

Face Recognition based Attendance System using LBPH Algorithm

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ABSTRACT

In traditional days attendance is managed by hand, it might be a significant strain for the teachers. A clever and automated 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. 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 takes a person's facial traits and stores them as a unique faceprint 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 methods such as fingerprint, palmprint, and iris recognition. Face recognition systems may also recognise a person seen from afar, without requiring any communication or contact with the person. Facial recognition software is becoming increasingly popular currently 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 way improved. In the previous ten years there is enormous improvement in techniques of recognition.

However, most image recognition methods can currently do this perform great only if 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 uniuqetasks are required to uniquely identify different topics by trying to manipulate various problems such as illumination and pose and 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," most face recognition systems require faces to be fed into them based on certain rules, 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, facerecognition cannot be used in many real-time applications.

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 agency area, 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 energy wasted by attendance.

3. EXISTING SYSTEM

Computers have the ability to communicate with humans in a variety of ways. It will be a collaborative effort. It is 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 system algorithm 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 of attendance applications, for example - systems, security, and so on. The paper shows the result of creating a system in the form of a display.

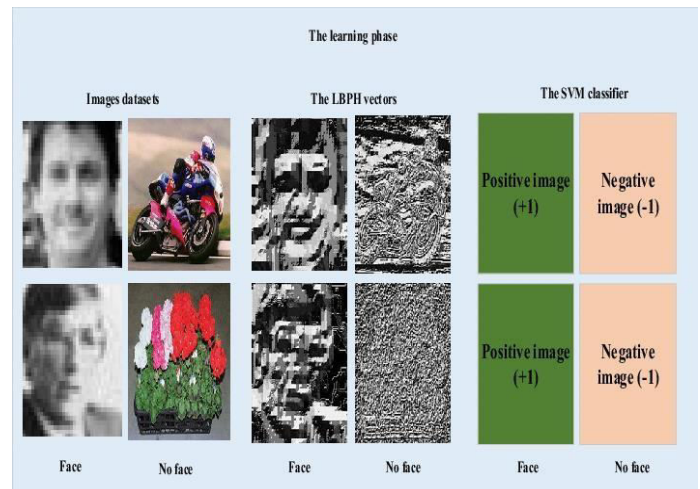


Figure 1: Traditional neural network versus CNN.

The author of the study "Face Attendance System Based on Recognition utilising 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.

It was first described in 1994 (LBP) and has since been found to be a powerful feature for texture classification. It has further been determined that when LBP is combined with histograms of oriented gradients (HOG) descriptor, it improves the detection performance considerably on some datasets.

a classifiers are highlighted in the haar. Ada-Boost calculation course ideas. Every understudy's face is shaved and groomed various highlights, such as the separation of the eyes, nose, and mouth and face blueprint, are erased. The under study is 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 classroom technology. It activates the student face photo event and scans when the student's information is needed signs in with their campus card, preventing non-school staff entry into the classroom and substituting 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. This sheet that says "exceed expectations" is generated 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.

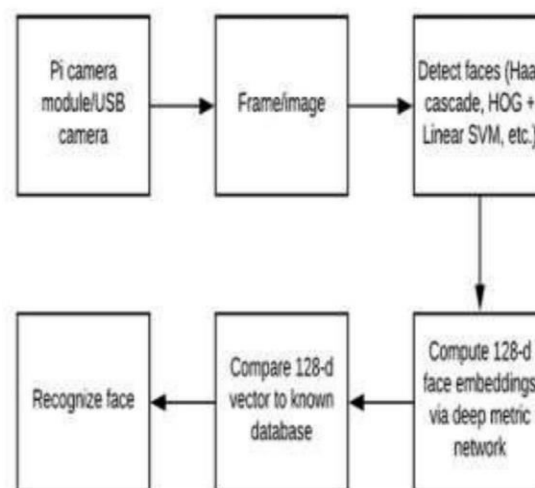


Figure 2: Face Recognition model

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. Local Binary Patterns (LBP) are used to complete facial recognition. The first step is to identify and update the ROI of interest, which is human face, and apply the Haar Feature-based Chain reaction after that computation. The picture highlights are 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.

