

Research Article

# Video Analysis for Face Recognition in Real Time Attendance Monitoring System

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## Abstract

Authentication is a one of the major problems in computer-based management of the communication system. Now a days, human face recognition is an important biometric verification branch and it is commonly used in many applications including video monitoring system, human device interface etc. This paper describes a framework for student's attendance system that uses an algorithm and CNN Classifier to incorporate face recognition technology. The presence is identified on the basis of the face recognition of the participant. A group image of a class will be captured and faces will be segmented from the captured image. The segmented faces are then compared to the predefined details of all class pupils. The program can quickly monitor the attendance of students.

**Keywords:** Face Detection; Face Recognition; Extraction Function, CNN.

## Introduction

Attendance is a key administrative aspect that can often turn into a time-consuming, repeated job that lends itself to inaccuracies. The proposed method eliminates the need of a manual paper registration and handwritten documentation. This system reduces the administrative burden on faculties and makes it easier to utilize resources in a better manner. Eventually leading to a more efficient and productive education system. Absences are quickly identified, resulting in the student and staff taking appropriate action quickly and in the best interest. A biometric is a unique, measurable human trait that can be used to automatically recognize an individual or to verify an individual identity. Biometrics can assess both clinical and behavioural features. Clinical biometrics include:

- Finger scanning,
- Facial recognition,
- Iris scanning,
- Retina scanning, and
- Hand scanning.

Conduct biometry includes:

- Voice-scan, • Signature-scan, and
- Keystroke-scan.

The face is an important part of who you are and how people identify you. For face recognition, there are two types of comparisons available. The first is verification and the second is identification. Verification is where the system compares the given person with who that person says they are and gives a yes or no decision.

Identification is where the program compares the person that is assigned in the database to all other individuals and gives a ranked list of matches. In the 1960s, the first semi-automated facial recognition device to identify the features (such as eyes, head, nose and mouth) on the images. In the 1970s, Goldstein and Harmon standardized identification of 21 different contextual identifiers, such as hair color and lip size. In 1988, Kirby and Sirovich applied the traditional linear algebra method to facial recognition. For all recognition and authentication systems, the following four steps are used:

- Capture: during registration and also during the identification or authentication process, the device takes a physical image.
- Extraction: Remove unique data from the sample and construct a blueprint.
- Comparison: Comparison of a new sample with a template.
- Match / Non-match: the system decides whether to extract new sample features.

The proposed method shows how face recognition can be used to automatically record an individual's presence at the respective venue for a successful attendance system. A face recognition system is a computer application that can identify or verify a person from a digital image. One way to do this is to compare chosen facial features from the photograph with a face database.

## Literature References

**Xiujie Qu, Tianbo Wei, Cheng Peng, Peng Du, "A Quick Face Recognition System Based On Deep Learning"** In this, with the emergence of the Big Data era, theory of deep learning was rapidly developed and applied, especially in the field of image recognition. Similar to the classic recognition algorithm (such as LBP and PCA algorithm), the deep learning algorithm has high recognition rate and robustness characteristics. A real-time face recognition method on FPGA was proposed based on the convolution neural network (CNN) principle, which improves the speed and accuracy of face recognition. The process is divided into two sections. First, the PC terminal is used to complete the network testing and get the parameters of the network. Furthermore, the FPGA [1] is based on the face recognition system. FPGA parallel processing has the advantage of speeding up the network's computation speed in order to achieve the purpose of face recognition processing in real time. The results of the test showed that the system's detection speed was 400FPS, far above the current tests. It also has good robustness for complex lighting environments[1].

**LianzhiTan, ZhifengLi, QiaoYu,"Deep Face Attributes Recognition Using Spatial Transformer Network"**

We propose an end-to-end framework for locate face region, instead of locating the fiducial point he face region, in which spatial trans-former network is applied (priorityclassification network)tolearn the parameters of alignment. For an image or a feature map, the spatial transformer network learns about spatial transformation. Scaling, cropping, rotation and non-rigid deformation are part of the transformation. By adding a spatial transformer layer between input layer and classification layers, every input sample transformed before classified. For example, plane rotate dimagesare transformed to front alface images, and picture edge facial regions are transformed into the center area[2].

**Cherifi Dalila, CHERF AOUI Fateh,Yacini Si Nabil and Nait-ali,"FusionofFaceRecognition Methods at ScoreLevel."**

This paper describes method for Student's Attendance System which combines with the Personal Component A nalysis (PCA) algorithm for the face recognition technology. Through maintaining a log for clock-in and clock-out time, the system will automatically record attendance of the students in classroom enandit will provide the facilities to the faculty to access the information of the students quickly. This paper uses the technique of PCA(Principle Component Analysis) for face recognition and compression of images. It software is introduced using OpenCV libraries for face detection and additional methods. PCA approach has been commonly used for finding patterns in data in applications such as face recognition and image

compression. PCA is a common technique and for presenting data as an independent vector to show similarities and differences between different data. Then the design of the framework is split into three main components: Face Detection and Extraction, Read and Practice Face Pictures, Recognition and Classification[3].

**Nazare Kanchan Jayant, Surekha Borra,"Hybrid Face Recognition Techniques "attendance program.** This paper uses the equation Viola and Jones for calculations for facial recognition and association in facial identity. The algorithm Viola and Jones is used to detect the face. Where it is used in both the creation of repositories and the method of facial recognition. Where the input image is captured continuously via a web camera when a database is generated. The portrait that was taken is the one that was found. Cutting and inserting the picture in the tab. If there is any action video surveillance, where the moving target is protected in the case of face recognition. The image captured is facially defined and then examined by face recognition[4].

