

# Smart Attendance System using Face Recognition

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**Abstract:** In present academic system, regular class attendance of scholars plays a significant part in performance assessment and quality monitoring. The conventional styles rehearsed in utmost of the institutions are by calling names or subscribing on papers, which is largely time-consuming and insecure. This composition presents the automatic attendance operation system for convenience or data trustability. The system is developed by the integration of ubiquitous factors to make a movable device for managing the scholars' attendance using Face Recognition technology

**Key words:** MTCNN(Multi-Task Convolutional Neural Network) Face recognition, Tkinder, Smart Attendance, Opencv

## I. INTRODUCTION

Students' attendance in the classroom is veritably important task and if taken manually wastes a lot of time. There are numerous automatic styles available for this purpose i.e. biometric attendance. All these styles also waste time because scholars have to make a line to touch their thumb on the scanning device. This work describes the effective algorithm that automatically marks the attendance without mortal intervention. This attendance is recorded by using a camera attached in front of classroom that's continuously landing images of scholars, describe the faces in images and compare the detected faces with the database and mark the attendance. The paper reviews the affiliated work in the field of attendance system also describes the system armature, software algorithm and results

## II. LITERATURE SURVEY

Shraddha Arya and Arpit Agarwal( 1) proposed a work to design and apply a face recognition system that accepts full or partial face image to corroborate the face of the person. The way involved are pre-processing, LDA algorithm and Neural network. Pre-processing of the images takes place where the image of the face is partitioned to numerous different facial corridor. Secondly LDA algorithm is proposed which features in reducing the dimensional spaces with the reduction of advanced dimensional image to lower

dimensional image and retains as important as information possible for recognition. Eventually, a neural network is proposed to train the uprooted features in the database and the trained model receives the input image and computes the input faces and face recognition is performed( 8)

Prashant Ksambe, Akash Upadhyay, Anushka Waingankar, Nevil Pooniwalla, Ruchi Shah( 2) proposed a smartphone attendance system which is grounded on mobile operation where face recognition fashion grounded on machine literacy is used to mark the attendance. The result shows the capability of the system to manage with the change in posing and protuberance of faces. From face recognition with deep literacy, it has been determined that during face discovery, the problem of illumination is answered as the original image is turned into a overearer representation that captures the major features of the image anyhow of image brilliance. In the face recognition system, original facial milestones are considered for farther processing. After which faces are decoded which generates 128 measures of the captured face and the optimal face recognition is done by chancing the person's name from the encoding. The authors have claimed to have an delicacy of 98.3%.

Shama S, Karthikeyan Shanmugasundaram, Satees Kumar Ramasamy( 3) proposed a deep literacy CNN grounded face recognition system. This model uses MTCNN( Multi-Task Convolutional Neural Network) library for the face alignment, face recognition and FAREC has been enforced using the C language by computer vision. They've enforced Convolutional neural networks on trained point models. They've banded how CNN and MTCNN( Multi-Task Convolutional Neural Network) helps in facial recognition. The input images are compared with the images in the database and the compared models have maximum delicacy. The false acceptance rate( FAR) is only 0.1 and has delicacy of 96%.

## III. PROPOSED WORKS

Marking attendance in an educational institution is an important task to estimate the overall performance of a pupil. Face recognition system is homemade and hence

time consuming. thus, it's demanded to make an automated system which marks the attendance of the scholars with lower trouble as possible. The proposed model aims to achieve the below by erecting a smart attendance system depicted in the figure below

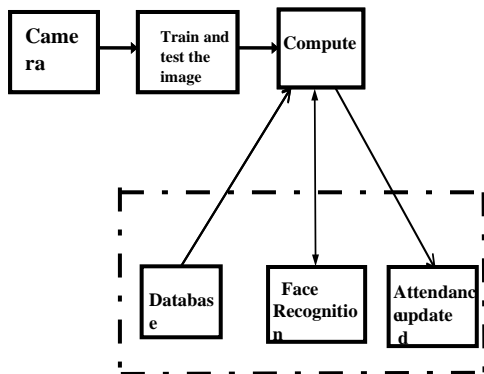


Figure 1: Block diagram

The photo of the student's inside the classroom will be taken by the lecturers. Depending on the dimension of the class we take multiple photos to cover all the students in the class without missing any one of them. Face recognition is performed using MTCNN(Multi-Task Convolutional Neural Network) and finally gets the list of all the students who are present in that photo and is updated in the form of a text file. Process:

