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Face Recognition And Attendance System

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ABSTRACT :

At the start and ending of the category , usually teacher check the attendance , but the manual attendance system may results in appear that an educator may miss someone or some students may answer multiple times. Now a days, Machine we use algorithms, to supply the pc systems the power of finding and recognizing human faces fast and precisely in images or videos in order that the systems can utilized in giving attendance. A great burden on the teachers if it's done by hand. By utilizing this framework, the matter of proxies and students being marked present albeit they're not physically present can easily be solved. This system marks the attendance using live video stream. The main implementation steps utilized in this sort of system are for which dlib is used. After these, the connection of recognized faces need to be conceivable by comparing with the database containing student's faces. This model are going to be a successful technique to manage the attendance of students.

KEYWORDS: Machine learning, Face recognition, Assessment, Face detection algorithm, LBPH, HAAR

1.INTRODUCTION

Generally, within the classroom the attendance was taken by the teachers manually at the start and ending of the category. The problem with this approach is that it requires a while to require and also the manual process will have chances to form mistakes in most of the cases. To overcome that problem, RFID (Radio Frequency Identification) was introduced within the past years. ***But those also are having the fail proof of attendance system. to achieve fail proof attendance system.*** *Face detection is employed for several applications for the identification of human faces in digital images or video. It is defined as specific case of object-class detection; where it's wont to find the locations and sizes of all objects in a picture that belong to a given class. The technology is are often ready to predict frontal or near-frontal faces during a photo, no matter orientation, lighting conditions or complexion .* ***Face Recognition may be a sort of biometric software that maps an individual's countenance mathematically and stores the info as a faceprint. The software consists of Deep Learning algorithms*** *to match a live capture or digital image to the stored face print so as to verify an individual's identity[1] .*

Human face plays a crucial role in our day to day life mostly for identification of an individual . Face recognition may be a part of biometric authentication that extracts the facial features of a face, then stores it as a singular face print to uniquely recognize an individual . Biometric face recognition technology has gained the eye of the many researchers because of its wide application. Face recognition technology is best than other biometric based recognition techniques like finger-print, palm-print, iris due to its non-contact process. Recognition techniques using face recognition also can recognize an individual from a distance, without any contact or interaction with person[2]. The face recognition techniques are currently implemented in social media websites at the airports, railway stations. The, at crime investigations. Face recognition technique also can be utilized in crime reports, the captured photo are often stored during a database, and may be wont to identify an individual . websites use the face recognition technique for automating the method of tagging people. For face recognition we require large dataset and sophisticated features to spot an individual altogether conditions like change of illumination, age, pose, etc. Recent researches show there is a betterment in face recognition systems.

Face Recognition using Python

Faces are made from thousands of fine lines and features that has got to be matched. The face recognition using Python is employed to interrupt the task of identifying the face into thousands of smaller, bite-sized tasks, each of which is straightforward to face Recognition OpenCV utilizes Machine Learning algorithms to look for faces within an image .

Facial Recognition using Python Libraries

An easy thanks to detect faces using Python is by using the OpenCV package which is written in C/C++, OpenCV now provides bindings for Python. It uses machine learning algorithms to search for faces within a picture. Faces are very complicated, made of thousands of small patterns and features that has got to be matched. **Since there are a minimum of 5,000 or more tests per block, you would possibly have many calculations to try to to , which makes it a difficult process. To solve this, OpenCV uses cascades. The OpenCV cascade segments the matter of detecting faces into multiple stages.** The algorithm are often performed on around 30 to 50 of those stages or cascades, and it'll only detect a face if all stages pass. The cascades are a bunch of XML files that contain OpenCV data wont to detect objects.

2.RELATED WORKS:

The paper : [3]An Approach to face recognition like under a controlled illumination, at a specific position, under a particular angle of view , and with none obstacles. Such systems are called these rules restrict the uses of face recognition in many real time applications because they can't satisfy these rules. Real time applications need techniques which does not need any strict control over the citizenry for recognizing the face. These types of

systems need face recognition under uncontrolled conditions. So, this paper proposes one such system but the system needs a picture as input and one person per image which may be a drawback of the applications like attendance systems.

3.LITERATURE REVIEW

Traditionally attendance was taken manually which is extremely time consuming and sometimes results in human error**. Additionally, there are many uncertainties towards the sources of the attendance records which actually , most of the attendance records aren't retrieved from the actual situation.** The old method that uses paper sheets for taking student's attendance can not be used. Based on the research, there are many solutions that are available to unravel this issue. Communication (NFC) technology and mobile application[5]. According to the research paper, each student is given a NFC tag that features a unique ID during their enrolment into the school .

