimated to determine whether the tracking will be continuous or not. By use of estimation of face size, the proposed method can avoid a huge amount of computation time that is required by a point-by-point scanning method in conventional methods.

In paper [4], we propose finding matching and non-matching pairs of pictures by representing them with neural network based mostly feature vectors, whose similarity is measured by euclidian distance. The feature vectors square measure obtained with convolutional neural networks that square measure learnt from labelled samples of matching and non-matching image pairs by employing a contrastive loss perform in a very Siamese specification. Antecedently Siamese design has been used in facial image verification and in matching native image patches, however not nevertheless in generic image retrieval or whole-image matching. Our

experimental results show that the projected options improve matching performance compared to baseline options obtained with networks that square measure trained for image classification tasks. The options generalize well and improve matching of pictures of recent landmarks that don't seem to be seen at coaching time. This can be despite the very fact that the labeling of matching and non-matching pairs is imperfect in our coaching information. The results square measure promising considering image retrieval applications, and there's potential for any improvement by utilising additional coaching image pairs with additional correct ground truth labels.

The paper [7] proposes category area victimisation face detection and raspberry pi. Student attending is a vital task in school. It appears to be a waste of a great deal of productive time of the category taken, once it's done manually Here implement a sensible answer for the matter. This describes the tactic of detection and recognizing the face in period victimisation Raspberry Pi board and economical formula victimisation open supply image process. This technique includes six steps: Face Detection, Face Preprocessing, Face coaching, Face Recognition, model matching and attending information. The dataset is collected to acknowledge the faces of the scholars. The system is foremost trained with the datasets collected and it uses a user friendly interface for its correct implementation. This technique gave the impression to be terribly correct as compared to others.

Paper [8] targeted on ever-changing the normal manual attending to a digitized system victimisation identity verification. For face recognition modules, the system used computer code to implement the Haar Cascading formula. The code was loaded on Associate in Nursing embedded hardware system that conjointly connected the camera. Automatic attending Management System supported Face Recognition Algorithms[6] on this paper they propose an automatic attending management system. This method is largely supported face detection and recognition algorithms, mechanically detects the coed once he enters the room and marks the attending by recognizing him. As a result of LBPH outperforms different formulas with higher recognition rate and low false positive rate the system relies on this algorithm. The system uses SVM and theorem as a classifier as a result of they're higher in comparison to distance classifiers. The progress of the system design is once an individual enters the room his image is captured by the camera at the doorway. A face regionitios then extracted and pre-processed for any process. As less than 2

persons will enter the room at a time face detection formula has less work. Room attending System victimisation identity verification System [7] this paper aims to introduce a replacement approach to spot a student employing a face recognition system within the room atmosphere, i.e. the generation of a 3D Facial Model. This analysis is to try to produce an automatic attending system that acknowledges students victimisation face recognition technology from Associate in Nursing image/video stream to record their attending in lectures or sections and evaluating their performance consequently.

The analysis paper [9], it approaches the coed numeration system within the room and conjointly in a very crowded space. Distinct ripple Transforms (DWT) and distinct circular function remodel (DCT) used for face recognition tasks. Science space authentication plays a serious half. These 2 techniques are used for authentication of users. For video monitoring/surveillance systems we tend to use biometric verification and external body part recognition. The study [5], discussing a completely unique deep convolutional network (DCN) that achieves smart performance. This detects faces underneath many conditions. Main issue in most existing face detection approaches shows that the utilization of DCN and high run time speed achieves. A system for detection and numeration humans in extremely crowded pictures and video scenes by epsilon- Support worth Regression (SVR) [6]

This paper [9] proposes real time object detection through YOLO and conjointly makes some errors in localization. The recent survey shows that during this paper [11] clarifies most vital specific objects i.e. face that is narrowed to at least one specific domain. By increasing use of applications, face detection is turning into difficult. Face detection is that the initiative for face recognition, face analysis and detection of different options of face. The paper discusses and analyses the varied face detection algorithms Viola-Jones, and Neural Network-Based Face Detection and Support Vector Machine-Based face detection. Comparison of those detection algorithms is completed supported the preciseness and recall worth that is calculated victimization some software package that deals with correct results by taking the values of the bounding boxes round the faces.

