FACIAL RECOGNITION ATTENDANCE SYSTEM USING MATLAB

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1. Abstract

The Facial Recognition Attendance System is a MATLAB-based solution that automates attendance management using advanced facial recognition technology. The system is designed to function in three key phases: data collection, model training, and real-time testing. Initially, the system captures facial data through a webcam, creating a dataset of images that serve as the foundation for training. The model is then trained to accurately recognize individuals based on these images, taking into account various facial features and characteristics. During the testing phase, the system continuously monitors the webcam feed, detecting faces in real-time. When an individual is recognized, the system marks their face with a bounding box, displays their name above it, and logs their attendance in an Excel sheet. This automated process not only eliminates the need for manual attendance tracking but also minimizes errors and enhances efficiency, making it a valuable tool for educational institutions and workplaces alike. By leveraging MATLAB's powerful capabilities in image processing and machine learning, this system offers a reliable and streamlined approach to managing attendance.

2. Introduction

The Facial Recognition Attendance System using MATLAB is designed to automate the process of recording attendance by leveraging face detection and recognition techniques. Traditional attendance methods are often time-consuming and error-prone, whereas this system offers a fast, contactless, and reliable solution. Using a webcam, the system captures images of individuals, extracts unique facial features through a pretrained convolutional neural network, and matches them with the stored database. Once recognized, the attendance is automatically marked in an Excel sheet along with the date, time, and location, ensuring accuracy and efficiency. This approach not only minimizes manual effort but also enhances security and can be extended for use in classrooms, workplaces, and other organizational environments.
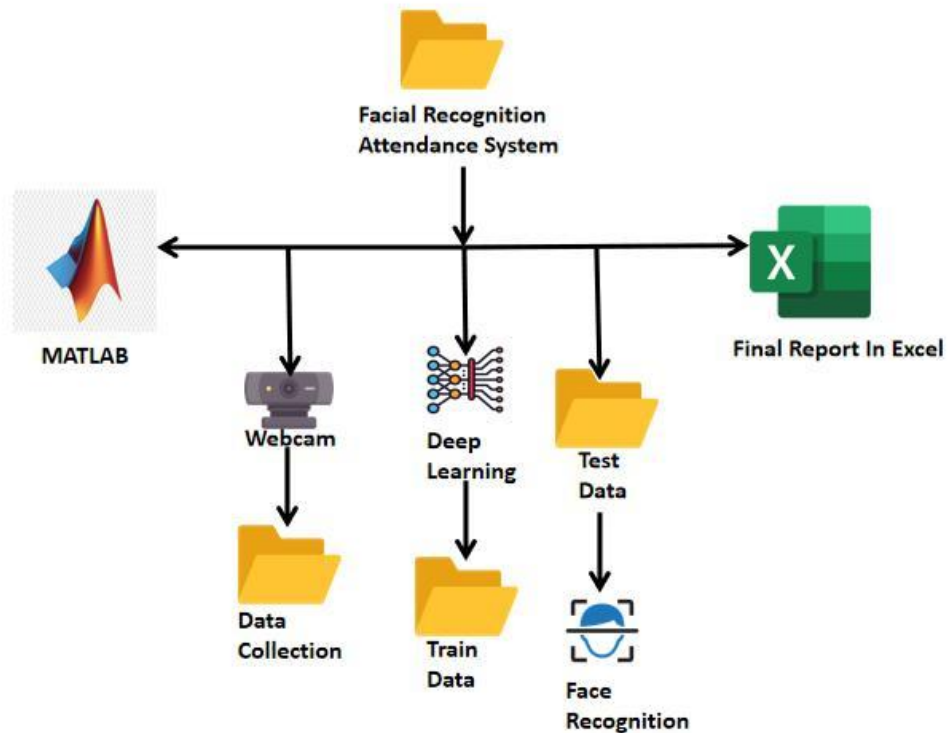
3. Methodology

Fig 3.1. Schematic Representation of Facial Recognition Attendance System using MATLAB with Real-time attemdance recording and data processing

4. Implementation

4.1 Image Capture and Database Creation
A folder was created to store datasets, and images of each person were captured using a webcam in MATLAB. Each individual's images were saved in a separate folder under their name.

