Journal of Engineering Sciences
Vol 12, Issue 06, JUNE /2021
ISSN NO:0377-9254

Attendance Evaluation with Face Recognition by using OpenCV

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ABSTRACT

If attendance is managed by hand, it might be a significant strain for the teachers. A clever and automated a attendance-tracking system can be used to overcome this problem. The problem of proxies and students being marked present even when they are not physically there can be easily solved with this architecture. This technique uses a live video broadcast to track attendance. OpenCV is used to extract frames from video. Face detection and recognition are the major implementation processes in this type of system, and dlib is utilised for both.Following that, a link of recognised faces should be possible by comparing them to a student information faces. This model will be an effective strategy for managing student attendance. The face is the most essential aspect in human relationships since it holds significant information about a person or individual and is utilised to determine a person's presence or absence. This work provides a concept for developing an automated attendance management system for students in a class utilising eigenface values algorithm and face recognition methodology.

I.INTRODUCTION

Human faces serve a crucial part in our daily lives, mostly for identifying people. Face recognition is takes a person's facial traits and stores them as a unique face print in order to identify them. Because of its wide application, biometric face recognition technology has piqued the interest of many researchers. Because it is a non-contact process, face recognition technology outperforms other biometric-based identification methodssuch as fingerprint, palmprint, and iris recognition. Face recognition systems may also recognise a person seen from afar, without requiring any communication or contact withthe person. Facial recognition software is becoming increasingly popularcurrently used at social media sites such as Facebook, airports, and train stations. The, when it comes to criminal investigations. The taken photo can be stored in a database and used to identify a person, and the method of facial recognition can be utilised in crime reports. Face recognition is used by Facebook to automate the process of tagging people. Face recognition requires a huge dataset and

sophisticated attributes to recognise a person in a variety of situations, such as changing lighting, age, and stance. Recent studies suggest that Face recognition software has come a long wayimproved. In the previous tenyears there is enormous improvement in techniques of recognition.However, most image recognition methods can currently do this perform great onlyif the number of persons there are only a few people in one frame, and they are tightly controlled light, Faces in the right place and best images. For face recognition Large data sets and unique tasks are required to uniquely identify different topics by trying to manipulate various problems such as illumination and poseand ageing. the accuracy of facial recognition technology has improved significantly over the last few years.The face is the most essential aspect in human relationships since it holds significant information about a person or individual and is utilised to determine a person's presence or absence. This work provides a concept for developing an automated attendance management system for students in a class utilising eigenface values algorithm and face recognition methodology.

2.LITERATURE REVIEW

According to Xin Geng's paper "Individual Stable Space[1]: Facial Recognition in Unfamiliar Environments Conditions," mostface recognition systems require faces tobe fed into them based on certainrules, such as controlled illumination, a specific position, a specific view angle, and no obstacles. Under controlled conditions, such systems are known as face recognition systems. Because these rules cannot be satisfied, face recognition cannot be used in many real-time applications. Real time applications need techniques which does not need any strict control over the human beings for recognising the face.Face recognition is required in these systems under uncontrolled situations. As a result, this study presents one such system, however it requires an image as input and only one person per image, which is a drawback of the system and prohibits it from being utilised in real-time applications like attendance systems.

Edy Winarno developed a system in his article "Anti-Cheating Presence System Based on 3WPCA-Dual Vision Face Recognition" that may forecast cheating in facial recognition-based systems by using a photograph of an authorised person or an image that looks like the authorised person. They employed a dual vision camera, also known as a stereo vision camera, which uses two lenses to produce one image. They used the half-join method to merge the half of the left picture and half of the right image of a person into a single image of the person that could then be extracted using the 3WPCA approach once they got the two images. Cheating is detected 98 percent of the time with this approach. [2]

The author of this study built and explained how to improve a picture-based attendance system capture.Many pupils' faces [3] may represent the next generation of biometric devices that are now in use. Because the human face is a unique object with a high degree of changeability, it must be quick and precise when recognising student facial structures. Students will be registered for the system by having their photos taken, and then they will be taken for setting attendance. To obtain great and crisp accuracy, continuous registration is essential. This system is in place. The system will be explained in this

document, and evidence will be provided to back up the method.

Traditional data collection methods have limitations and are difficult to implement, such as a biometric presence. In the technology, there is no room for human error, such as when a fingerprint scan is rejected due to moist conditions. Fingers that are filthy, excessively dry, or peeling. As a result, the author advises that the authority add a mobile presence system and a face with NFC security, as well as the ability to store data using Raspberry Pi in the cloud. The paper examines works that are relevant. NFC, face agencyarea, microcomputers, and cloud area are all part of the attendance management system. Then it offers a new method, as well as a system of planning and development. As a result of this, a system has been developed that decreases the use of paper and eliminates the time and energywasted by attendance.