1. Camera section This section consists of the Camera that's used to take the image of the scholars present in the classroom. The Camera must be installed in every classroom to take the image.
2. Train and Test section This section consists of a laptop or a desktop computer in which a smart attendance system program will be running. The program will do training and testing for any new image uploaded from the camera.
3. Compute Section his section consists of three modules like database for storing and reacquiring the data, Face recognition module is used to fete the face using the data in database and Attendance update is used to modernize the attendance in the attendance distance

### Face recognition system

MTCNN( Multi-Task Convolutional Neural Network) provides an effective fashion for face recognition grounded on the Convolutional neural network. It gives ideas about the styles involved in face recognition step by step. It consists of four main way, they're Face Discovery, Face Alignment, Face cropping and point birth..

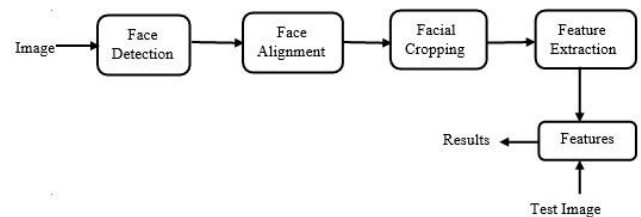


Figure 2: Face recognition system

Figure.2 Shows the overview of the MTCNN(Multi-Task Convolutional Neural Network) Face recognition system that starts from the input image of a person to be recognized, then detects the landmark of the face and alignment will be done. Later the features are extracted from facial images.

### I. Face Detection

The face detection is a computer vision technology to detect the front faces of the person from the digital image or video. This will detect the frontal faces by using facial landmark detection of upper lips and nose. Human nose is the middle point of the facial landmarks. The precise detection of human faces is a much more important process. MTCNN(Multi-Task Convolutional Neural Network) facial landmark detector which is faster, more efficient and smaller than the original version. a 5point facial landmark detector is used. The 68-point detector localizes regions along eyes, nose, mouth, jawline and eyebrows. The 5-point facial landmark detection reduces this information.

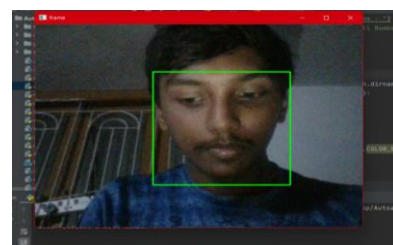


Figure 3: Face detection

### II Face cropping

Face cropping is the process of elimination of unasked external area from an image. Face cropping is used to learn the facial features of humans in neural networks. The process encompasses in omission of gratuitous trash from the image, to ameliorate its architecture or separate the subject matter from its background.



Figure 4: Face Cropping

### III. FEATURE EXTRACTION

#### Convolutional neural network

When it comes to Machine Learning, Artificial Neural Networks perform very well. Artificial Neural Networks are used in various classification tasks to classify image, audio, words etc. Convolutional neural network is a derivative of ANN which is used mainly to classify images like classification of images of animals, plants or face recognition. Convolutional neural network is designed to process data through multiple layers of arrays. The primary difference between Convolutional neural network and any other ordinary neural network is that Convolutional neural network takes input as a two-dimensional array and operates directly on the images rather than focusing on feature extraction. The solution for the problems in face recognition can be solved using Convolutional neural network approach.

A convolutional neural network uses three basic ideas:

- Local receptive fields
- Convolution
- Pooling

CNN uses spatial correlations which are present in the input data. Each layer of a neural network is connected to some of the input neurons. This region is called the local receptive field. Local receptive field is used to mainly focus on the hidden neurons.