Counting folks in video police work could be a terribly powerful subject that is mentioned in [10]. It becomes

tougher once the task is completed in real time. The utilization of InfraRed (IR) sensors and Channel State info (CSI) of the WLAN network, that ar the classical strategies, offer the count however have their own vary constraints and its restricted pertinency to controlled environments. Video-surveillance systems are {one of|one among|one in a veryll|one amongst|one in every of} the advanced technologies utilized in this technology life and it to estimate the density of individuals in a place for security reasons and to get the human statistics. The science vision primarily based techniques work well once folks are in motion or moving and once a high resolution image with clear background is on the market. Folks numeration presents image process and embedding algorithms that are used for crowd estimation and their connected applications. This will be revised to make new algorithms with multiple benefits and may be enforced for a selected application like observation the group in looking malls, in uncontrolled environments like bus stands and railway stations thereby preventing congestion and providing comfort.

Paper [11], evaluates the flexibility of convolutional networks to unravel the issues arising with face classification in at liberty setting. It contains style and implementation of Siamese design consisting of 2 convolutional networks used for face verification on sets of images. Within the scope of the paper, the coaching method is closely monitored and that we value many practices and parameters still as their impact on the network learning.

3. PROPOSED SYSTEM

To overcome the problem in the existing attendance system we shall develop a smart attendance system over a simple attendance system. There are many solutions to automate the attendance system like a thumb based system, simple computerized attendance system, iris scanner, but all these systems have limitations overwork and security point of view. Our proposed system shall be a "Smart student attendance system" which uses the basic idea of image processing which is used in many applications like schools, colleges.
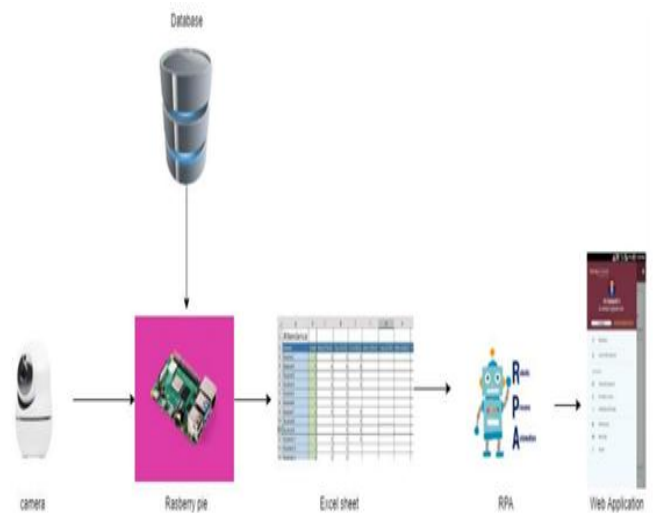

Fig- 1: Outline of the proposed framework

Figure 3.1 describes the outline of the proposed framework. Specifically in the proposed framework user will give the image as a input to the system then it will undergo four modules like image enhancement, segmentation, feature extraction after that it will display the result in the user interface.

In this, the camera is been connected to the raspberry pie embedded kit it also consists of database server connected to it. Database server consists of student dataset and it will have facial features of each students, camera is used to capture the image or video. The excel sheet is used to mark attendance whereas RPA is used to drag the attendance from the excel sheet and update it in the application. Raspberry pie code is written in the system and database and raspberry is connected to the database. Camera is connected to the raspberry pi is directly by using wire.