3.EXISTING SYSTEM

Computers have the ability to communicate with humans in a variety of ways. It will be collaborative effort. It more acceptable to both people and computers if it is based. Concerning the validation procedure. The author is interested in incorporating and growing a student recognition systemalgorithm based on the "survival-Ing" method. The system then uses embedding to classify a person's face, and it may be utilised for a range Attendance applications, for example - systems, security, and so on. The paper shows the result of creating a system in the form of a display.

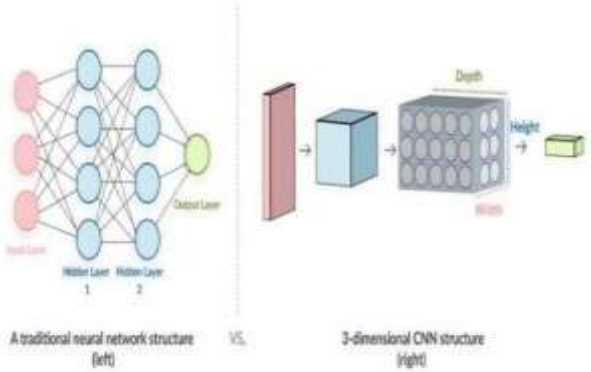

Figure 1: Traditional neural network versus CNN.

The author of the study "Face Attendance System Based on Recognitionutilising Machine Learning Algorithms" by Radhika C. Damale claims that facial traits can be used to identify a person. Facial recognition is the term for it. Face features can be employed in a variety of computer-based vision algorithms, including face identification, emotion detection, and multi-camera surveillance. The face recognition system is gaining academics' attention. Various approaches, including as SVM, MLP, and CNN, are discussed. Face detection is done using DNN. SVM and MLP techniques use extraction techniques to extract features like PCA and LDA. Images are delivered directly to CNN Module as a feature of the CNN methodology.

For CNN-based techniques, the methodology has a high detection accuracy percentage. On self-generated databases, SVM, MLP, and CNN obtain test accuracy of 87 percent, 86.5 percent, and 98 percent, respectively. [6]Priyanka Wagh wrote the paper "Class Attendance Framework the on- Face Recognition." The histogram levelling of the picture should be completed to easily differentiate the understudies seated in the last columns. The image will be circulated around for people's faces to be discovered. The Ada-Boost computation has the highest

productivity of all of them.As a result, this research will use this calculation to recognise the faces of understudies by utilising Classifiers and classifiers are highlighted in the haar.Ada-Boost calculation course ideas. Every understudy's face is shaved and groomedvarious highlights, such as the separation of the eyes, nose, and mouth and face blueprint, are erased. The understudyis perceived using these features are included in Eigen's countenances, and their participation is marked by comparing them with the face database. With the eventual purpose of inspection in mind, a database of faces should be created.The camera is used to keep an eye on the situation in Face-recognition-based attendance monitoring system in the classroomtechnology. It activates the student face photo event and scans when the student's information is neededsigns in with their campus card, preventing non-school staff entry into the classroom andsubstituting classes. [8]

Akshara Jadhav, Akshay Jadhav, Tushar Ladhe, and Krishna Yeolekar wrote the paper "Computerized Participation Framework Utilizing Face Acknowledgment." The recognised face is segregated from the rest of the group and subject to pre-treatment.The extricated face image is histogram levelled and scaled to 100x100 in this pre-preparing stage. After perceiving the understudies' essences, the names are rehashed into an exceed expectations sheet in this approach. The sheet that says "exceed expectations" isgenerated by a database framework trading instrument. The database can also generate month-to-month and week-to-week participation reports for understudies. have a look at the picture of the understudy To convert a rectangle bouncing box to dim scale, use Face identification algorithms to distinguish faces and identify the location of passion.