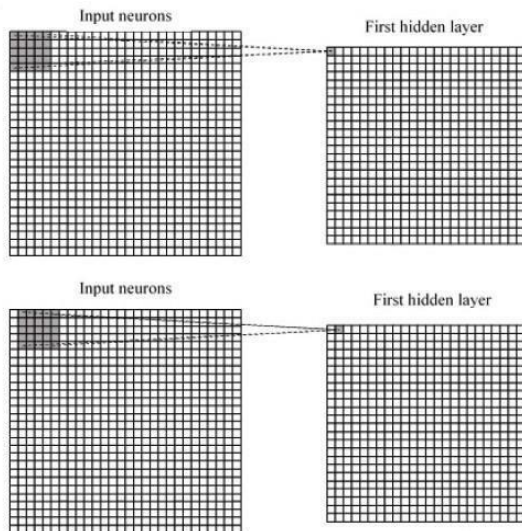


Figure 5: Local receptive fields

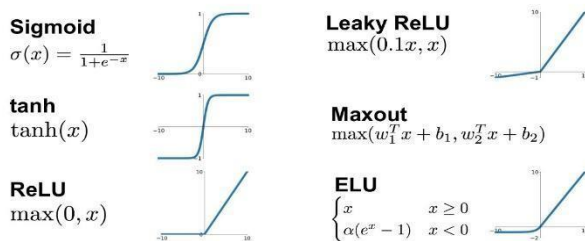


Figure 6: Functions of CNN

The output from the pooling layer is provided to the fully connected layer which is a regular neural network layer that gets input data from the last layer and computes the class scores and provides the 1-D array of size which is the same as the number of classes.

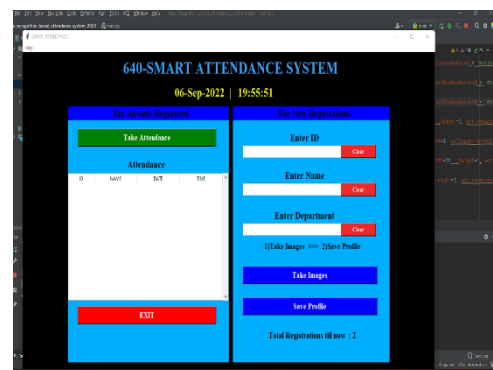
#### Database

A database is an organized collection of data, generally stored and accessed internally from a computer system. Formally, a "database" refers to a set of related data and the way it is organized. Access to this data is usually provided by a database management system consisting of an integrated set of computer software that allows users to interact with one or more databases and provides access to all of the data contained in the database. The DBMS provides various functions which allows entry, storage and retrieval of large quantities of information and provides ways to manage how that information is organized.

In this proposed work Database consists of 100 images and the database path is given to the program to compare the faces with test images.

### IV. USER INTERFACE

In this Attendance System the Attendance for students is marked using Face verification. Create account by registering as a user faculty and Login to account. After Login the faculty has the access to add a students, take Attendance, modify Student details. The faculty can search Attendance of a student using Multiparameter Search, by specifying the student ID, date of attendance, period of Attendance. The credentials for the Faculty are provided by superuser who has access to the whole database. Also we can create faculty as a user through register signup and then login to the main account. In this system you can register as a user faculty through signup and using social account google or facebook. Through google and facebook social account, this web app only creates user, The credentials for the Faculty are provided by the superuser who has access to the whole database. Only the superuser can create faculty . We can add multiple faculty in user through superuser.



Tkinder web framework is used for the development of the whole web app. OpenCv and face\_recognition API's were used for the development of Face Recognizer. The Face Recognizer can detect multiple face at a time and mark their attendance into Database.

## V. RESULTS

The dataset of the proposed work consists of 100 images. The group image which is downloaded from the link will be compared with the dataset one after the other. If both the faces are matched, then it marks as present and gets updated in the txt file. The proposed work is tested on two group images. Out of 100 people in the test dataset, we took a photo of a group of three. The image in Figure.8 has three students.

## VI. CONCLUSION

In this work, a smart attendance system has been proposed. The proposed work is dedicated to design and implement a face recognition model that accepts face images in order to recognize the face and it facilitates to update the attendance of the students in a very effective manner. The proposed model for taking attendance is effective in reducing extra hardware components required to take attendance. All the devices required for this purpose are already available with almost everyone in the present day and age. MTCNN(Multi-Task Convolutional Neural Network) Face recognition approach for detecting and recognizing faces has been seen to be very effective. Hence from the above results we can obtain a paperless attendance system which is automatically maintained. This method effectively reduces proxy for the students and also is a time effective system.

## REFERENCE

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