International Scientific Journal of Engineering and Management (ISJEM) ISSN: 2583-6129
Volume: 04 Issue: 06 | June – 2025 DOI: 10.55041/ISJEM04251
An International Scholarly || Multidisciplinary || Open Access || Indexing in all major Database & Metadata

FACE RECOGNITION ATTENDENCE SYSTEM

Saloni H.Varma, Prof. Sujata Patil

[1]*Saloni H. Varma Master of Computer Application & Trinity Academy of Engineering, Pune*
[2] *Prof. Sujata Patil Master of Computer Application & Trinity Academy of Engineering, Pune*

Abstract

The Face Recognition Attendance System is a modern approach designed to automate the tra ditional attendance marking process by leveraging facial recognition technology. This system replaces outdated manual methods with a contactless, efficient, and secure solution, signifi cantly reducing the chances of proxy attendance and human error. It is especially beneficial in environments such as schools, universities, and workplaces where accurate attendance tracking is essential. Developed using Python, the system integrates libraries such as OpenCV for image process ing and face detection, along with machine learning techniques to recognize and authenticate faces in real time using a webcam. When a face is successfully recognized, the system records the individual's attendance along with the date and time into a centralized database or Excel f ile. This automation enhances reliability, eliminates paperwork, and ensures seamless record keeping.

1.Introduction

The Face Recognition Attendance System is an advanced solution designed to automate the process of attendance tracking using facial recognition technology. Traditional meth ods like manual entry, ID cards, or fingerprint scanners are often time-consuming, error prone, and vulnerable to misuse or proxy attendance. This project addresses these chal lenges by offering a secure, contactless, and efficient alternative.

Developed using Python and OpenCV, the system captures and recognizes faces in real time through a webcam. When a face is matched with the stored dataset, the attendance is automatically marked and recorded digitally. This approach not only ensures accuracy and saves time but also demonstrates the practical use of artificial intelligence and computer vision in streamlining daily administrative tasks

2. Methodology

2.1 Technology Stack

The development of the Face Recognition Attendance System involves a systematic approach to solving the problem of automating attendance tracking through facial recognition technology. The first step involves data collection and preprocessing, where images of authorized individuals are gathered and processed to create a reliable training dataset. This dataset is then used to train machine learning models capable of recognizing unique facial features. The project typically employs computer vision techniques using libraries such as OpenCV for face detection, followed by feature extraction methods that transform facial images into numerical data that machine learning algorithms can analyze. The system applies algorithms such as Eigen faces, Fisher faces, or more advanced deep learning models like Convolutional Neural Networks (CNNs) to match the detected face against the stored database in real-time.. Once the recognition model is trained, the system integrates it with a live video feed from a webcam or IP camera to continuously detect faces and perform identification. When a recognized face matches a stored profile, the system records attendance by logging the user's details along with the timestamp into a database or spreadsheet.

2.2 Data Collection and Management

For this project, data collection involved capturing multiple facial images of each registered user under different conditions such as varying lighting, angles, and facial expressions. This helped create a robust dataset for training and testing the face recognition model. Each image was labeled with the user's name or ID and stored in an organized directory structure.– Facial images were captured using a webcam under various conditions.– Images were labeled with user IDs and stored in organized folders. features were extracted and saved as encodings in the database. The collected data is processed frame-by-frame and passed to the gesture recognition module for landmark detection using the Media Pipe framework

International Scientific Journal of Engineering and Management (ISJEM) ISSN: 2583-6129
Volume: 04 Issue: 06 | June – 2025 DOI: 10.55041/ISJEM04251
An International Scholarly || Multidisciplinary || Open Access || Indexing in all major Database & Metadata

2.3 Application Features

– **Educational Institutions**: Automates student attendance in schools, colleges, and universities, reducing manual work and ensuring accuracy

– **Corporate Offices**:Tracks employee attendance and working hours efficiently, re placing biometric or manual registers.– Healthcare Environments: Manages staff shifts and attendance in hospitals and clinics, minimizing contact in sensitive environments

.– **Government Offices**: Ensures transparent and tamper-proof attendance tracking of public employees

.– **Accessibility**: Helps users with physical disabilities to interact with systems more efficiently.