3.1 PROPOSED METHODOLOGY

The figure 2 represent the detailed diagram of how does this system works. Camera is used to capture the images/videos. From the camera the images of the students are extracted and is given as input for our processor which is nothing but raspberry pie. Database will be stored in the database server where the details of the students such as usn, name, and other facial features will be stored in the Database. Code will be written in such a way that the processor and the database will be connected. Camera is connected to our processor raspberry pie using Ethernet cable. And system and processor will be connected.
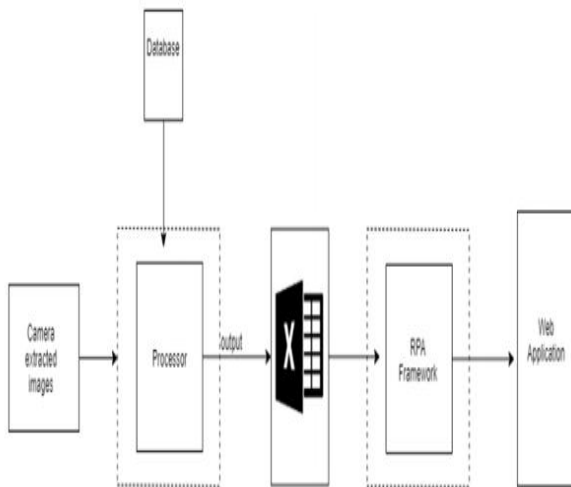
Fig 2:Block Daigram of Face Recognition System for monitoring student attendance

In Processor the images extracted from the camera and images given in database are compared by preprocessing the data first. Then the if the details of the extracted images matches the feature of stored in database then for that particular period the attendance will be marked in Microsoft Excel. Then by using Robotic Process Automation (RPA) the attendance result is extracted from excel sheet is marked in web application according to their credentials.

Technique Used:

Here the idea of running two identical composition neural network on two different implicit and comparing them in Siamese neural architecture.

Siamese Network:

Let us consider x (1) and x (2) are the two input images.

f(x (1))-> encoding of x (1) that is input image is encoded into 128 parts.

D(x (1), x (2)) = ||f(x (1))-f(x (2))|| 2 indicates the difference between two images.

Let us take two similar images that is image x(1). When comparing two images difference is very small when comparing with two dissimilar images.

Standard classification V/s unit of ammunition classification

In case of normal classification, the input image is fed into a series of layers, and at last at the output we tend to generate a likelihood distribution over all the categories (typically employing a Softmax). for instance, if we tend to are attempting to classify a picture as cat or dog or horse or elephant, then for each input image, we tend to generate four chances, indicating the likelihood of the image happiness to every of the four categories. 2 details should be detected here. First, throughout the coaching method, we tend to need an oversized variety of pictures for every of the category (cats, dogs, horses and elephants). Second, if the network is trained solely on the on top of four categories of pictures, then we tend to cannot expect to check it on the other category, example "zebra". If we wish our model to classify the photographs of equine also, then we'd like to 1st get heaps of equine pictures and so we tend to should re-train the model once more. There square measure applications whereby we tend to neither have enough knowledge for every category and also the total variety categories is large also as dynamically dynamical. Thus, the price of information assortment and periodical re-training is simply too high.

On the opposite hand, in a very unit of ammunition classification, we tend to need just one coaching example for every category. affirmative you bought that right, just one. Therefore the name unit of ammunition. Let's try and perceive with a true world sensible example. Assume that we wish to make face recognition system for a little organization with solely ten workers (small numbers keep things simple). employing a ancient classification approach, we'd return up with a system that appears as below: Instead of directly classifying associate input (test) image to 1 of the ten folks within the organization, this network instead takes an additional reference image of the person as input and can manufacture a similarity score denoting the probabilities that the 2 input pictures belong to identical person. Usually the similarity score is squished between zero and one employing a sigmoid function; whereby zero denotes no similarity and one denotes full similarity. Any variety between zero and one is understood consequently.

