A Review Paper on Attendance Management System Using Face Recognition

Soundarya S[1]. , Ashwini P[2]. , Rucha W[3]. , Gaurav K[4]

MS.Savitri Patil Department Of Information Technology
G.H.Raisoni(GHRCEM) Pune,India

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Abstract - *Identification of any peoples in any organization or colleges for the purpose of attendance marking is one such software of face recognition. The use of Attendance Management System is to perform the regular activities of attendance marking and analysis with reduced human intervention. In this method the camera is settled and it will capture the image, the faces are recognize after that recognized along with the database and eternally the attendance is marked. This system is depend on face detection and recognition concept, that detects the employees or student using web cam when they arrive in the office or class room and marks the attendance by recognizing.*

Keywords- Face Recognition, Attendance Management System, Convolutional Neural Network, MATLAB.

I. INTRODUCTION

Maintaining of student attendance using traditional methods is very grim for every organization and also reliability of that approach is very poor.Attendance Management System Using Face Recognition is swapping the activity of traditional attendance where teachers take manually attendance of every student in class. This system used for different organizations and also different educational institute for marking the attendance. Face recognition is the biometric method of identifying an individual by comparing live capture. Face recognition technology is gradually evolving to a universal biometric solution since it requires virtually zero efforts from the user end while compared with other biometric options.

Machine learning is one of the finest domain among all the domains because it provide dataset only once as an input and provide a desirable output by applying a different machine learning algorithms. In earlier days each education institute, school or colleges are considers a student attendance factor very cautiously. Automated attendance management system using face recognition will help most because it handles all the problems related to time, safety issue and proxy issue very simply.Convolutional Neural Network (CNN) and MATLAB are basically used to complement these system. CNN is often applied for analyzing images. Attendance Management System Using Face Recognition is saves time, prevent fake attendance also help for security purpose.

II. LITERATURESURVEY

In[1] 2017 Samuel John presented a Face Recognition Attendance System with GSM Notification. This system uses the Viola-Jones algorithm. This algorithm used for detect faces. Also, Fisher faces algorithm was used to create templates of the faces which were captured. That created templates stored in the database. This system used library which is OpenCV and used Software Development Kit (SDK) to create the graphical user interface.

In[2] other paper, Jenif D Souza introduces a Automated Attendance Marking and Management System by Facial Recognition. This system marked student's attendance automatically by the camera which captures the photo of student in the class. This system uses the algorithm called Histogram. Histogram algorithm used for face identification purpose. In this algorithm, the face image is converted to matrix form. Histogram are used for identify of the particular faces.

This system overcomes the problem of time consuming. In[3] 2019 NandhiniR. Introduced Attendance System based on face recognition. This system captures the video of the students, convert it into frames and store it in the database.

Also, Convolution Neural Network (CNN) algorithm is used to detect faces. This System helps in improving the accuracy and speed.

In[4] 2019,Shreyak Sawhney, karan kicker, Samyakjain introduced Real Time Smart Attendance Management System Using Face Recognition Techniques**.** In this system they use face detection and recognition method using convolution Neural Network and Principal Component Analysis (PCA) but using two camera some camera is used for the face detection and recognition at the door of classroom and ano the camera is used at inside the classroom for checking proxy attendance In[5] 2016, E Vardharajan , R Dharani, S Jeevitha,SHemalata introduced Automatic Attendance Management System Using Face Recognition**.** In this system the use Eigen Faces, Eigen Weight method for face detection this system the camera capture the picture and then system crop the faces of student and match the faces with student database.

In[6] 2017, Poornima S, Sripriya N introduced Attendance Management System using Facial Recognition with Audio Output

and Gender Classification. In this system they use Viola Jones algorithm and Principal Component Analysis (PCA) for the face recognition and they also use the gender classification and Voice conversion module. After the facedetection and recognition the system use the Microsoft Speech API for announce the absent student names this can serve as a cross check.

In[7] 2018, Omkar abdul rhmansa limintroduced Class Attendance Management System Using Face Recognition. The system is based on Raspberry Pi. By facing the camera. It will capture the image. The Raspberry Pi is a programmed to handle the face recognition by implement in the Binary Patterns algorithm LBPs.

