Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)

Volume 7-Issue1, January 2024
Paper: 29

Multi Face Recognition for Automated Attendance Management System Using Computer Vision

Asish Singh Rana,
Department of Computer Science,
Atria Institute of Technology,
Visvesvaraya Technological University,
Bangalore, India.

Mrs Farhana Kausar,
Department of Computer Science,
Atria Institute of Technology,
Visvesvaraya Technological University,
Bangalore, India.

Akash T,
Department of Computer Science,
Atria Institute of Technology,
Visvesvaraya Technological University,
Bangalore, India.

Abhishek Yadav,
Department of Computer Science,
Atria Institute of Technology,
Visvesvaraya Technological University,
Bangalore, India.

Sunil R B,
Department of Computer Science,
Atria Institute of Technology,
Visvesvaraya Technological University,
Bangalore, India

Abstract-Keeping track of pupils' attendance. Accessing the numerous classes is a challenging task and calling each student's name once an hour. Maintaining attendance records is time-consuming, and there is also the potential for false signs and names going missing. Putting information manually into computers and papers. There is also a potential that a proxy will show up. The. Attendance is recorded using face detection and recognition theory using the following technique. Every student's daily attendance is tracked by subject, and the administrator keeps track of the data as a result, accessing also easier and more convenient for storing the attendance efficient. It makes excellent and efficient use of resources and manpower. Keywords are Deep Learning, Multi-task Cascade Convolutional Neural Network (MTCNN), Image Processing, Facial Feature Mapping, and Face Recognition.

I. INTRODUCTION

The conventional way of keeping track of student punctuality frequently has a number of problems. monitoring attendance with facial recognition. The system emphasizes how straightforward it is by doing away with conventional student attendance tracking techniques like calling out names or verifying identification cards. They distract pupils during exam times in addition to disrupting the instructional process. The attendance list and calling names are distributed in the classroom during the lectures. The attendance sheet may be difficult to distribute in a lecture class, particularly in a class with a large number of pupils. Thus, it is suggested that facial recognition student attendance systems take the place of the laborious and distracting manual signing of students' presence. Lecturers no longer need to repeatedly count students to verify their attendance because the automated facial Identification-based pupil attendance system might help the issue of fraudulent approaches. Every student's information only needs to be input once; after that, the whole database of students is automatically maintained. facial recognition and detection reduce manual labour required of humans. We are able to broadcast video from a recorder or even capture images from a camera or cctv in real time. We first extract the image from that offline or online data and then apply facial detection methods to it. Face detection involves finding faces in images and determining their existence. We can see the mouth, ears, eyes, nostrils, and various facial expressions in this face detection.

The key goal of this research is to develop facial identification automated student attendance systems. To enhance performance, test and training images in this suggested method are limited to frontal, left, and upright facial images via a single face. In order to guarantee that there is no quality variance, the test photographs and training images must be used with the same tool. The basic interface allows immediate enrollment.

Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)
Volume 7-Issue1, August 2023
Paper: 29

II. RELATED WORKS

1. The essay suggests a new framework for board involvement in customary level schools that includes RFID and mobile application components for automated attendance management. The RFID component records student interaction while the application portion sends attendance information to parents.

2. The model proposed in the essay tackles the problem of face recognition in biometric frameworks by using a camera to take input images, separating and encoding faces, recognizing them, and recording attendance in a spreadsheet and PDF file. An Android phone's camera is used to capture the photo, which is then transmitted to the server for identification and recording .

3. The essay proposes an advance method for face detection by integrating advanced image processing methods with Local Binary Pattern calculation. The results show increased accuracy and effectiveness, making the approach suitable for use as a programmed attendance management system in real-world settings.

4. The research proposes a simple attendance system using Android Face Recognition with Deep Learning approach and cloud storage to improve accuracy. The application has a confirmation screen for students to double-check the attendance information.

5. Face recognition, highlight extraction and removal, and attendance examination using advanced LBP and other methods comprise a few the features suggested in the design. It forecasts as it takes into account how the face changes over time.

6. The suggested system compares captured images to database-stored reference images using a high-quality digital camera to track class attendance. The study investigates into pattern recognition, which is useful in uses such as detection and identification.

