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ATTENDANCE SYSTEM USING FACIAL RECOGNITION

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***Abstract*— The Attendance of the students is an important task in class. The attendance system is used to track and monitor whether a student attends a class. It is difficult task to manually mark the attendance and very time consuming. There are many biometric processes used for attendance system, among which face recognition is the best method. A Face recognition-based attendance system is more secure and time-saving. The Face recognition-based attendance system will replace the manual method of taking the attendance, which takes a lot of time, that is, it is very time consuming and is difficult to maintain. This project is going to describe the attendance system which uses Face Recognition to mark the attendance. In this method the camera will capture the image, the faces are detected and then it's recognized with the dataset and finally the attendance is marked and is stored into a csv file. This face recognition-based attendance system using camera has very accurate data processing and high accuracy so that it can produce a system that is reliable and powerful to identify human faces in real-time.**

Keywords—Attendance, Face Recognition, Face Detection, Open CV, CNN.

I INTRODUCTION

A face recognition program is a software application for verifying a person and identifying him or her with a video or picture from a source. Facial Recognition modules tend to work in different forms, but the one concept that holds true for any module is the comparison of facial features that are selected uniquely. Generally, face recognition includes face recognition and face validation. Recently, efforts have been made to explore the impact of face alignment methods based on larger datasets or new loss functions on face recognition performance. Nowadays, research on face recognition has made great progress. It can be called as an application that works with artificial intelligence that identifies people based on their unique features like shape, color, or any other unique feature. This is also implementable in various platforms. This technology is widely used in mobile phones in this era by tech giants as it is extremely efficient and hardly any work is to be done by the user.

II. LITERATURE SURVEY.

In the Paper Presented by Lixiang Li, Xiaohui Mu , Siying Li And Haipeng Peng describes the development stages and related technologies of face recognition, including early algorithms, artificial features and classifiers, deep learning and other stages. After that, the author has introduced the research on face recognition for real conditions. a simple process of feature extraction where PCA is combined with face recognition by using K-Nearest-Neighbour(KNN) algorithm.

The authors Gurlove Singh, Amit Kumar Goel, after the face is detected the main task of face recognition system starts as to identify the known or unknown face and act accordingly. Often people are mistaken by the term face detection whereas face recognition means on the other hand is to authenticate a given face data based on the stored face data in the database. Once the face data matches with the database then the system is authenticated. There are different approaches that are being followed in the whole process of face recognition. Each process has its own pros and cons, and has also some limitations which makes it different from other approaches.

In the Paper Presented by E.Varadharajn, R.Dharani, S.Jeevitha, B.Kavinmathi, S.Hemalatha describes about the biometric attendance management. The automatic attendance management will replace the manual method, which takes a lot of time consuming and difficult to maintain. There are many biometric processes, in that face recognition is the best method. In this paper the researchers are going to describe the attendance without human interference. In this method the camera is fixed in the classroom and it will capture the image, the faces are detected and then it is recognized with the database and finally the attendance is marked.

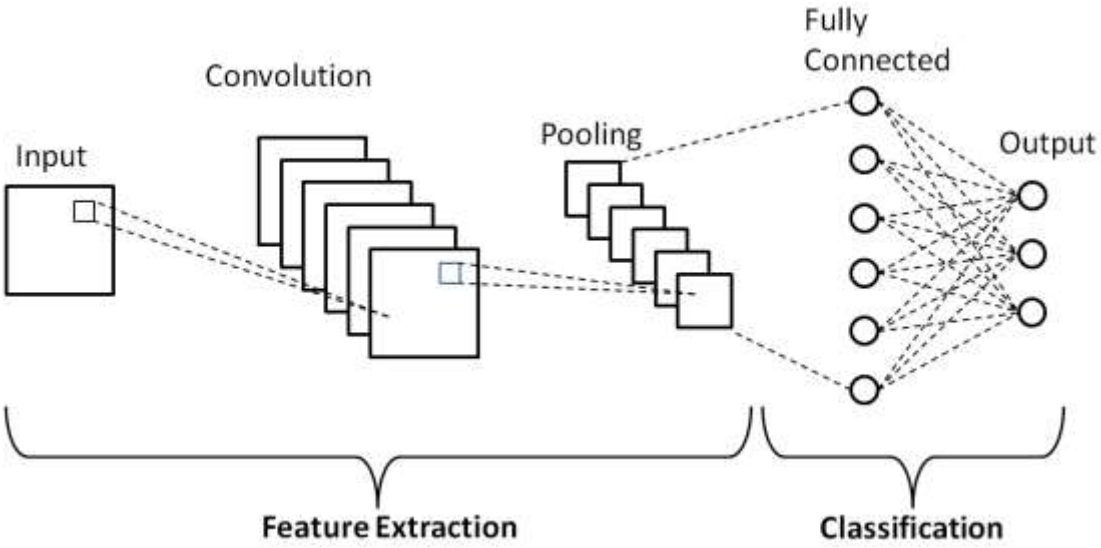
In the Paper Presented by Hendy William Sino, Indrabayu, Intan Sari Areni states that the increasing of CCTV usage for handling security's problems has prompted the demand for face recognition system. Therefore, face recognition with low resolution data from CCTV is needed. In this study, Viola Jones, Gabor filter and Support Vector Machine (SVM) is used for face detection, feature extraction, and classification, respectively. Adaptive Histogram Equalization (AHE) is applied in the pre-processing stage to increase the recognition accuracy.

