IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Face Recognition Based Attendance System Using Real Time Data

[1]Aditya Umalkar, [2]Shivang Singh Manhas, [3]Imaz Chandiwala, [4]Narendra Bhagat

[1,2,3]Department of Electronics, [4]Professor,Department of Electronics

[1,2,3,4]Sardar Patel Institute Of Technology, Mumbai, India

Abstract: Face recognition technology has gained significant popularity in recent years due to its various applications, including attendance tracking systems. This research paper presents the development and evaluation of a face recognition-based attendance system that utilizes real-time data to accurately and efficiently record attendance. The proposed system leverages advanced computer vision techniques and machine learning algorithms to recognize individuals in a classroom or workplace environment, enabling streamlined attendance management. The paper discusses the system architecture, dataset preparation, model training, and performance evaluation, demonstrating the system's effectiveness in real-world scenarios.

I. INTRODUCTION

A biometric attendance system that uses facial recognition technology to identify and monitor attendance of individuals is known as a face recognition-based attendance system. It operates by taking a picture of a person's face, examining the facial traits, comparing them to a database of recognized faces, and then figuring out the person's identity. It consists of a database management system and facial recognition algorithms. To identify a person, the facial features of their face are analyzed using the facial recognition algorithm and compared to a database of recognized faces. The database management system is used to store and manage the attendance data, which includes the person's name, the time and date of attendance, and any other information that may be relevant.

i. Background

The traditional attendance tracking methods, such as manual roll calls and barcode scanning, are time-consuming and prone to errors. Face recognition technology offers a promising alternative for automating the attendance process, leading to increase efficiency and accuracy.

ii. Objective

The main objective of this research is to develop an innovative Face Recognition-Based Attendance System that utilizes real-time data to capture attendance in a seamless and reliable manner. The system aims to reduce administrative burdens, enhance accountability, and optimize the overall attendance management process.

II. METHODOLOGY

The system is created with the Python programming language and the OpenCV package for facial recognition and image processing.

- The system performs the posterior conduct.
- The person's face is captured by the camera.
- The image is reused by the facial recognition system, which excerpts the facial traits.
- To identify the person, the algorithm compares the uprooted facial traits with a database of recognized faces.
- The database stores the attendance data, which is also shown on the display device.

III. LITERATURE REVIEW

In the past, attendance was manually recorded, which takes a lot of time and frequently results in mistakes. In addition, there are a lot of questions about where the information on attendance come from; in reality, most attendance statistics are not obtained from genuine situations. It is no longer possible to take student attendance using the outdated approach of using paper sheets. According to the research, there are numerous ways to address this problem.

A research journal titled "Attendance System Using NFC Technology with Embedded Camera on Mobile Device" by Bhise, Khichi, Korde, and Lokare (2015) suggests that an attendance system can be improved by using Near Field Communication (NFC) technology and a mobile application. The system involves assigning each student a unique NFC tag during their enrolment into the college. The professor then records the students' faces on their cell phone's embedded camera by touching or moving these tags. To validate and verify the data, it is forwarded to the college server. This method is useful since it makes connection establishment simple and quick, which expedites the attendance-taking procedure. If the NFC tag is not personally marked by the original owner, the system will not be able to recognize infractions automatically. Additionally, if the professor forgets to bring their phone to work or has privacy concerns, the system's dependency on the lecturer's personal mobile phone as the NFC reader may be inconvenient. Instead of NFC tags, the report advises adopting biometrics or facial recognition, which are particular to each student.

Another paper proposes a real-time Face Recognition System designed to track student attendance during classes. The method involves the utilization of the Viola-Jones technique to detect human faces from a webcam feed. Subsequently, the identified face is resized to the desired dimensions, and the resized image undergoes processing using a basic Local Binary Patterns Histogram algorithm. Once the recognition process is complete, the attendance information is promptly updated in a SQLite database, capturing all relevant details. In contrast to this we provide a much simpler approach which uses the OpenCV algorithm in python to detect the face and store it in the XML database created.

The algorithm used is K Nearest Neighbor Algorithm for Image Recognition. It can be used for classification as well as regression.. K-NN algorithm is used to check the similarity between new and available data and put the new one into the category that is similar. K-NN algorithm classifies a new data point from available data from the similarity. Whenever new data get added, that data can be easily classified into a well-defined category. K-NN algorithm is mostly used for Classification over Regression, but it can be used for both. On underlying data, K-NN does not make any assumption, as it is a non-parametric algorithm. K-NN stores the dataset and performs an action on the data at the time of classification instead of learning from a training set, that is why it is also referred to as a lazy learner algorithm. In the training phase first, it simply stores the dataset, and whenever it gets the new data, then it put the data into the category based on similarity