4. PROPOSED SYSTEM

The proposed face recognition approach has four main steps: module for image acquisition, module for extraction of features, module for training classifier database, and module for classification. Initially, the face datasets are collected by the image acquisition module. Then, a series of salient features are extracted by applying feature extraction module. These facial features are used to analyze face landmarks which represent human identity information. In the next process, the classifier is trained for recognizing the face. In the last module, the system recognize face image and fetch information about the person from the csv file.

Workflow of Face recognition based Attendance System.

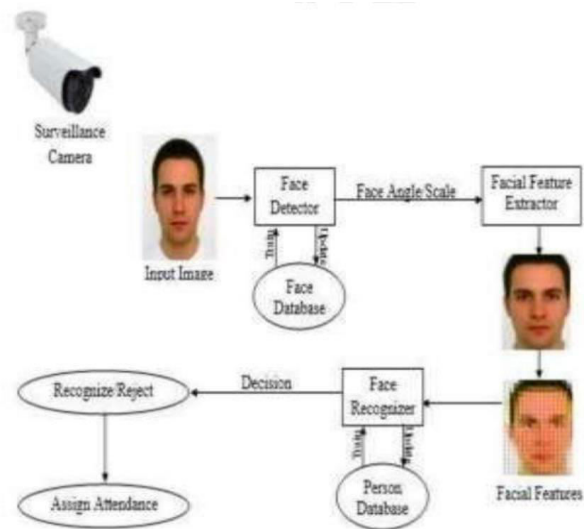
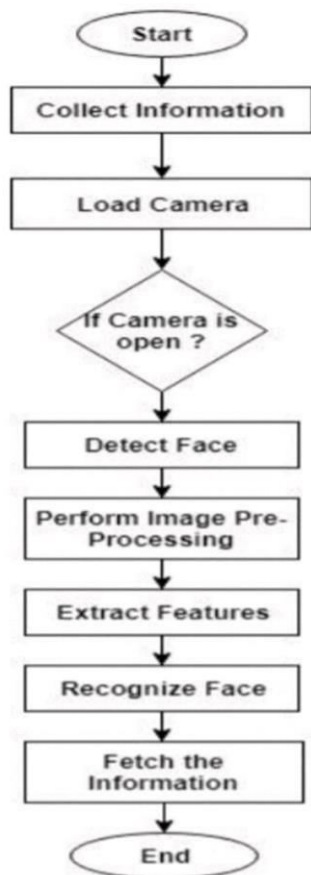


Figure 3: Proposed Architecture Diagram

About the dataset used here

We designed our own dataset, with 500 individual photos. Throughout the image acquisition process, face images are cropped and converted into gray images, then these images are saved in the same folder to make face databases for extraction tasks. After this, the standardization technique is applied to all images to reduce noise and set the correct image scaling position to quickly obtain the result of recognition.

ABOUT LBPH ALGORITHM

The LBPH algorithm operates by dividing the face image into small regions and extracting local binary patterns (LBP) from each region. It then constructs a histogram of these patterns, effectively encoding the texture information of the face. Finally, it uses these histograms to recognize faces.

```
recognizer= cv2.face.LBPH FaceRecognizer_create()
```


LBPH is famous for its performance and accuracy, which can recognize a person's face from both the front and the side