In[8] 2018,Kritika Shrivastava, ShwetaManda , Prof. P.S. Chavan introduced Automated Attendance System based on Face Recognition and Gender Classification using Haar- Cascade, LBPH Algorithm along with LDA Model.

In[9] 2017, Prof. Arun Katara , Mr. SudeshV. Kolhe introduced Attendance System Using Face Recognition and Class Monitoring .This paper introduced the raspberry pi. They used OpenCv library installed for both. The web camera connected with raspberry pi and also database which is connected top.

III. METHODOLOGY

This Proposed system improves the attendance management system using of our unique characteristics of their face. For the purpose of verification and identification face recognition technique is used.

The algorithms which use for biometric facial recognition follow different steps of image processing.

Capture- The first step of this system is to collect physical or behavioral tests in predefined conditions and during the state period of that time.

Extraction- In this step, all data will be extracted from the sample created to make template using facial recognition with audio output gender classification in ICCCSP2017.

Comparison- After finishing the extraction step collected data is compared with existing that templates.

Matching-In this last stage of face recognition, the face features of gathered samples are matching with the one from a facial database or not. It will take just a second. In this system we can use CNN method. A Convolutional Neural Network (CNN) is a type of artificial neural network used in image recognition and image processing that we specially designed for pixel data.
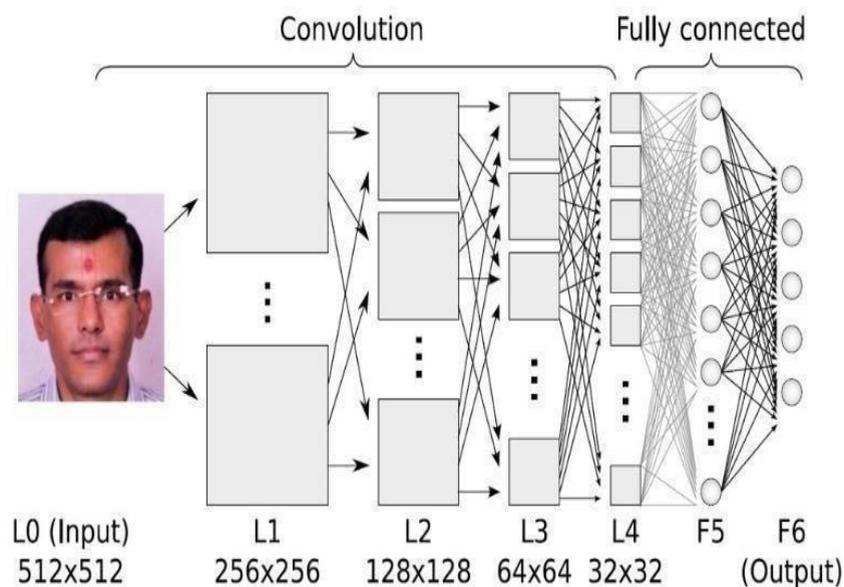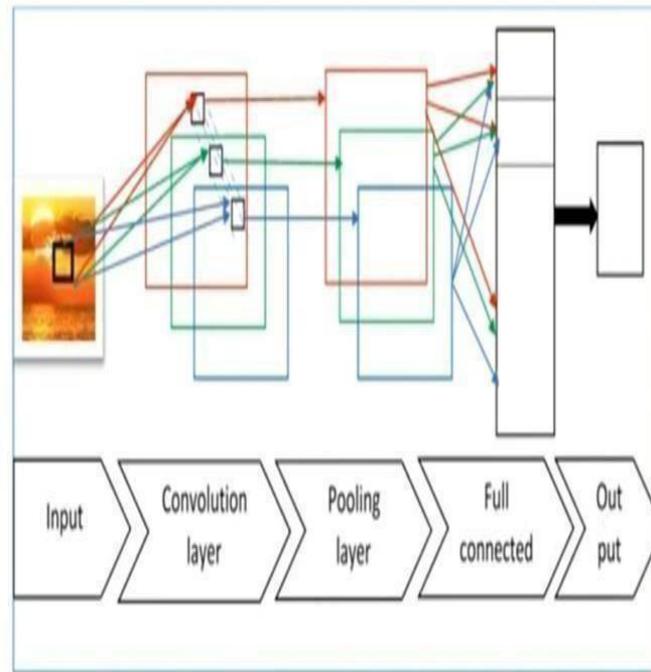
Convolution Layer has many filters that process filters are goes to another layer which is called Pooling Layer. Convolution is the first layer to extract features from an input image. Convolution preserves the relationship between pixels by learning image features using small squares of input data. It is a mathematical operation that takes two inputs such as image matrix and a filter or kernel Convolution of an image with different filters can perform operations such as edge detection, blur and sharpen by applying filters. Pooling Layer is nonlinear down sampling layer, then that filters goes through Polling Layer. Pooling Layer checks the nonlinearity of the patch. Spatial pooling has different types:

-Max Pooling

-Average Pooling

-Sum Pooling.

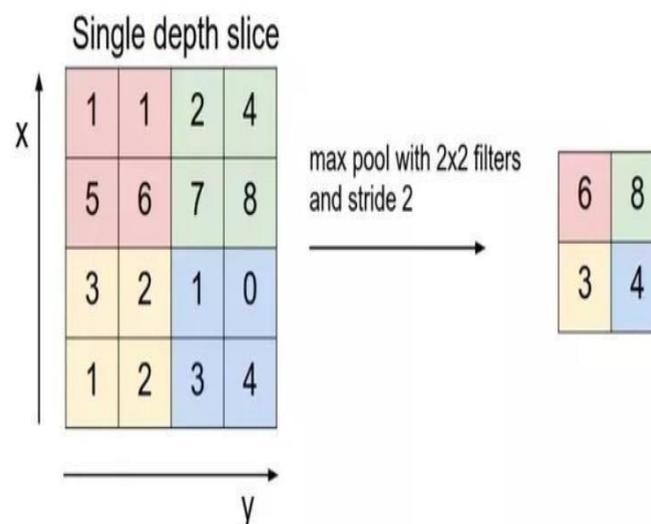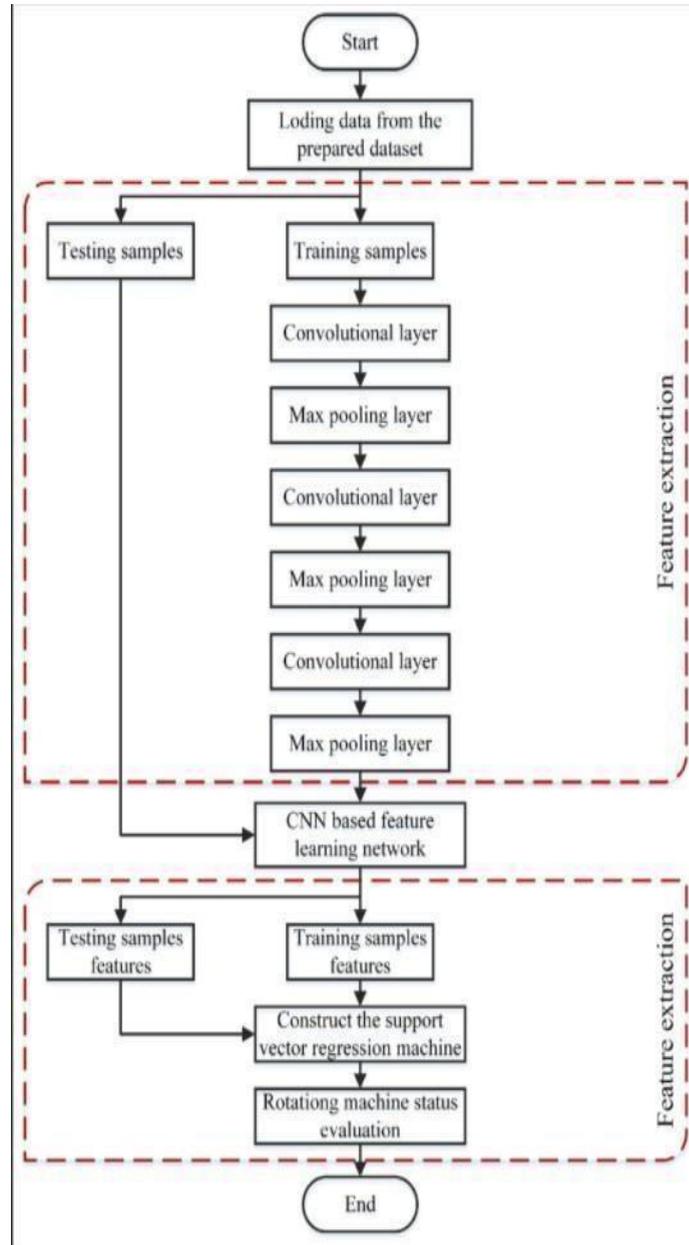This layer called as FC layer, we flattened our matrix into vector and feed it into a fully connected layer.