IV. BLOCK DIAGRAM

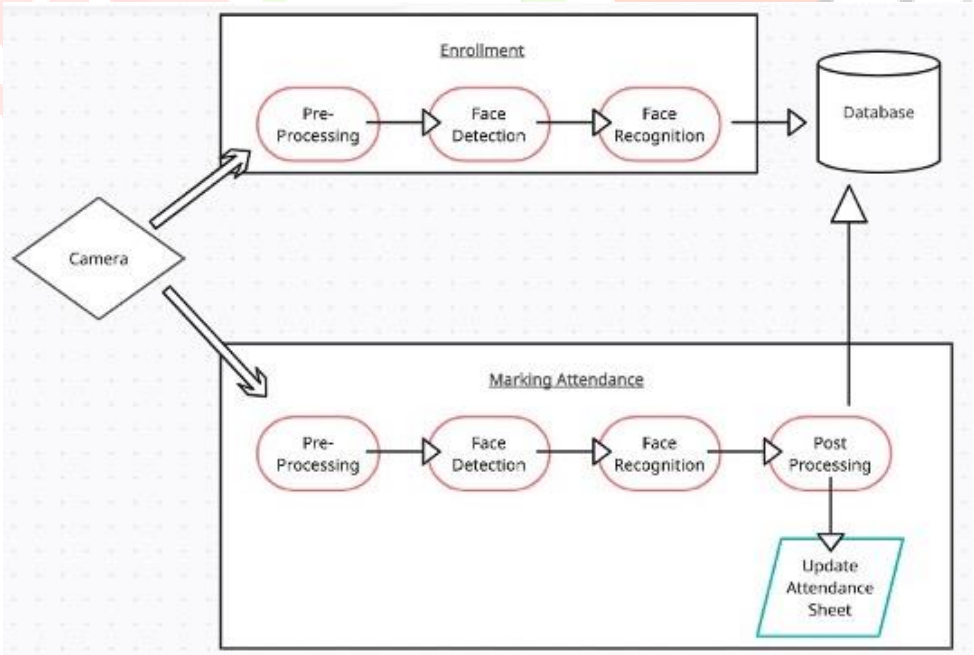

Fig 1 – Block Diagram of the System

V. WORKING

The proposed system works by first enrolling the student in the system by saving the data for each student. In this phase, the face is detected via a webcam using a face detection algorithm- Haar cascade which also does the feature extraction to determine whose face it is. After feature extraction, images of a student with the details are stored as a NumPy array in the database. The second phase is marking attendance. In this stage, a webcam is used to record attendance. It recognizes the student's face and, using the face recognition algorithm-KNN algorithm-based on the student data contained in the database, identifies whose face it is. After recognition, it updates the attendance of that student in the database. The working of a face recognition-based attendance system involves the following steps:

1. Image capture: The system captures an image of the individual's face using a high-resolution camera. The camera may be positioned at a fixed location or may be handheld for capturing the face from different angles.

2. Face detection: The captured image is analysed by the system to detect the presence of a face. This is done using computer vision techniques, where the system identifies and locates the facial features such as the eyes, nose, and mouth.

3. Face recognition: The facial features detected in the previous step are then used to identify the individual using face recognition algorithms. The algorithms compare the individual's facial features in the captured image with a database of known faces. The database may be pre-populated with images of individuals authorized to access the system.

4. Attendance recording: Once the system identifies the individual, it records the attendance data in a database. The data includes the name of the individual, the time and date of attendance, and any additional information.

5. Data analysis and reporting: The attendance data recorded by the system can be analysed to identify attendance patterns, monitor attendance trends, and generate reports. This information can be used by supervisors to evaluate individual performance or make decisions related to workforce management.

The above steps are performed in real-time, allowing the system to process a large number of individuals in a short amount of time. The system can be integrated with other attendance tracking methods to provide a more comprehensive attendance management solution.