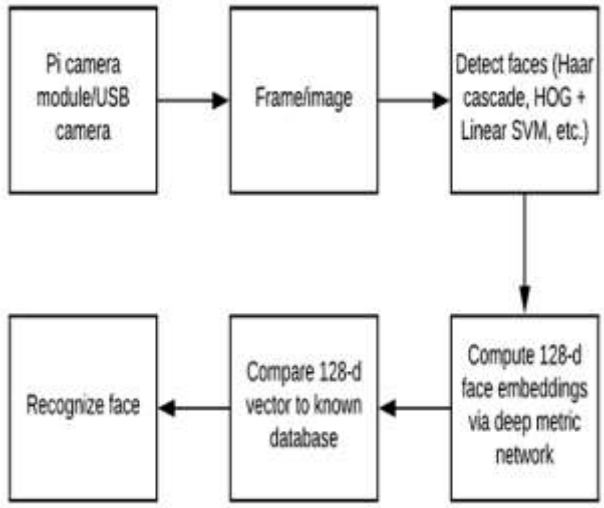

Figure 2: Face Recognition model

The author offered a technique in which the framework was employed as an online Web Server, allowing the outcomes of the participation to be visible to a validated web customer. LocalBinaryPatterns (LBP) are used to complete facial recognition. The first step is toidentify and update the ROI of interest, which is human pace, and apply the Haar Feature-based Chain reaction after thatcomputation. The picture highlightsare then extracted using LBPs, and LBPs calculation is used to compare the separated highlights to the prepared datasets. The participation results are then saved in MySQL database by hitting 'c' as in catch on the console framework, therefore they tend to be available to the public.The basic operating rule of the project, according to Nandhini R.'s article "Participation based on facial identification System," is that the video captured information is converted into an image to recognise and perceive it. To recognise the faces, a CNN computation is used. A CNN employs a multilayer perceptron-like structure to handle the

requirements more quickly. After the face has been distinguished and prepared, it is compared to the faces in the understudy's database to renew the students' participation.The amount of highlights of any facial understudy picture is produced to be consistent, for example 16 DCT coefficient, according to Samuel Lukas, Aditya Rama Mitra, Ririn Ikana Desanti, Dion Krisnadi's article "Student Attendance System in Classroom Using Face Recognition Technique." Grayscale standardisation, histogram balance, Discrete Wavelet Transform (DWT), and Discrete Cosine Transform are all completed as part of the procedure (DCT). A closer look at the dissatisfaction in interpreting the rest of the facial photos reveals that an understudy could be mistaken for another pupil (s) By taking into account the whole extent of acknowledgement.

4.PROPOSED SYSTEM

In the process of marking attendance, facial expression, facial recognition, and registrationeventually recording attendance ina database are all procedures. Unlike Eigenfaces and Fisherfaces, which are used in most system and technology verifications, where training and enrolment aretwo independent procedures, training and enrolmentare two independent steps in most modern pace verification systems. During the training process, millions of photographs are used. Enrolment, on the other hand, is accomplished through the use of a minimal number of photographs. Sending a few images of the individual through the network to obtain 128-dimensional feature descriptors for each image is all it takes to enrol someone in Dlib.Alternatively, each image is converted into a three-dimensional feature. Traits it will be close if they belong to the same person.together in this high-dimensional space, whereas features belonging to other persons would be separated.

Step 1: Locate All of the Faces: In the backend, the Histogram of Oriented Gradients approach is utilised to detect faces. In which our image will be divided into 16*16 pixel squares.

Step 2:Posing and Projecting Faces ,As the face to be recognised, it is possible that it will not be in the same posture as when we trained.The bakend's dlib library locates face landmarks and warps the image.So that our model may be trained to accurately detect.

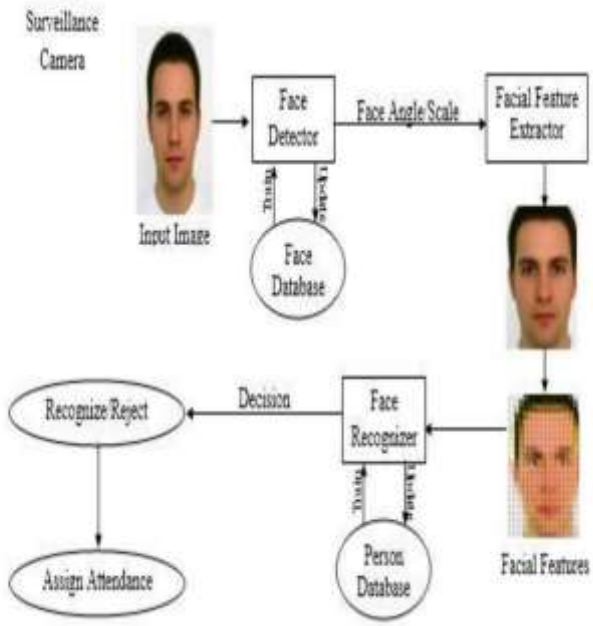

Figure 3: ProposedArchitecture Diagram

Step 3: Encoding Faces 128 measurements are calculated, such as the distance between the nose and the eyes, the size of the lips, and so on, which may be used to

compare faces and provide an accurate recognition result.