**Fig. Max Pooling.**

CNN Flowchart :

IV.   COMPARISON OF FACERECOGNITION TECHNIQUES

There are different technical paper regarding the Attendance management system using face recognition. We studied some papers, They used different methods or techniques. Below is the chart of summary of some papers.

Sr. No.	Paper title	Author Name	Summary
1.	AUTOMATIC ATTENDANCE MANAGEMENT SYSTEM USING FACE DETECTION	E.Varadharajan,R.Dharani, S.Jeevitha, B.Kavinmathi, S.Hemalatha	• Methodology 1. Background Subtraction 2. Face detection and cropping • Removes the risk of Manual Errors • Automated plus Accurate • Decreases the Loss of Output • Saves Time
2.	CLASS ATTENDANCE MANAGEMENT SYSTEM USING FACE RECOGNITION	Omar Abdul Rhman Salim, Rashidah Funke Olanrewaju, Wasiu Adebayo Balogun	• Methodology 1. Haar Feature-based Cascade algorithm 2. Local Binary Patterns (LBP) 3. Algorithm • This system saves time. • Decreases the Loss of Output
3.	ATTENDANCE MONITORING SYSTEM USING FACIAL RECOGNITION WITH AUDIO OUTPUT AND GENDER CLASSIFICATION	Poornima , Sripriya , Vijayalakshmi,Vishnupriya .	• It is cumbersome to maintain a huge set of records. As and when the class strength increases, the number of records also keeps increasing. • It is time consuming. Every time, the teacher in-charge has to take time out from his/ her class to mark attendance, thereby consuming time other than knowledge transfer.
4.	ATTENDANCE MANAGEMENT USING FACIAL RECOGNITION	Rajath S Bharadwaj, Tejus S Rao, Vinay T R	• Existing algorithms: 1) Eigen face 2) Line Edge Map 3) Histogram of oriented gradients (HOG) • The **disadvantage** of this is that,it makes the **attendance** marking process slower and less efficient.

V. BLOCK DIAGRAM
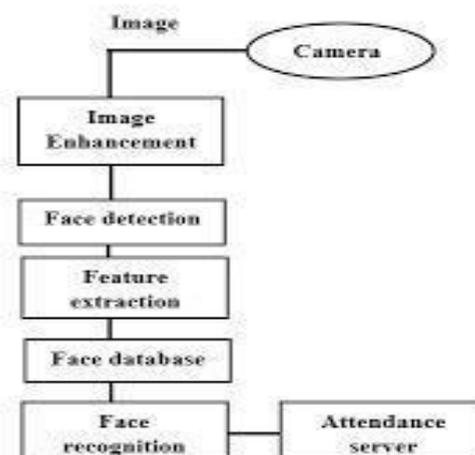
- **IMAGE ENHANCEMENT**

In Image Enhancement process it take images from user side check all quality of images and enhance quality of image using CNN method in machine learning.
Image quality is the most important factor for specify a particular person so CNN algorithm is very helpful for the image enhancement and improvement process.