4.2 Training the Model
The collected dataset was trained using the pretrained CNN model *myNet1*, which extracted facial features and classified them according to the stored folders.

4.3 Testing and Attendance Recording
In testing, the webcam detected faces in real time, displayed a bounding box with the person's name, and simultaneously recorded attendance in an Excel sheet with date, time, and location.
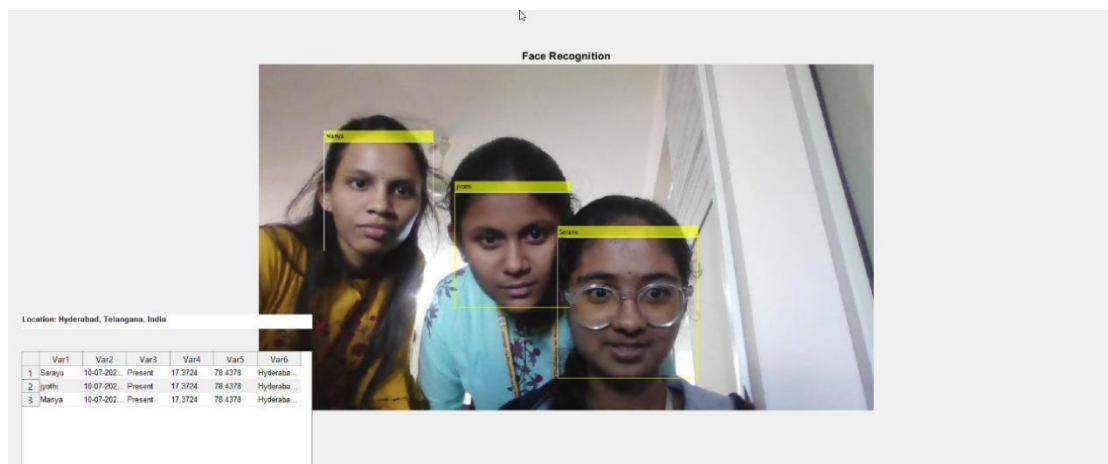
5. Results

Fig 5.1 Facial Recognition with bounding boxes over the person's face
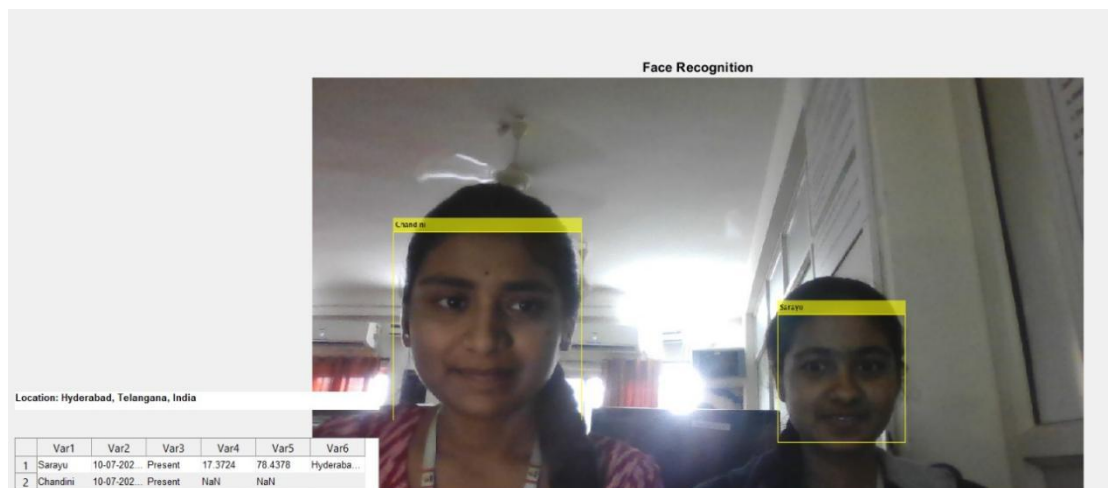