Notice that this network isn't learning to classify a picture on to any of the output categories. Rather, it's learning a similarity perform, that takes 2 pictures as input and expresses however similar they're.
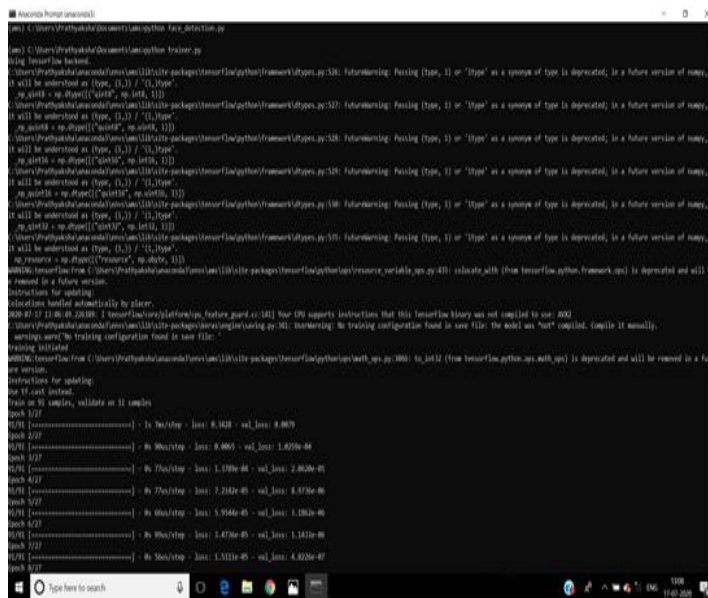
4. RESULT

Fig 3: training the system with given dataset

Fig 3 represents the training the system with the given dataset. This the first step were the system is trained with the dataset of students i.e, the face features of students. This is the main step because if we train the system wrong it gives wrong result and the system fails.
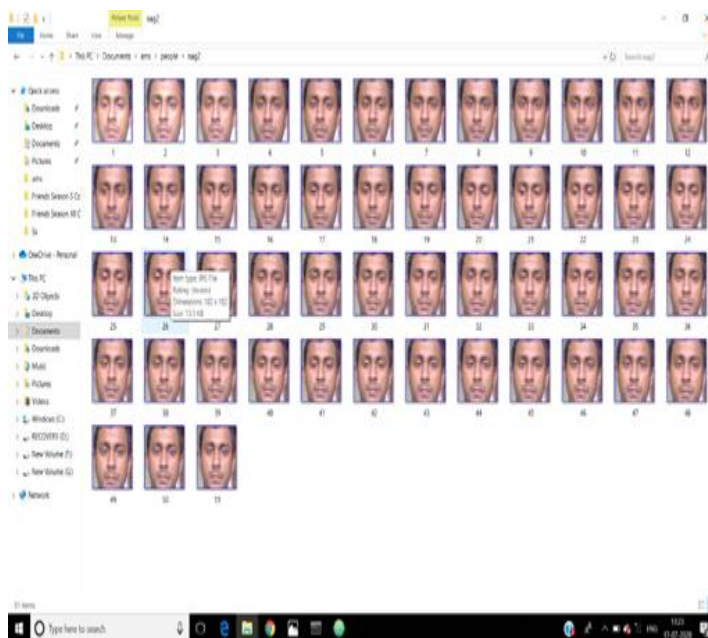

Fig 4 Trained data set

Fig 4 represents the trained data set. After training the System data set will look like this. Each students will have different dataset. In case we want to add or remove student we can do that in this step.
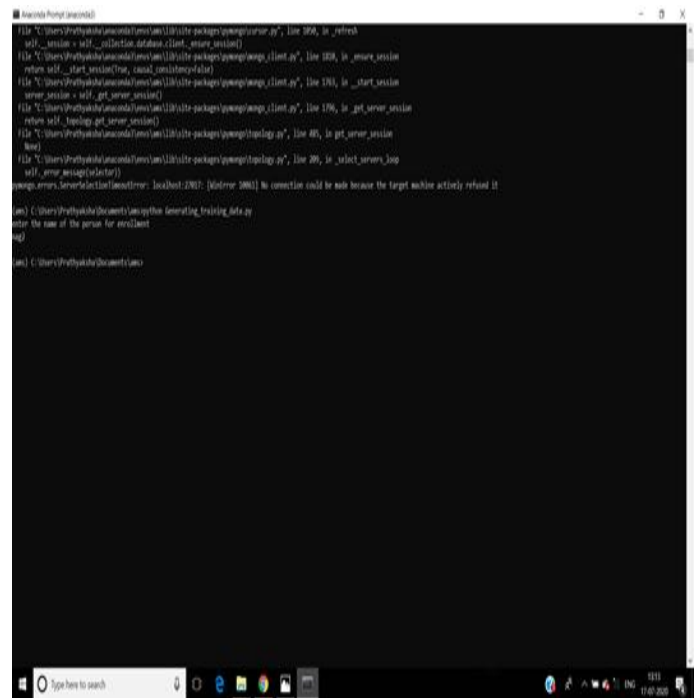