- **FACE DETECTION**

In attendance management system firstly capture images enroll by the student and that Image check in our database created by the admin side.
Enrolled image compared to every database image if that is present in system database then that student marked as a present either marked as a absent.

- **FEATURE EXTRACTION**

In this step, all data will be extracted from the sample screated to make template using facial recognition with audio output gender classification in ICCCSP2017.

- **FACE DATABASE**

In this step system can use the dataset that is already present in the database of system for matching a entered image with database images.
In database save all student information for helping to system to take particular student attendance in very less time.

- **FACE RECOGNOTION**

In this last stage of face recognition , the face features of a gathered samples are matching with the one from a facial database or not. It will take just a second. In this system we can use CNN method.

A Convolutional Neural Network (CNN) is a type of artificial neural network used in image recognition and image processing that us specially designed for pixel data.

- **ATTENDANCE MARKING**

Attendance marking is the last stage of the system operations in this stage mark the attendance of student if overall above process are done and recognize a image properly , then it will marked as a present otherwise it will marked as a absent in the server of system.

VI. ADVANTAGES

- There are many benefits to attendance management system using face recognition such as its convenience and social acceptability. Increasing security and enhance comfort day today life.
- Attendance management system using face recognition is easy to use and it can be performed without person.
- Attendance Management System Using Face Recognition gives fast and accurate report of
- Attendance. This system has come faster and more accurate under over condition from different angle.
- Attendance using face recognition is time saving and without human errors. Sometime miss the attendance form student side or
- Teacher side and so it will be very helpful for overcome this type of all disadvantages.
- In pandemic situation it is helpful for student and teachers health security.
- Attendance using face recognition is also higher security in our work place.

VII. RESULT

Attendance Management system using face recognitions is very simple to use irjd works efficiently with less time requirement. This is the automated system so if admin created a student profile once in database then it will use automatically by the number of times in face detection and recognition process. This system is based on machine learning MATLAB and CNN methods.
Machine learning algorithm consist the following modules in system:

1. Image Enhancement
2. Face detection
3. Feature extraction
4. Face database
5. Face recognition
6. Attendance server

For initializing this system, admin firstly create all student profile with their name, roll number, department and other educational details.
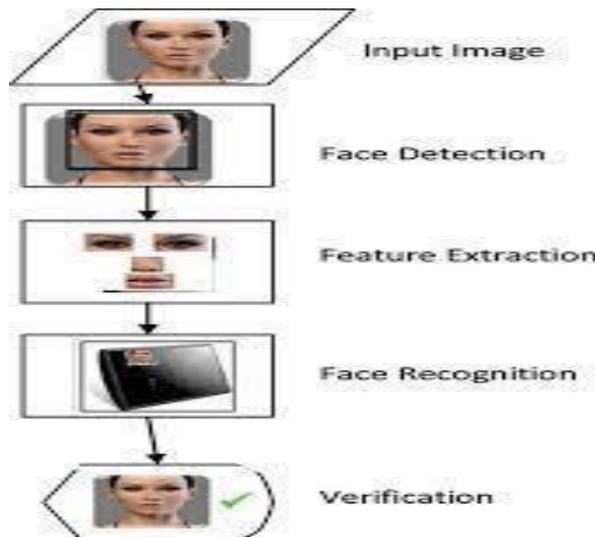
We have created a dataset of our class student for purpose of system testing. Server created a folder to show the student details of attendance accordingly to the time table all subject are fulfilled when the student arrives for lectures then system automatically capture the image, detect all faces then enhance all the captured images and compared with faces that is already existed in our dataset.
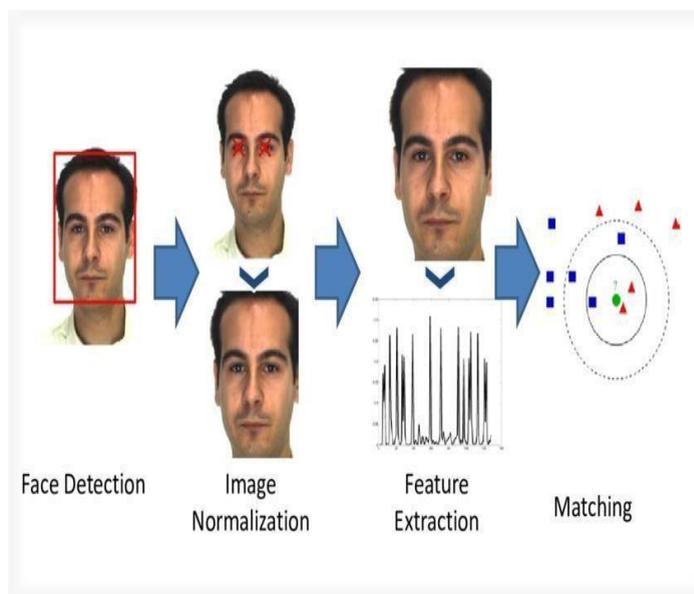
When the all process has done then generate the marked attendance shit of student in excel shit format. Attendance management system is recognize all images with different angles and lights, If some entered data is not in our dataset then it is stored in dataset as a unknown data.