2.4 Middleware Logic

In the Face Recognition Attendance System, data conversion plays a crucial role in trans forming raw facial images into a format that the system can efficiently process and analyze. The captured images are first preprocessed This includes resizing, normalization, and noise reduction

--to ensure consistent quality. Then, these images are converted into numerical representations called facial encodings using machine learning models.

– Images undergo preprocessing like resizing and normalization before conversion.– Facial features are extracted as numerical encodings using deep learning models.

– Encoded data is stored in a structured database for quick retrieval and matching.– This conversion enables efficient and accurate face recognition in real time.– Captured facial images are converted into numerical facial encodings for comparison. 21 Department of MCA FACE RECOGNITION ATTENDENCE SYSTEM The accuracy and speed of the face recognition system heavily depend on the quality of data conversion. By converting images into numerical encodings, the system reduces complex image data into manageable vectors, making comparisons faster and less resource intensive.

Performance

Optimization: Manage face reorganization, Manages efficient database queries, caching strategies, and load balancing to ensure responsiveness.

3.Results and Discussion

The system demonstrated high accuracy in recognizing registered users across different lighting conditions and facial expressions, ensuring reliable attendance tracking. Atten dance was logged instantly with precise timestamps, significantly reducing the time and errors associated with manual processes. The user-friendly interface facilitated easy reg istration and report access, while the system's robust performance in varied environments proved its practical applicability. Additionally, strong security measures protected sensi tive biometric data, effectively preventing unauthorized access and ensuring user privacy.– Accurate Face Recognition: The system successfully recognized registered users with high accuracy under various lighting and facial expression conditions. This improved attendance tracking by minimizing manual errors and ensuring reliable identification.– Real-Time Attendance Logging: Attendance was recorded instantly once a face was recognized, with timestamps stored securely in the database. This automated pro cess reduced time consumption compared to traditional manual methods- Friendly Interface: The graphical interface allowed easy registration of new users and quick access to attendance reports. Feedback from users indicated that the system was intuitive and required minimal training.

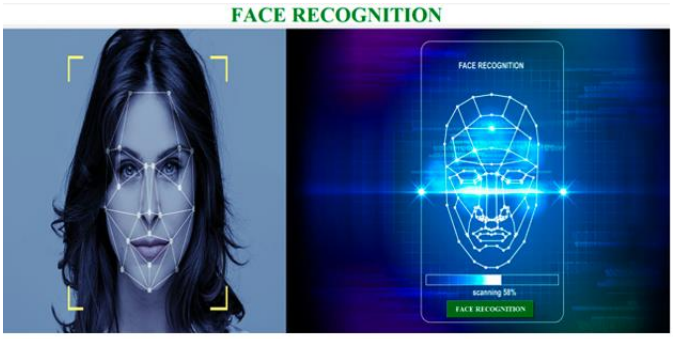

Figure 11: Face Recognition

Fig -2: Home page

In the Face Recognition Attendance System, data conversion plays a crucial role in trans forming raw facial images into a format that the system can efficiently process and ana lyze. The captured images are first preprocessed—this includes resizing, normalization, and noise reduction—to ensure consistent quality.