Fig 5 After Enrollment

Fig 5 represents the data after enrollment. After the datas are trained dataset are arranged and USN are assigned for students. And later attendance are marked accordingly and attendance is finalized.
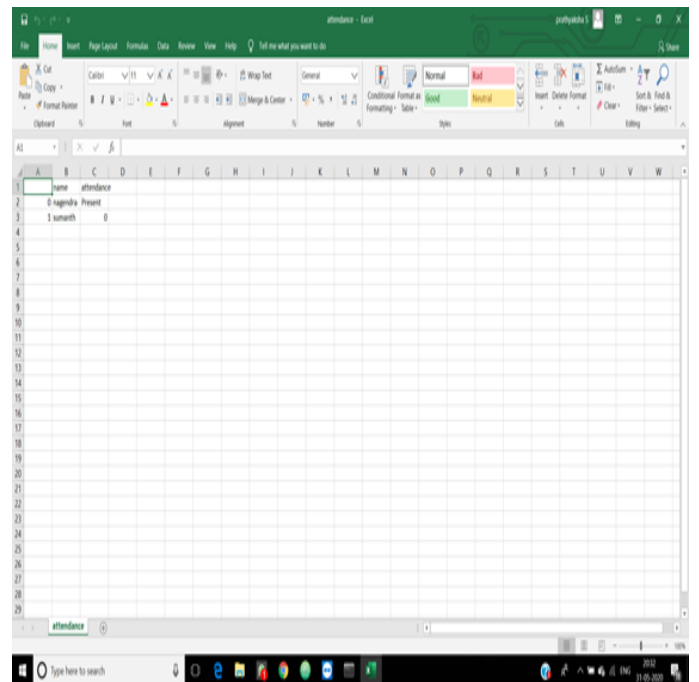

Fig 6 Attendance marked in excel

Fig 6 represents the attendance marked in excel. After face is recognized by the system using data set the attendance is marked in excel sheet USN and class wise.

And after the attendance is uploaded in excel sheet it will be further updated in the application using RPA.

5. CONCLUSIONS

The aim of this project is to capture the video of the scholars, convert it into frames, relate it with the information to make sure their presence or absence, mark attending to the actual student to keep up the record. The machine-controlled schoolroom attending System helps in increasing the accuracy and speed ultimately attain the high-precision time period attending to fulfill the requirement for automatic schoolroom analysis. It are often utilized in the food business to form positive that smart quality fruits area unit used which can be consumed later by the shoppers.

The aim of this project is to develop an automatic attending system to be utilized in instructional establishments, which might turn out a lot of correct results than the manual attending sheet. The system is programmed victimisation each Python for face recognition system and attending management system web site. The attending is keep in MySQL information and with web association provided, the results area unit accessed from any laptop application. Every lecturer needed to log-in to the web site to access his/her attending sheets.

Capturing the pictures from camera or cc camera and applying techniques face detection and recognition will decrease the manual work from human and increase the protection safety, taking the choice from this recognition result. Supported this face detection and recognition will utilized in implement such a big amount of application like automatic attendances system supported face recognition. During this system we've enforced associate degree attending system for a lecture, section or laboratory by that lecturer or teaching assistant associate degree record student's attending. It saves time and energy, particularly if it's a lecture with immense variety of scholars.

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