7. To recognize human faces, the technology empowers a hybrid method for face detection that combines a skin-color model with a fuzzy neural network for face recognition with few false positives and great accuracy. This speeds up the process of identifying the detected image.

8. This approach focuses on facial recognition technologies and compares well-known with face detection applications like Eigen faces and Fisher faces, and LBP to the novel A-LBP facial recognition strategy. The A-LBP method performs better, especially for face data sets with variations such as soft stance and brightening surroundings, as confirmed by the ROC curve created using various face databases.

III. METHODOLOGY

Proposed automated attendance system will be cracked into several parts.

1.Image Acquisition: Image acquisition is the process by which facial scan technologies acquire an individual's facial characteristics .There are various options identifying an individual's face from a video or image captured with a camera of exceptional quality.

2. Face Detection: The face-identifying algorithm helps the correctness of face recognition. Some face detection algorithms was apparent to exhibit face geometry-based performances. When via multiple classifiers for an overall greater detection rate, the observed algorithm provides greater outcomes in various scenarios. Later on, computer vision bounding boxes can be used to safely label them.

Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)

Volume 7-Issue1, August 2023
Paper: 29

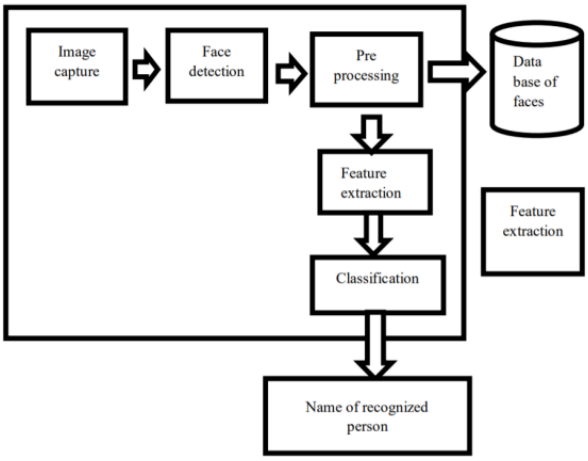

Fig. 1.Flow Chart

3. Image processing starts after successful image acquisition. At this stage, the image is cropped and made to black and white. This step facilitates a sample comparison based on the image's grey scale features. Image processing corresponds to the picture taken to the image in the database. Normalization is often required when preparing an image by changing its format to that of the saved template.

4. Extraction of skills we can use the segmented facial image to establish the facial feature map. Earning 128 relative points and preserving them. We ask the user to turn left and right to get a 128*3 approximation of the face's features.

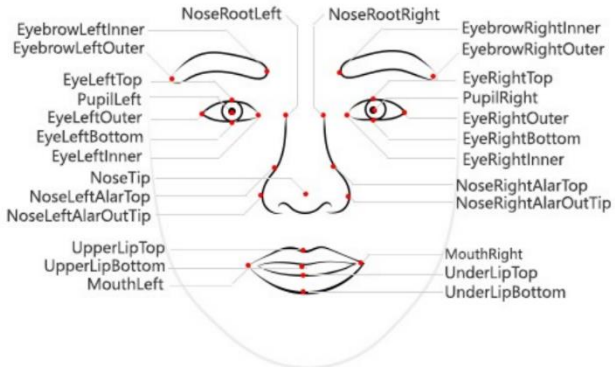

Fig. 2.Facial Feature Map

5. Landmark Recognition and Classification Face recognition systems attempt to match features in the same way that humans do. Certain facets of the face are likely to differ. Upper ridges of the eye socket, distance between the eyes, nose shape, nasal width, and jaw line length are all characteristics. Feature extraction and landmark grasping with the MTCNN PNet, RNet, and ONet.

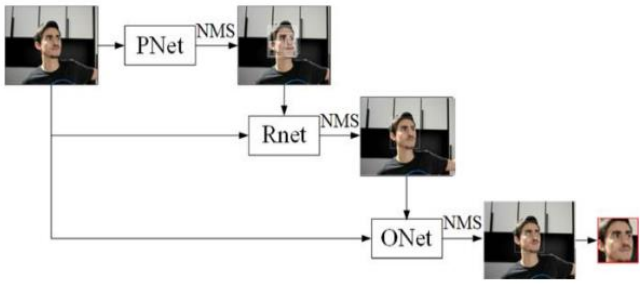

Fig. 3.Using the Neural Networks

6. Database Development: Using a NOSQL MongoDb database to track all user data. The landmarks on the front, left, and right sides of every individual's visage are collected. To just collect attendance, a simple SQL database with subjects for the individual's ID and dates answered with 'Present' or Not is used.