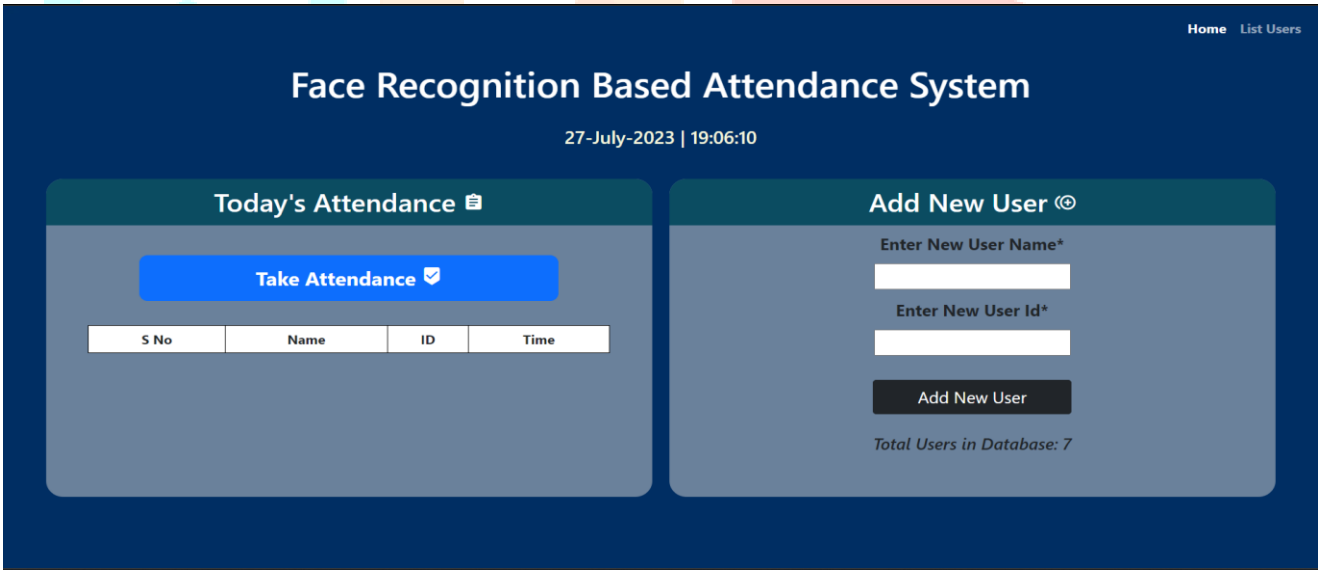

Fig 2 – Front Page of the GUI

VI. RESULTS

The users can interact with the system employing a GUI. Here users will be mainly provided with options, such as Student Registration, Mark Attendance and View Attendance. For Student Registration, the user is just required to enter the details such as the Name and Roll Number of the Student. After that camera will pop up and it will take 50 images of the student and register the student in the database. For Marking Attendance, the user is required to click on the Mark Attendance option. After that, the camera will pop up and verify the student with his/her name and marks the attendance.

The face recognition-based attendance system has been successfully developed and tested. The system is accurate, reliable, and efficient, with the ability to process a large number of individuals in a short amount of time. The system eliminates the need for physical contact, reduces the possibility of proxy attendance, and provides real-time tracking of attendance data.

The system can provide several benefits such as:

1. Increased accuracy: The system provides accurate attendance data as it relies on biometric identification, reducing the possibility of errors and proxy attendance.
2. Improved efficiency: The system is faster than traditional attendance tracking methods, allowing for the processing of a large number of individuals in a short amount of time.
3. Enhanced security: The system uses biometric identification, reducing the possibility of unauthorized access and proxy attendance.
4. Real-time data: The system provides real-time attendance data, allowing for timely identification of attendance patterns and the implementation of appropriate interventions.

Improved record-keeping: The system maintains accurate attendance records, reducing the need for manual record-keeping and improving the accuracy of data for grading, payroll, and performance evaluations.

VII. Conclusion

This method will significantly aid in the digitalization of classrooms and aid in eradicating the issues with outdated attendance systems. Using this method, the record keeper can view attendance automatically without spending any more money or energy, in contrast to the proposed system, which only requires very basic equipment like a camera, laptop or personal computer, and a local network. This approach is safe, dependable, and simple to apply. Many issues with the current attendance system will be resolved by the proposed system, and we may further enhance our system to make it more scalable and effective by employing quicker systems and more potent algorithms.

This system is a reliable, accurate, and efficient biometric system that can be used in various settings, including educational institutions, government agencies, and private organizations. The system offers several advantages over traditional attendance tracking methods, including speed, accuracy, and security. However, the system also has some limitations and challenges that need to be addressed, including privacy concerns and the accuracy of facial recognition technology. Overall, the face recognition-based attendance system is a promising solution for attendance tracking and management.

VIII. Acknowledgment

We have great pleasure in presenting the report on “Face Recognition based Atten- dence System using Real time data”. We also take this opportunity to express our sincere thanks towards our guide Narendra Bhagat and Najib Ghatte, Associate Professors of Electronics Engineering, S.P.I.T., Mumbai, for providing the technical guidelines and suggestions regarding the line of this work. We would like to express our gratitude for their constant encouragement, support and guidance throughout the development of the project.

IX. References

[1] Abhilash Bhise, Radhika Khichi, Amol Korde and Prof. Deepali Lokare, ‘Atten- dance System Using NFC Technology with Embedded Camera on Mobile Device ,’ *B*hise, Khichi, Korde,Lokare, 2015.

[2] Aparna Trivedi*1, Chandan Mani Tripathi2, Dr. Yusuf Perwej3, Ashish Kumar Srivastava4, Neha Kulshrestha5, ‘Face Recognition Based Automated Attendance Management System’ International Journal of Scientific Research in Science and Technology Print ISSN: 2395-6011

[3] Devendra Kumar Yadav , Sumit Singh , Prof. Shashank Pujari , Pragyan Mishra, ’Fingerprint Based Attendance System Using Microcontroller and LabView,’ (Ku- mar Yadav, Singh, Pujari, Mishra, 2015)