In the Paper Presented by Aftab Ahmed, Jiandong Guo, Fayaz Ali, Farha Deeba describes that Automatic individual face recognition is the most challenging query from the past decade in computer vision. Author have designed the dataset (LR500) for training and classification. This paper employs the Local Binary Patterns Histogram (LBPH) algorithm architecture to address the human face recognition in real time at the low level of resolution the final task is to recognize face images. The Haar cascaded classifier and training recognizer will be used for face recognition. The classifier will compare the stored face images with input face

images. If the face features of input images matched with the database images, the recognition result will be displayed on the camera screen.

III. PROPOSED SYSTEM APPROACH

CONVOLUTION NEURAL NETWORK: In past years, CNN have achieved great results in face recognition. With advanced networks architecture and keen learning methods, CNN has improved face recognition ability to unprecedented levels. A face recognition model based on the deep convolutional neural network (DCNN) can accurately identify the identity of a face. The main goal of a CNN is to be able to extract advanced features from an image. It has multiple layers, each layer having functions of its own. The user can also add a few hidden layers with functions of their own. It mainly works in three layers: Convolution, pooling and fully connected layers.



i. Convolution: In CNN the convolution is performed on input data i.e., photo or video with the use of filters. These filters are sided over the input to execute the convolution. At every iteration while sliding a matrix multiplication is performed and sums the result and put into other matrix called as feature map.

ii. Pooling: After convolution layer, the next comes the pooling layer. Main function of this layer is to continuously decrease the dimensionality to minimize number of parameters and computations present in network i.e., here size of image will be shrinked (reduced). The size is reduced with the help of threshold value. The output from convolutional layer is been compared with the threshold value if output value is less than threshold value then we can ignore that particular one.

iii. Fully connected layer: This layer acts as the classification layer which will serve as the classifier on the top of extracted features. Here all the values that are obtained from pooling extraction feature are stored in single list. Then the values in single list will be compared with filters and then we get the final value image.

The Proposed system is implemented mainly by using three steps, such as: creating the dataset and then train them, work on recognizing the students face and finally generate the attendance for the students. The dataset is created by collecting the photos of the students maximum 100 for each student and make the separate folders for respective students with the respective roll numbers of the students. We can create the live data set of students by taking video. The processing of frames includes actions like padding with respect to every side with the black color and then it is resized with proper dimensions. In next step the dimensionally reduced image is being passed through the MTCNN which produces the face with the bounding boxes. Then the bounded images with the coordinates are used for cropping the faces from frames and then sent for the

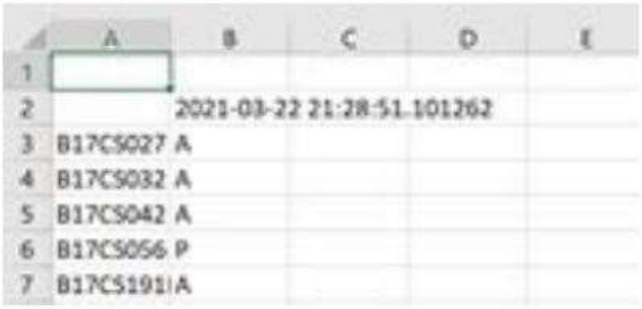
augmentation, this includes the factors like blurring, level moving, adding Gaussian commotion, flipping, salt and pepper clamour, vertical moving, expanding and diminishing the brilliance. The amplified faces are then reduced to 112x112 and thus saved in the folder which corresponds to the respective video's name. The entire process is repeated for the other frames in the video. Then the dataset creation is finished. Later, after completion of the dataset the next part is to train them. Then software that is designed allows the user to take the respective percentage for training and remaining percentage is automatically used for testing the classifier that is trained before. The certainty scores of all the classes are noted and the respective class with most extreme score is allotted to the face.

IV. RESULT

We created the data set of students images trained the model and tested the model based on trained dataset and generate the attendance. We tested the proposed approach by varying different parameters and adding different noises to the video. We altered the various parameters of the video that outweighed the practical scenarios. Such measurement shows the performance of the proposed approach in different real-time scenarios. The data augmentation increase the diversity of data for training models and helps to improve the accuracy of the end-to-end system.

(multiple faces in single frame)

The image captured from the web camera first detects the faces on each student and then it stores the result into the csv file.



	A	B	C	D	E
1					
2		2021-03-22 21:28:51.101262			
3	B17CS027	A			
4	B17CS032	A			
5	B17CS042	A			
6	B17CS056	P			
7	B17CS191	A			

V. CONCLUSION

The Face Recognition based Automated Attendance System is simple, accurate and works efficiently. The proposed system achieved appreciable results when tested in a real classroom environment. The system was able to overcome the usual challenges of occlusion, alignment, orientation, and luminescence. Experimental results demonstrate that the proposed system is able to achieve appreciable results in practical environments, and hence it can be implemented at various places to carryout attendance process. The limitation of the proposed system is that it gets perplexed for distant faces and also for low resolution videos. The MTCNN architecture is impotent for faces with their eyes closed which makes this system restricted to faces with eyes open analogous to camera. The future work may include detecting and recognizing faces irrespective of resolution of the video coverage by pre-processing it using a super-resolution module.

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