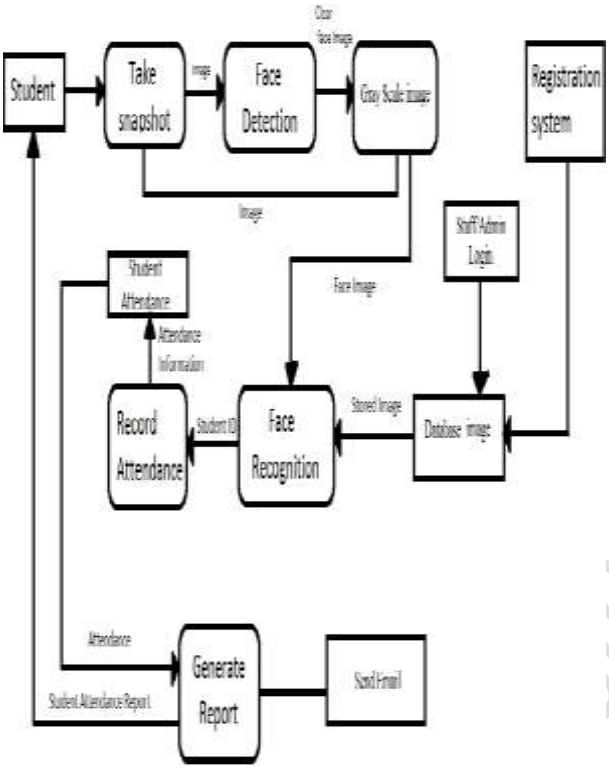

Figure 4: Flow Diagram

We define a smaller ResNet neural network for enrolling. This network was also used for training. The photographs of the people we'll be enrolling are organised as follows: We'll have subfolders, with photographs of one individual in each subfolder. We'll keep track of this image-to-label mapping so we can use it in testing later. Then, one by one, we process enrolment photos, converting each one from BGR to RGB format, as Dlib utilises RGB as its default format. Because Dlib's cv image format isnot recognised by neural network module, tranflation OpenCV BGR picture to Dlib's cv image and then Dlib's cv image to Dlib's matrix format. Pace in the image should be detected.We can check if a new image of a person is the same person by measuring the distance between the enrolled faces and the new face in 128-dimensional space. From disc, read the name-labels mapping and descriptors. Then convert the query image from BGR to RGB format, which is an image of a classroom with several pupils. Because Dlib's default format is RGB. Convert the OpenCV RGB image to Dlib's cv image, then Dlib's cv image to Dlib's matrix format. The neural network module does not recognise Dlib's cv image format. Faces in the query image should be detected. Find facial landmarks for each face. For each face, make a warped and 150x150 patch. Now compute each face descriptor.Find the enrolled face with the shortest distance. Dlib states that if the Euclidean distance between twoface descriptor vectors is less than 0.6, theyare from the same person; otherwise, they are from distinct persons. The number of photos enrolled and other differences (illumination, camera quality) between enrolled photos and query image will determine this threshold. We're utilising a 0.5 threshold. If the minimum distance is less than the threshold, look up the individual's name in the index; else, the person in the query image is unknown. The database will also include the student's name, as well as the day and time of attendance.

5.EXPERIMENTAL RESULTS

We can check if a new image of a person is the same person by measuring the distance between the enrolled faces and the new face in 128-dimensional space. From disc, read the name-labels mapping and descriptors. Then convert the query image from BGR to RGB format, which is an image of a classroom with several pupils. Because Dlib's default format is RGB. Convert the OpenCV RGB image to Dlib's cv image, then Dlib's cv image to Dlib's matrix format. The neural network module does not recognise Dlib's cv image format. Faces in the query image should be detected. Find facial landmarks for each face. For each face, make a warped and 150x150 patch. Now compute each face descriptor.Find the enrolled face with the shortest distance. Dlib states that if the Euclidean distance between twoface descriptor vectors is less than 0.6, They come from the same familyperson; otherwise, they are from distinct persons. The number of photos enrolled and other differences (illumination, camera quality) between enrolled photos and query image will determine this threshold.

We're utilising a 0.5 threshold. If the minimum distance is less than the threshold, look up the individual's name in the index; else, the person in the query image is unknown.The attendance is marked for the associated USN in the database for each face detected and matched with an enrolled face. The database will also include the student's name, as well as the day and time of attendance.

CONCLUSION

Thus the attendance of every students marked automatically by recognizing their face with the face present inthe data base effortlessly**.** Still Few countenances are there which truly extreme to recognized for example twin kin. Building a framework that can recognize the two lookalikes can be a test.The execution of the Smart Attendance System depicts the presence of an arrangement between the fitting acknowledgment rate and the limit esteem.The procedure described above will yield the best results. For frame extraction, OpenCV is used, and for face recognition, dlib is used. This method will be more accurate at recognising multiple faces from a single frame while also being faster.

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