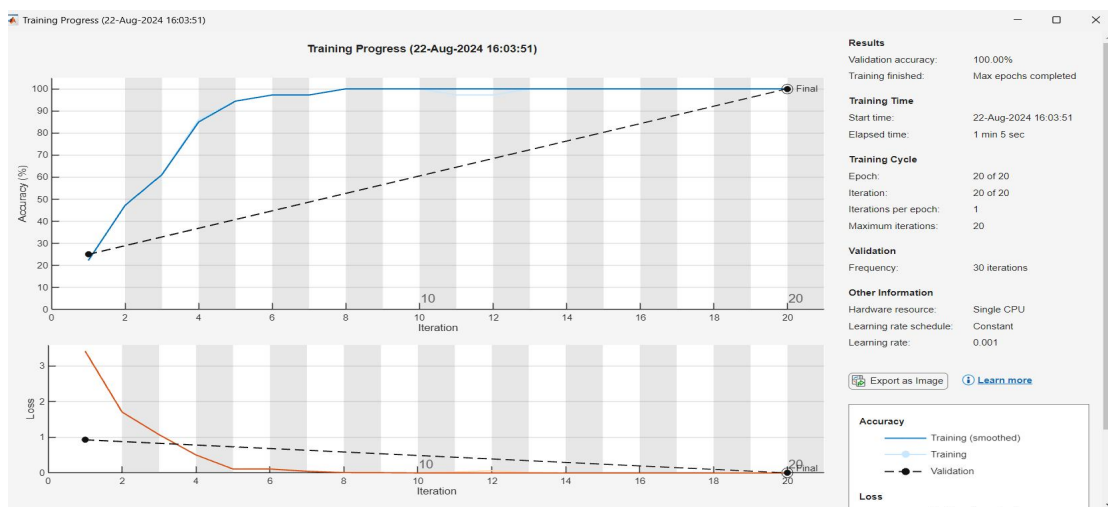Fig 5.2 Working under any background condition

Fig 5.3 Training the data with a number of Iterations

	1 Name	2 Time	3 Status	4 Latitude	5 Logitude	6 Area	7	8
1	'Sarayu'	'10-07-2024 16:55:11'	'Present'	'17.3724'	'78.4378'	'Hyderabad, Telangana, India'		
2	'jyothi'	'10-07-2024 16:55:18'	'Present'	'17.3724'	'78.4378'	'Hyderabad, Telangana, India'		
3	'Manya'	'10-07-2024 16:55:21'	'Present'	'17.3724'	'78.4378'	'Hyderabad, Telangana, India'		
4	'Chandini'	'10-07-2024 16:55:22'	'Present'	'17.3724'	'78.4378'	'Hyderabad, Telangana, India'		
5								
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Fig 5.4 The Excel Sheet with the person's name, attendance status, time and location

6. Conclusion

The Facial Recognition Attendance System using MATLAB successfully automated the attendance process by integrating face detection, recognition, and database management. The system captured images, trained them using a pretrained CNN model, and recognized individuals in real time with bounding boxes and their names. Attendance was automatically recorded in an Excel sheet with date, time, and location, ensuring accuracy, efficiency, and security. This solution reduces manual effort, minimizes errors, and provides a reliable, contactless method for attendance management.

7. Future Scope

The system can be enhanced to handle larger and more diverse datasets, improve recognition accuracy under varying lighting and pose conditions, and integrate more advanced deep learning models. Future developments may also include cloud-based storage, mobile application support, and multi-camera integration, making the system scalable for institutions, workplaces, and large organizations.