7. The following application algorithm is proposed:
i. The individual's image will be recorded.
ii. Prepare the image.
iii. Face detection algorithms operate to detect and gather features.
iv. Matching landmarks to facial features.
v. Once the registration has concluded, store the data in a database.

IV. EXPERIMENT AND RESULT

Creating a feature map helps to significantly improve accuracy when compared to the standard method of employing computer vision to capture a large number of photographs of the user. While utilizing a more conventional methodology, factors like lighting, product quality, or even wearing a fashion accessory like eyewear could render the user invisible, all of these issues are resolved when using our method.

Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)
Volume 7-Issue1, August 2023
Paper: 29

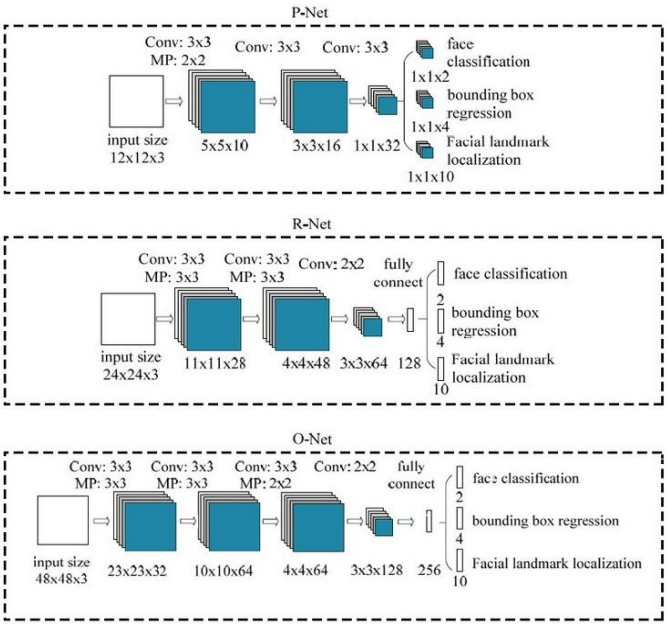

Fig. 4.The Network Architectures

With so many facial features that can be matched to identify people, we can define a flexible confidence interval. The accuracy and robustness of the system grow by using a compounded model structure with MTCNN as the foundation model and a CNN Structure in the head.

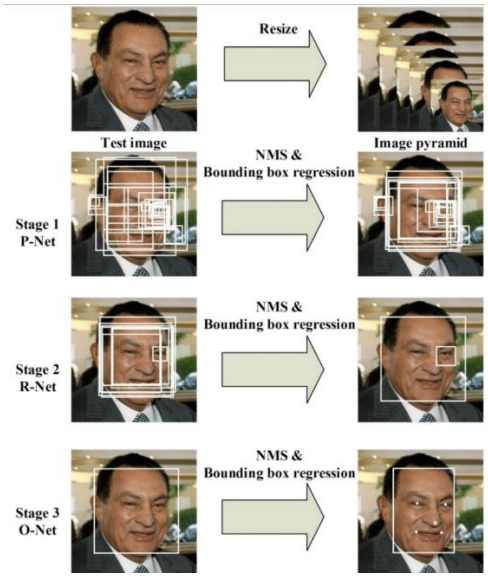

Fig. 5.Using the Convolution Neural Networks

Batch Normalization and SeparableConv2D layers are raised in the CNN architecture.

a. PROPOSED SOLUTION

For the implementation of this system, we can use a variety of submodules.

1. The Homepage:

The primary interface and a number of features exist for link between the user and the teacher. The user may register he or just keep an eye on the attendance list provided.