This system requires a standalone computer which can need a continuing power supply that creates it not portable. This type of system is merely suitable for marking staff's attendance as they only got to report their presence once each day[6] , unlike students which require reporting their attendance at every class on a specific day, it'll be inconvenient if the attendance marking system is not portable. work similarly with just batteries that creates it portable. Proposed an answer of using fingerprint to mark the attendance. **Firstly, the fingerprint pattern are going to be obtained through a fingerprint sensor, then the information will be transmitted to microcontroller 1.** Next microcontroller 1 will pass the information to microcontroller 2 After finding a student's match, the small print are sent to the PC through serial communication to be displayed. This design is sweet because it accelerates development while maintaining design flexibility and simplifies testing. But again, this technique is attached to a PC which make it not portable. **Other than that, the database information can't be accessible easily. Meaning that, for the oldsters whom have an interest in knowing their child's attendance cannot easily or conveniently access the knowledge[7] .** Therefore, to provide accessibility of the student's information to the legitimate concerned party, the knowledge are often uploaded to an internet server for straightforward access.

4.METHODOLOGY

which includes enrolment, face detection, face represented as some extent in higher dimensional space, **partition the space using hyperplanes that separated points representing different classes.Traditional image classification pipeline**. Dlib's Face Recognition module. recognition, then marking the attendance during a database[8-9]. **Training is performed on millions of images**. On the other hand, enrolment is performed employing a small set of images. In case of Dlib, enrolling an individual is just passing a couple of dimensional **feature descriptors corresponding to feature in a high-dimensional space. In this highdimensional space, features belonging to the sameperson** are going to be on the brink of one another and much away for different persons.

A. Traditional Image Classification Pipeline VersusDlib's Face Recognition Model in higher dimensional space.

5.PROPOSED WORK

The proposed system face recognition-based attendance system are often divided into five main modules

functions are defined as follows.

Image Capture

The camera is fixed at a distance from the doorway to capture the frontal image of the scholars .And remaining process goes for face detection.

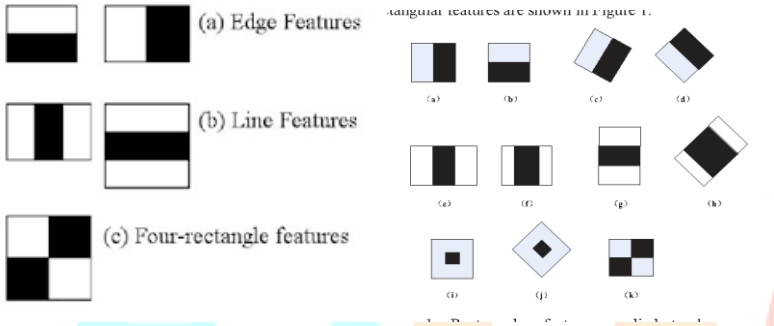
Face Detection

Various algorithms are proposed for face detection like face knowledge based methods, feature invariant methods, machine learning based methods[10]. These are in JPEG format only. on the other. In this case face recognition needs face detection for creating an identification to “recognize” a face. I will onlycover face detection. Face detection uses classifiers, which are algorithms that detects what's either a face(1) or not a face(0) in an image.

Classifiers are trained to detect faces using thousands to many images so as to urge more accuracy. OpenCV uses

Understanding Haar Cascades

It is supported the Haar Cascades use the Adaboost learning algorithm which selects alittle number of important features from an outsized set to offer an efficient result of classifiers[11].



Database Development

In this Biometric based system collection of each individual is required. and after it's enhanced using pre-processing techniques and to be stored within the database.

Post -Processing

reports of students attendance. These generated records are often viewed by the school and students .this ensures that student whose Faces aren't recognized correctly by the system have the prospect to send an invitation to admin.

Proposed Algorithm

1. Capture the student’s image through camera.

2. apply pre-processing.