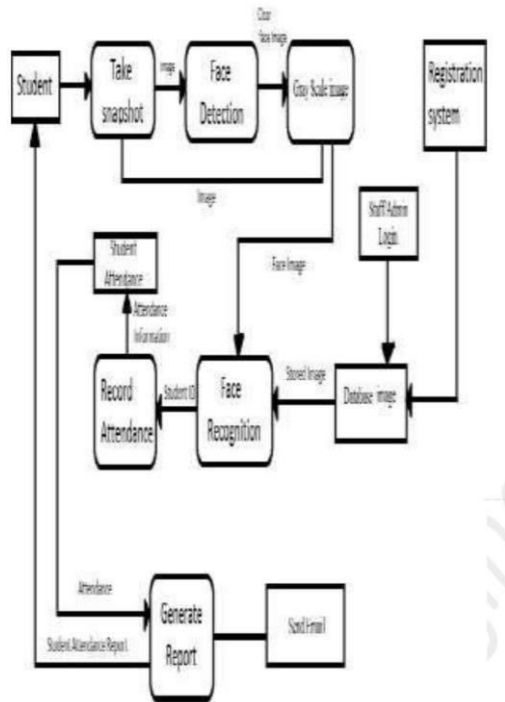


Figure 4: Flow Diagram

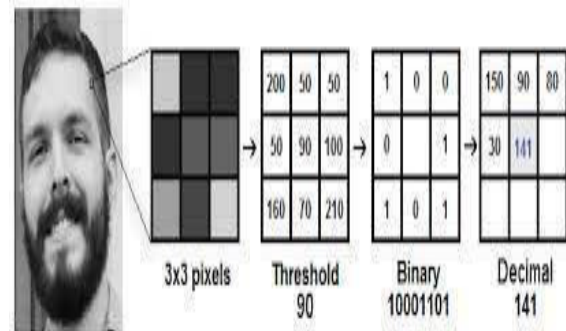
FACE DETECTION

For face detection, OpenCV is used that introduces a Haar cascade classifier . The classifier of the Haar cascade uses the AdaBoost algorithm to locate numerous image facial features. Initially, it takes an input image using the camera and converts that color image into a grayscale image. After this, it loads Haar cascade classifier for determining whether the image contains any faces in the frame or not. When any face is detected, other facial features are checked and a square frame is drawn on the face. Otherwise, it starts reading other pictures. Figure shows the flow chart of the detection process

FEATURE EXTRACTION

The input image is divided into many small sub-images after the application of the LBP operation and the histograms of the LBP value of each sub-images are extracted.

Then all histograms are linked to make an image-representing feature vector and used to train a facial recognition classifier.



$$LBP(x_c, y_c) = \sum_{p=0}^{P-1} 2^p s(i_p - i_c)$$

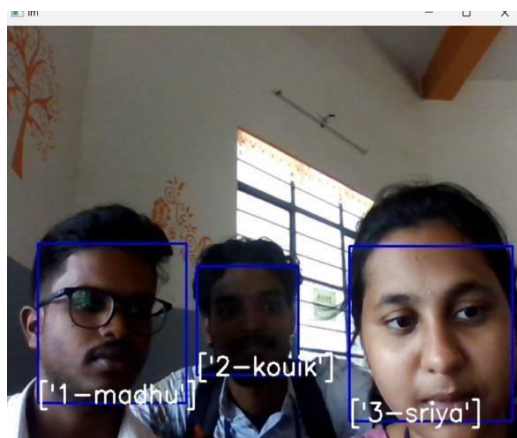
$$s(x) = \begin{cases} 1, & x \geq 0 \\ 0, & x < 0 \end{cases}$$

FACE RECOGNITION

For the face recognition process, Local Binary Pattern Histogram algorithm is applied the LBP operator uses local binary patternsto reduce the local spatial distribution of a face image.

The LBP operator is a collection of binary pixel value ratios in the center at regular pixel intervals and is around 8 pixels.

5. EXPERIMENTAL RESULTS



ADVANTAGES

In this way a lot of time is saved and this is highly secure process no one can mark the attendance of other

Attendance is maintained on the excelsheet so anyone can access it for purposes

CONCLUSION

Thus the attendance of students marked automatically by recognizing their face with the face present in the 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.

REFERENCES

1. Xin Geng, Zhi-Hua Zhou, & Smith- Miles, K. (2008). Individual Stable Space: An Approach to Face Recognition Under Uncontrolled Conditions. IEEE Transactions on Neural Networks
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3. Jorge Orts, "ECE533 Image Processing Project", Face Recognition Techniques, The University of Wisconsin