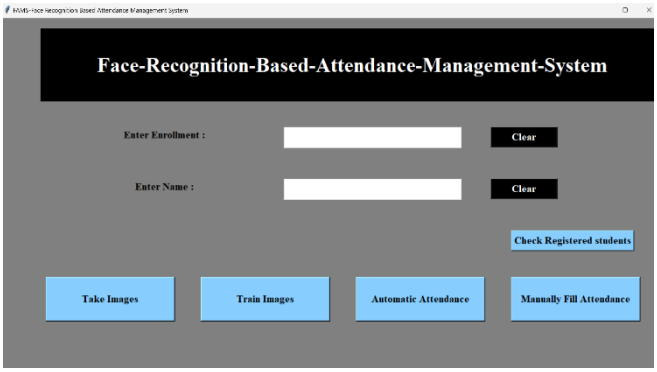

Fig. 6. Tkinter is employed to build the User Home Page's GUI.

2. The Application:

Asking them to turn both left and right while looking at the camera so that they can map traits from all angles. As a consequence, each person receives a landmark set of 128 * 3.

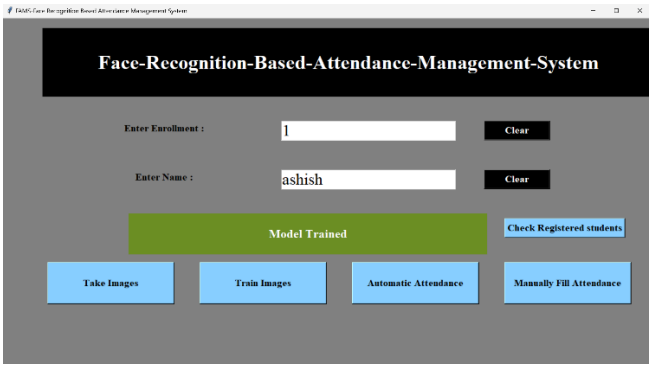

Fig. 7.student registration and model training

3. Recording presence:

The kids only need to look at the camera when it is on, raise their heads when their name is read, and continue.

Real-time operations and the fastest possible use of the technology are made possible.

Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)

Volume 7-Issue1, August 2023
Paper: 29

Fig. 8.Features and Landmarks

4. Access to the database:

The final database sheet gives the authorities all the information they need to determine daily attendance.

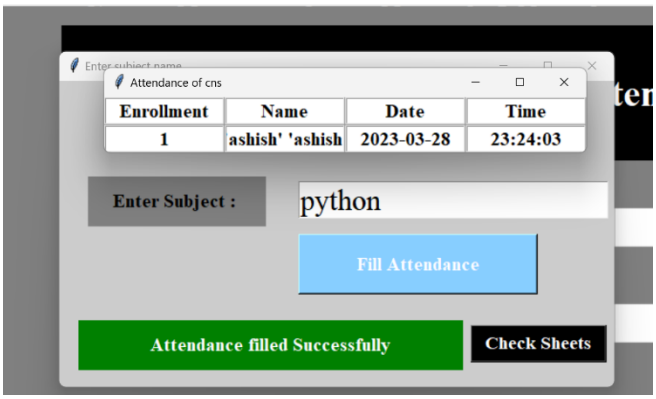

Fig.9.GUI of attendance

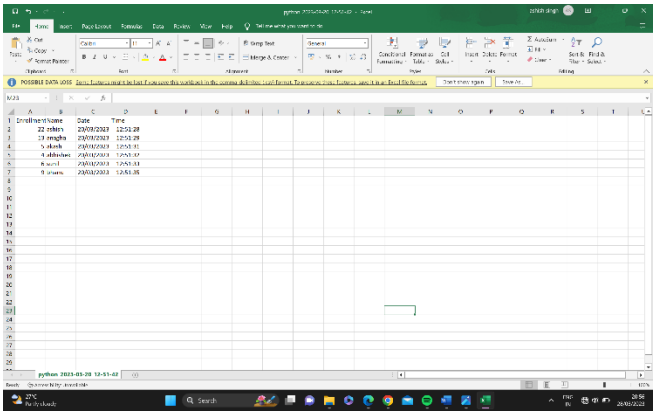

Fig. 8.Sheet with the attendance

gathering the entire attendance in one location using a self-appending date sheet. You can use a spreadsheet or any database.

b. ANALYSIS

i. Images captured

The module captures 128 images and stores in the attendance image folder. The trained image should include all the possible angles of face possible .Trained images act as the major role in the detection of student.

ii. Facial detection

Student to be present under a certain distance from the camera around 5 meters.