3. If image captured then

Store in database

Else

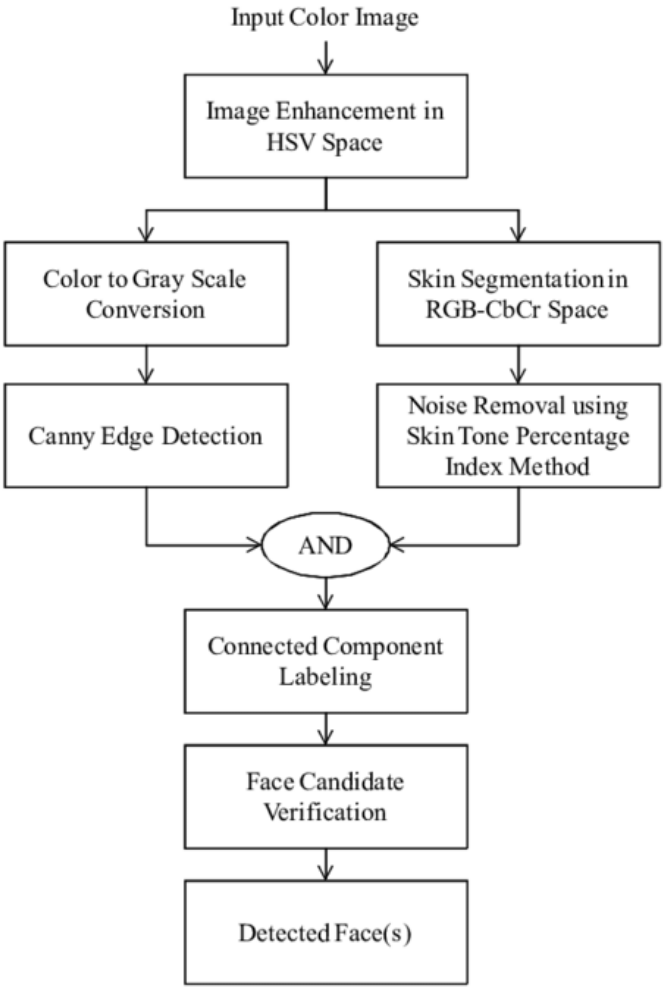
Apply LBPH (for feature extraction)

Apply SVM(for classification)

End if

4.Post-processing

FLOW CHART



Scaling:

Having differently scaled object of interest within the images is that the most vital aspect of image diversity. When your network is in hands of real users, the thing within the image are often tiny or large. and yet won't be present totally in image (i.e cropped at edges of object).

Translation:

we might like our network to acknowledge the thing present in any a part of the image. Also, the object can be present partially within the corner or edges of the image. For this reason, we shift the thing to varied parts of the image.

This may also result in addition of a background noise

Assuming the image is square,rotating the image at 90 degrees won't add any ground noise within the image.

Rotation (at finer angles):

Depending upon the need , there maybe a necessity to orient the thing at minute angles.However problem with this approach is, it'll add ground noise . If the background in image is of a hard and fast color (say white) the network may consider it on be a feature and learn unnecessary features.

Flipping:

This scenario is more important for network to get rid of biasness of assuming certain features of the thing is out there in only a particular side.

You don't want network to find out **that tilt of banana happens only in right side as observed within the base image. multiple of 90 degrees.My additional question** is has anyone done some study on what's the utmost number of classes it gives good performance.

it is important to remember that a general user who is taking image to feed into your network may not be a professional photographer. His camera can produce blurry images with many white and black dots.

Lighting condition:

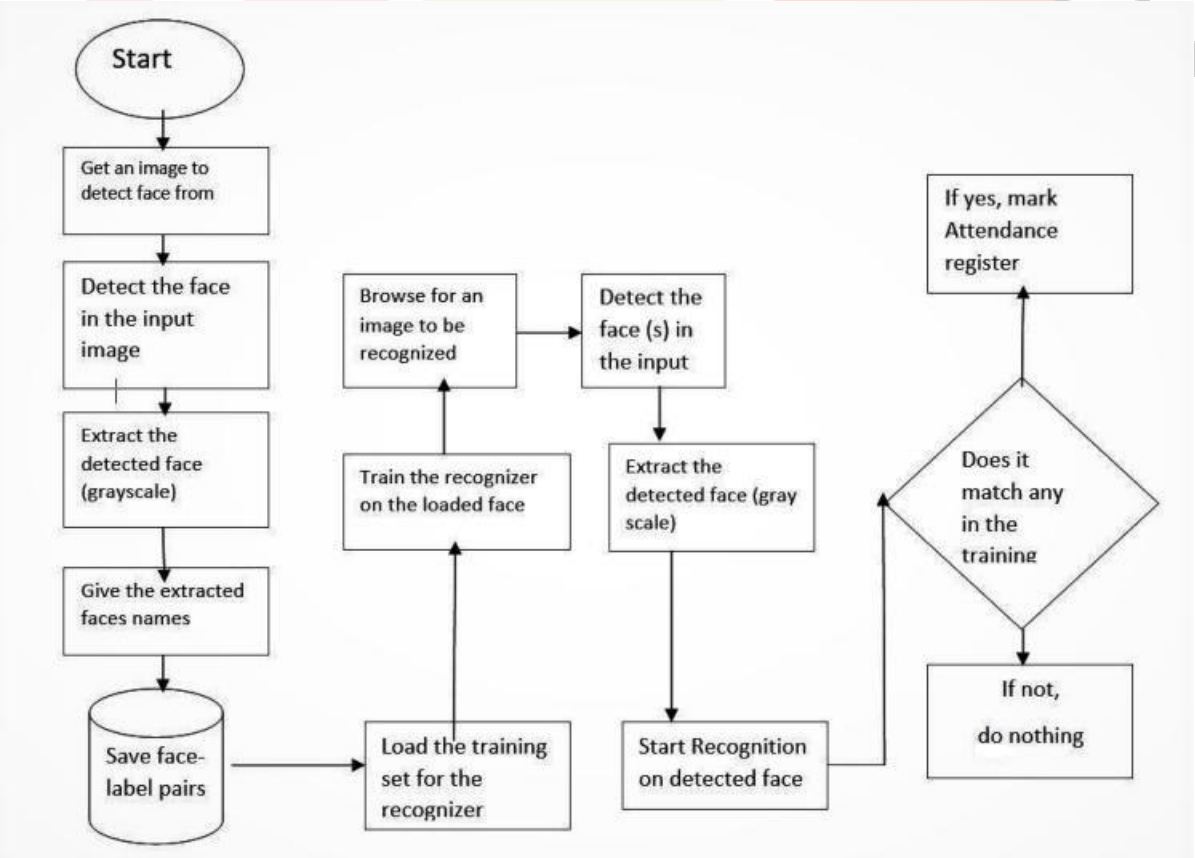
this is often a really important sort of diversity needed within the image dataset not just for the network to find out properly the thing of interest but also to simulate the sensible scenario of images being taken by the user. The lighting condition of the pictures are varied by adding Gaussian noise within the image.

Perspective transform:

In perspective transform, we attempt to project image from a special point of view. For this, the position of object should be known in advance.

Merely calculating perspective transform without knowing the position of the thing can lead to degradation of the dataset. Hence, this sort of augmentation has got to be performed selectively.

The greatest advantage with this augmentation is that it can emphasize on parts of object in image which the network must learn.



6.STEP- BY -STEP ALGORITHM:

Parameters:

The LBPH uses 4 parameters:

• Radius: the radius is employed to create the circular local binary pattern and represents

the radius around the central pixel. It is usually set to 1. binary pattern. Keep in mind: the more sample points you include, the upper the computational cost.

It is usually set to 8.

• Grid X: the amount of cells within the horizontal direction. The additional cells, the finer the grid, the upper the dimensionality of the resulting feature vector. It is usually set to 8.The more cells, the finer the grid, the upper the dimensionality of the resulting feature vector

Training the Algorithm:

First, we'd like to coach the algorithm. people we want to recognize. We need to also set an ID (it could also be variety or the name of the person) for every image, so the

algorithm will use this information to acknowledge an input image and provides you an output. Images of an equivalent person must have the same ID.original image during a better way, by highlighting the facial characteristics. To do so, the algorithm uses an idea of a sliding window, supported the parameter's radius and neighbours.

Extracting the Histograms: Now, using the image generated within the last step, we will use the Grid X and Grid Y parameters to divide the image into multiple grids.

Performing the face recognition: during this step, the algorithm is already trained. Each histogram created is employed to represent each image from the training dataset. So, given an input image, we perform the steps again for this new image and make a histogram

which represents the image.return the image with the closest histogram. We can use various approaches to match the histograms (calculate the space between two histograms), for example: euclidean distance, chi-square, definite quantity , etc. Euclidean distance

CONCLUSION

frequency Identification and every one other bio-metric systems. It saves the time and energy within the aspect of taking

attendance. Automated Attendance Systems supported face recognition techniques thus proved to be time saving and secured.

This system also can be wont to identify an unknown person whether he's associated with the organization or not.

FUTURE SCOPE

Further extensions are often made, to realize the important time detection of specific student within the surveillance premises. Instead of

taking images, we will also work with recorded videos. But a while period is maintained to record the pictures , because if

continuous recording is completed then load on database increases.

when there are unintentional changes during a person like tonsuring head, using scarf and beard. The system developed only

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