**Hemant kumar Rathod, Yudhisthir Ware, Snehal Sane, Suresh Raulo, Vishal Pakhare and Imdad A. Rizvi," System automated attendance using Machine Learning approach"** For acertain period of time, attendance management systems ticontinuously press picture sand to select the best image for processing. The system allows the instructor to test student attendance at noextracostand initiative automatically, While the package suggested contains very basic things such as camera, laptop, personal computer and local network. This method is safe, reliable and easy to use. MATLAB applies the whole method[5].

## Proposed System

This paper suggests an automatic attendance management system based on the techniques of face detection and face recognition. For face detection and face recognition, the device uses modified CCN(Convolutional nural network) algorithm. The system will automatically update the attendance in the database after successful recognition of a student. The proposed system enhances the performance of existing attendance management systems by eliminating manual calling, marking and access to institutional websites.

### Advantages:

- It's not a process that takes time.
- Improve performance.
- Make a user-friendly system.
- No need to be physically present in patients.
- Reduce paper work to a minimum

### Architecture Diagram

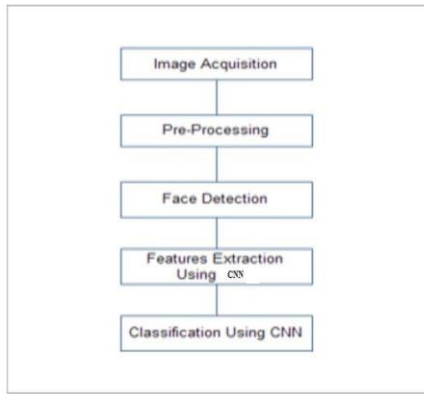


Fig 1 System Architecture

**Input Image:** Read the captured image in real time and collect the data.

**Preprocessing:** The purpose of preprocessing images is to remove redundancy in captured images selectively without affecting the details that play a key role in the overall process.

**Face Detection:** A good and effective algorithm for face detection also increases the efficiency of face detection systems. Different face recognition algorithms are proposed, such as facial geometrybased methods, object invariant methods, machine learning methods.

**Feature Extraction using CNN:** Component extraction is a low-level procedure in image processing that is usually performed as the first operation of image processing. A feature can be defined as part of the "value" of an image. Repeatability is the desired property for a feature detector; i.e. whether different images from the same scene detect the same feature or not. Step edges, curves, and junctions typically convey the most relevant information about the image; thus it is necessary to detect reliably. Here we are going to use the CNN to extract features CNN Algorithm:

Convolution neural network (CNN) is one of the algorithm which can be used for images recognition, images classifications. Also for to detect an object, faces. For image classification, the algorithm process on input image and classify it into categories. Computer perceives an image as an array of pixels which in turn relies upon the image resolution. In this , it observe height(h), width(w) and dimation(d) which is like  $h*w*d$ . At first in convolution layer feature will extracted from input image and it holds relationship between pixels by learning image features using small squares of input data. It is a mathematical operation that takes two inputs such as image matrix and a filter or kernel i.e.feature map and as resultant convoluted matrix comes.

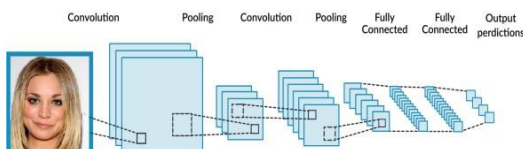


Fig 2 CNN architecture

In pooling layers section number of parameters are reduces if the images are too large in size. The spatial pooling is also called subsampling or down sampling which reduces the dimensionality of each map without affecting an important information. Fully Connected Layer( FC layer) ,after pooling matrix will flattened into vector and give it to a fully connected layer.Its like a neural network. In the above diagram, feature map matrix will be converted as vector .With the fully connected layers, we combined these features together to create a model. Finally, we have an activation function such as softmax or sigmoid to classify the outputs as person. **Classification:** Here we will use for classification purposes the CNN algorithm.

**Result and Discussions**

The Dataset for marking an attendance, the proposed system is using real time for dataset.

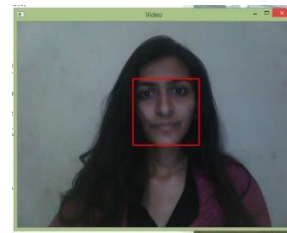


Fig 3 live face detection

According to fig. 3 ,The face is detected in real time enjoyment i.e. using camera in surface area faces are detected. the faces detected with square boarder which are cropped and stored in database. See below fig.4 It can be done using IDLE(python 3.6) platform.

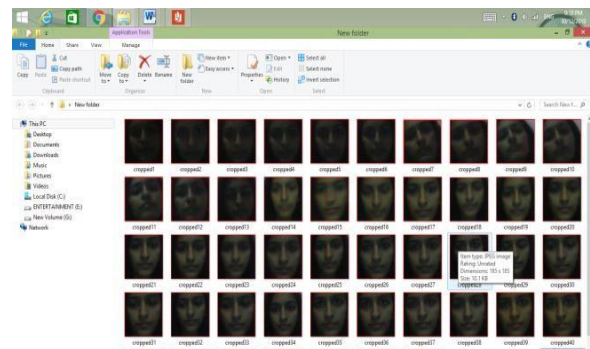


Fig. 4 Cropped faced store in database

The cropped faces are compared to the student database which is already stored in system and attendance is marked.

**Conclusion**

An automated attendance management system based on multiple face detection and face recognition techniques is proposed to eliminate the manual labor involved in recording attendance. For face detection and recognition, the famous CCN algorithm is used.

The system proposed increases the efficiency of current attendance management systems as follows:

- Manual recording of student records
- Minimization of manual labor and burden on lecturers to correctly mark attendance
- Minimization of time required to mark attendance and maximization of time required for actual teaching process
- Improvement of overall system accuracy
- Quality of health.

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