The attendance of student faces recognition is marked in real time, and in the final step of the procedure is that the excel shit of attendance is saved by the system automatically and imported in student database.

VIII. CONCLUSION

In this proposed Attendance Management System Using Face Recognition is the better model for attendance management for students in the classroom and also at the other places. Now in this todays era a large number of systems are available like biometrics or other methods but the facial recognition is the best option for the accuracy .There is no special hardware requirement for the implementation of the system. A camera Laptop and database are sufficient for developing attendance management system using face recognition.

IX. REFERENCES

[1]Kennedy Ok okpujie,EtinosaNoma-Osaghae,Samuel John, Kalu-Anyah Grace, Imhade Okokpujie " A face Recognition Attendance system with GSM Notification" in IEEE NIGERICON 2017.https://ieeexplore.ieee.org/document/8281895

[2]Jenif D Souza, Jothi S, Chandrasekar A, "Automated Attendance Marking and Management System by Facial recognition using Histogram" in ICACCS 2019.
https://ieeexplore.ieee.org/document/8728399

[3]Nandhini R, Duraimurugan N, S.P Chollalingam "Face Recognition Attendance System" in IJEAT in 2019.
https://www.ijeat.org/wpcontent/uploads/papers/v8i3S/C 11230283S19.pdf

[4]E Varadharajan , R Dharani , S.Jeevitha, B Kavinmathi, S. Hemalatha " Automatic Attendance Management system using face detection" at IC-GET 2016. 2020 Department of Information Technology.
https://ieeexplore.ieee.org/abstract/document/7916753

[5]Shreyak Sawhney, Karan Kacker, Samayak Jain, Shailendra Narayan ,Rakesh Garg "Real Time Smart Attendance system using face recognition techniques " in international conference on cloud computing data science and engineering 2019.
https://ieeexplore.ieee.org/abstract/document/8776934

[6]Poornima S,Sripriya N , Vijayalakshmi B, Vishnupriya P " Attendace monitoring system using facial recognition with audio output gender classification " in ICCCSP 2017.
https://ieeexplore.ieee.org/document/7944103

[7]Kritika Shrivastava, Shweta Manda,P.S Chavan, "Conceputal model for proficient automated attendance system based on face recognition and gender classification using Haar- cascade" in IJEAT 2018.
https://www.ripublication.com/ijaer18/ijaerv13n10_111.pdf

[8]Aruna katara , Sudesh V, Amar P, Nikhil D, Bhele ,Chetan J " Attendance system Using face recognition and class monitoring system " in International journal on innovation and computing communication 2017.
https://www.scribd.com/document/350875725/Attendance- System-Using-Face-Recognition-and-Class-Monitoring-System.

[9]Omar Abdul Rhman Salim, Rashidha Olanrewaju , Wasiu Balogun "Class attendance management system using face recognition" in ICCCE 2018.https://www.researchgate.net/publication/329067820_Class _Attendance_Management_System_Using_Face_Recognitiion