Facial detection depends on the resolution of the camera, distance , and the clarity which depends on the surroundings.

c. FUTURE SCOPE

The predicted implementation of his Automated Classroom Attendance System is,

1. Identification and Recognition of Retina:This method of identification identifies individuals built on distinctive patterns on their retina. The thin nerve at or below the eyeball, known as the retina, is where blood vessels are found in patterns and are used by retina recognition technology to record and analyses light entering through the pupil. Very distinguishing characteristics are retinal patterns.

Even identical twins' eyes have different blood vessel patterns since every eye has its own, completely unique pattern.

Technologies for retina identification are being developed that are newer, faster, and better. There are three separate steps that make up the whole retinal scanning procedure:

i. Capturing images

ii. Computer-based computation

iii. Finding and identifying characteristics.

2. Speech recognition (ASR) is the act of converting a speech signal into a sequence of words using an algorithm that is executed as computer code.

Speech handling is a key area in signal processing. Speech recognition is the study of methods for speaking to machines. The basics of a complete speech recognition system are as follows:

i. Preprocessing of the signal

Journal of Current Research in Engineering and Science
Bi-Annual Online Journal (ISSN : 2581 - 611X)
Volume 7-Issue1, August 2023
Paper: 29

ii. Extraction of characteristics
iii. Language model
iv. Decoder
v. Audio Recognition

3 Emotion Detection and Recognition (EDR) is a method for identifying and categorizing human emotions that combines biosensing, facial recognition, speech and voice recognition, machine learning, and pattern recognition technologies. The algorithm will comprise of three basic steps.
Image processing, facial feature extraction, and mood detection are the three stages.
During the image processing process, a fuzzy algorithm is used to retrieve the face region and facial component. A colour filter, a virtual face model, and a histogram method of analysis are also included. During the extraction phase, features for emotion recognition are extracted from the facial component. The fuzzy classifier is used in the emotion detection step to determine the emotion from retrieved features.

V. CONCLUSION

It takes a lot of effort and time to manage pupils. The objective is to use a application to simplify the work. Attendance following the use of face detection and face recognition algorithms, marking is performed on the application. Many algorithms and techniques for ML-based facial recognition and detection were deduced from the papers. Data can be preserved effectively and stored and retrieved quickly**.** The application will get all the data right away, and reports will be created without the need for paper effort. The resources are utilizing by the System will be very accurate and compatible with the newest technology on the market. It will also experience very little wear and tear**.**

REFERENCES

[1] Jenif D Souza W S, Jothi S, Chandrasekar A, "Automated Attendance Marking and Management System by Facial Recognition Using Histogram", ICACCS, 2019.
[2] Dhanush Gowda H.L, K Vishal ,Keertiraj B. R, Neha Kumari Dubey, Pooja M. R, "Face Recognition based Attendance System" IJERT, 2020.
[3] Serign Modou Bah, Fang Ming, "An improved face recognition algorithm and its application in attendance management system", ELSEVIER, 2019.
4] Dulyawit Prangchumpol, "Face Recognition for Attendance Management System Using Multiple Sensors", IOP,2019.
[5] Sujay Patole, Yatin Vispute, "Automatic Attendance System Based on Face Recognition", IJIRSET, 2017.
[6] Rohit Chavan, Baburao Phad, Sankalp Sawant, Vinayak Futak, "Attendance Management System using Face Recognition", IJIRST, 2015.
[7] Ravinder Pal Singh, Daljit Kaur, "Face Detection Using Skin Color Model and Face Recognition Using ANN", IJCSMC, 2015.
[8] Radhey Shyam, Yogendra Narain Singh, "Automatic Face Recognition in Digital World", ACSIT, 2015.
[9] Dhara Rathore, Gaurav Kumar Das, Dr. Akash Saxena, "Concept of Face Recognition: A review", International Journal for Technological Research In Engineering, 2020.
[10] Riddhi A. Vyas, Dr.S.M. Shah, "Comparision of PCA and LDA Techniques for Face Recognition Feature Based Extraction with Accuracy Enhancement", IRJET, 2017.