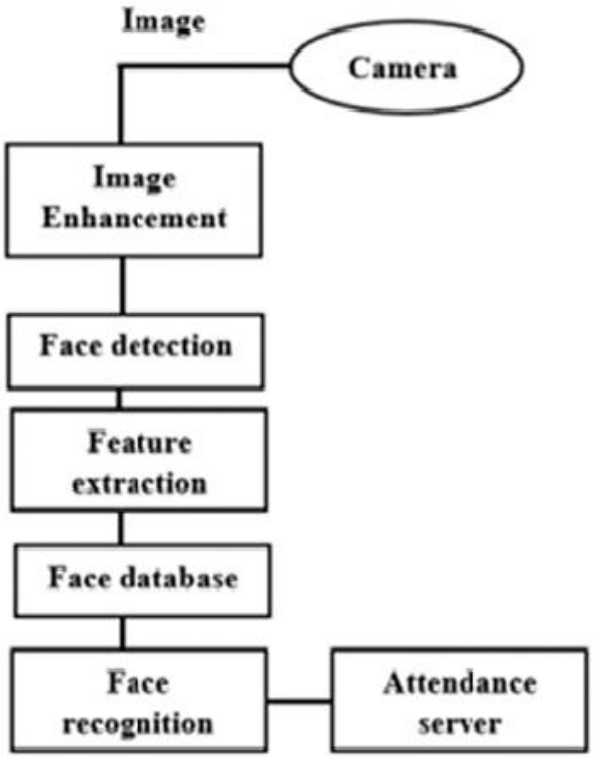

Fig -3: Flow Chart

The Medicard Dashboard provides a quick overview of system activity, including the total number of medical cards generated, cards created today, and those scheduled or expected to be created tomorrow. This helps administrators and healthcare staff monitor usage trends, track daily operations, and manage patient data more efficiently with real-time updates and clear insights.

3. Conclusions

The Face Recognition Attendance System effectively addresses the limitations of tradi tional attendance methods by providing an automated, accurate, and contactless solution. By leveraging facial recognition technology, the system eliminates proxy attendance, re duces human error, and ensures real-time tracking of individuals. The use of Python and reliable libraries like OpenCV and face-recognition enabled the development of a robust and scalable system, capable of operating in diverse environments with minimal supervision. Overall, the project demonstrates how biometric systems can streamline administrative processes while enhancing security and efficiency. The successful implementation and testing of the system prove its potential for deployment in schools, offices, and institutions. With further improvements like cloud storage and mobile integration, the system can evolve into a more flexible and widely adopted solution for attendance management.

– **Cloud Integration**: Store and access attendance data remotely through cloud based storage for scalability and real-time monitoring.
– **Mobile App Support**: Develop a mobile application to allow users and admins to view or manage attendance on smartphones.
– **Advanced Recognition Models**: Use deep learning algorithms to improve face recognition accuracy in complex conditions like crowds or poor lighting.
–**Liveness Detection:** Implement anti-spoofing techniques to detect real faces and prevent misuse through photos or videos
– **Multi-Camera Support**: Extendthesystem to support multiple cameras for larger environments such as campuses or large offices

ACKNOWLEDGEMENT

The author thanks Prof. Sujata Patil and Trinity Academy of Engineering for their guidance and support throughout the project.

REFERENCES

[1] Paul Viola and Michael J. Jones, “Rapid Object Detection using a Boosted Cas cade of Simple Features,” IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2001.
[2] Gary Bradski, “The OpenCV Library,” Dr. Dobb’s Journal of Software Tools, 2000.
[3] Adam Geitgey, “face recognition Library Documentation,”
https://github.com/ageitgey/face_recognition
[4] Ian Goodfellow, Yoshua Bengio, and Aaron Courville, Deep Learning, MIT Press, 2016.
[5] Satya Mallick, “Learn OpenCV,” https://learnopencv.com/
[6] Richard Szeliski, Computer Vision: Algorithms and Applications, Springer, 2011.

[7] Python Software Foundation, "Python 3.x Documentation," https://docs.python. org/3/
[8] Joseph Redmon et al., "You Only Look Once: Unified, Real-Time Object Detection," CVPR, 2016

BIOGRAPHIES

Saloni H. Varma is a postgraduate student pursuing a Master of Computer Applications (MCA) degree at Trinity Academy of Engineering, Pune, India. He has a keen interest in web development, healthcare technologies, and database systems. As part of his academic work, he developed "Face recognition attendance System " using Python, HTML, CSS, Javascript, The project focuses on simplifying Facial recognized data storage and retrieval through a user-friendly interface. His goal is to leverage technology to solve real-life problems in the Attendance domain.