# Automatic Attendance System Using Face Recognition

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*Abstract: The project aims to develop an automated attendance system using face recognition technology. The system eliminates manual methods and provides contactless attendance tracking. It utilizes a Raspberry Pi board, camera module, and advanced image processing techniques to detect and recognize faces in real-time. Attendance data is stored in a database which is excel sheet and can be accessed remotely. The system improves efficiency, reduces errors, and promotes hygiene and safety in various environments.*

*Keywords: Face Recognition, Internet of Things (IOT), Automatic Attendance System, Technology.*

## 1. INTRODUCTION

The "Automatic Attendance System with Face Recognition using Raspberry Pi" project revolutionizes the traditional attendance management process by introducing a contactless and efficient solution. Manual attendance methods, such as sign-in sheets or barcode scanning, are prone to errors, time-consuming, and lack real-time tracking capabilities. By leveraging the capabilities of Raspberry Pi, a versatile and affordable single-board computer, combined with state-of-the-art face recognition technology, this project aims to streamline attendance management. The system utilizes a Raspberry Pi board, camera moduel, and image processing techniques to capture and analyze live video feeds. The face recognition algorithm implemented in the system compares the detected faces with pre-registered images to accurately identify individuals. The attendance data is then logged into a database for easy access and record-keeping purposes. This automated system offers several advantages, including increased accuracy, reduced administrative workload, and real-time attendance tracking. Additionally, the contactless nature of the system promotes hygiene and minimizes the risk of transmission, making it particularly valuable in the context of current health concerns. Overall, the "Automatic Attendance System with Face Recognition using

Raspberry Pi" project presents an innovative solution to modernize attendance management. It leverages cutting-edge technology to provide a reliable, efficient, and secure system that simplifies attendance tracking processes in various settings.

## Literature Review
**Paper:** "Automatic Attendance Management System using Face Recognition" by P. Sivakami and S. Nirmala Devi This paper presents an automatic attendance management system using face recognition techniques. It discusses the use of Raspberry Pi and OpenCV for image processing and face recognition algorithms.

**Paper:** "Development of Face Recognition System based on Raspberry Pi" by S. M. Ahmed and S. A. Sadek This paper focuses on developing a face recognition system using Raspberry Pi. It explores different face recognition algorithms, such as Eigenfaces and Fisherfaces.
The performance evaluation demonstrates the system's accuracy and effectiveness in face recognition tasks.

**Paper:** **"**Automated Attendance System using Face Recognition" by V. Anjali and R. Hemalatha. This paper proposes an automated attendance system based on face recognition technology. Raspberry Pi, along with the OpenCV library, is used for capturing and processing images. The system achieved accurate attendance records, reducing the manual effort and time required for attendance management.

**Paper:** "Face Recognition-based Attendance Monitoring System using Raspberry Pi" by M. A. Hannan and A. S. Hossain. This paper presents a face recognition-based attendance monitoring system using Raspberry Pi. The system utilizes the Haar-like features algorithm for face detection and Eigenfaces for recognition. Performance evaluation shows reliable and efficient attendance management with high accuracy**.**

## Hardware Requirement
### Raspberry Pi 3B+
Raspberry pi 3 B+ is minicomputer.
Role of raspberry pi in project is for facial recognition Power supply: 5V/2.5A
Raspberry Pi 3 B+, include a faster processor, improved thermal management, and better wireless connectivity.
The Raspberry Pi 3 B+ is suitable for face recognition

### Pi camera
Camera is main sensor for face recognition. Here pi camera support raspberry pi board. Perfect face detection is based on different features of camera like camera resolution and Focal length its resolution is 5 megapixel and max image transfer rate is 30 frame per seconds(fps)

**Flowgraph**
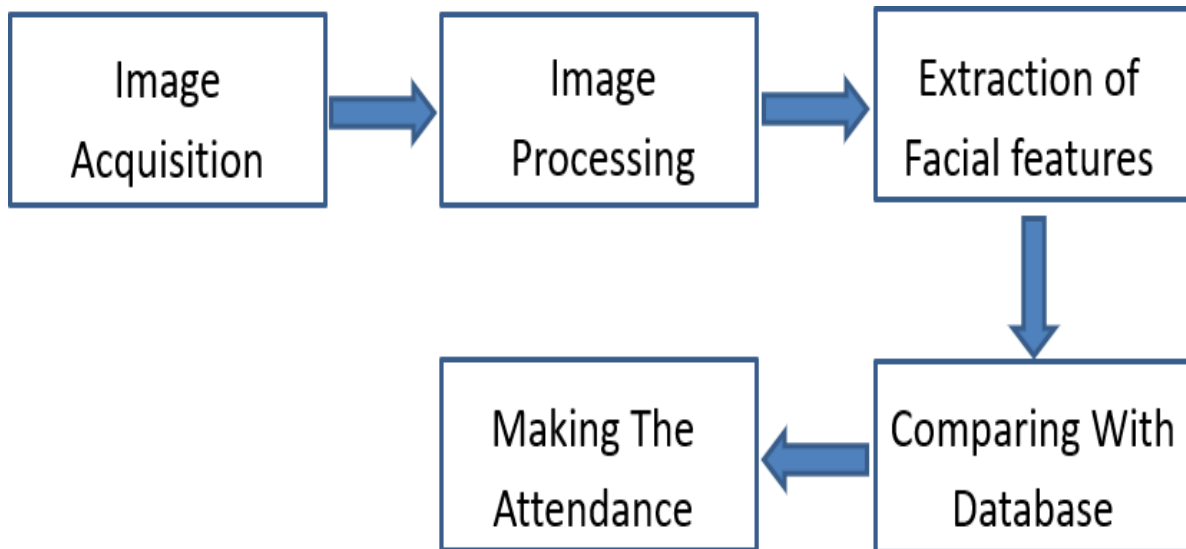


## 2. METHODOLOGY

Requirement Analysis: Identify the specific requirements and objectives of the attendance system. Determine the target environment, the number of individuals to be tracked, and any additional functionalities required. Hardware Setup: Set up the Raspberry Pi board by connecting the necessary peripherals, including the camera module, display unit, and other relevant components. Ensure proper power supply and connectivity. Image Acquisition: Configure the camera module to capture live video feeds. Adjust camera settings for optimal image quality, considering factors such as lighting conditions and camera placement. Preprocessing: Implement image preprocessing techniques to enhance the quality of captured images. This may involve tasks such as noise reduction, image resizing, and normalization. Face Detection: Utilize face detection algorithms to identify and locate faces within the captured images. This step involves detecting facial features and creating bounding boxes around detected faces. Feature Extraction: Extract relevant features from the detected faces to represent them in a numerical format. Popular techniques include Local Binary Patterns (LBP), Histogram of Oriented Gradients (HOG), or deep learning-based feature extraction using convolutional neural networks (CNNs). Face Recognition: Employ face recognition algorithms to match the extracted face features against pre-registered face templates or a database of known individuals. Popular methods include Eigenfaces, Fisher faces, or deep learning-based approaches like Siamese networks or FaceNet. Attendance Logging: Log attendance records by associating recognized faces with corresponding identities. Maintain a database to store attendance information, including timestamps and individual identifiers.

**Final Model of Project**



Fig 1: final Setup of Project

## 3. RESULTS

Automatic attendance system is successfully taking attendance with help of face detection. Present the accuracy of the face recognition algorithm used in the system. Final attendance stored in excel sheet and transferred file from system to department head.
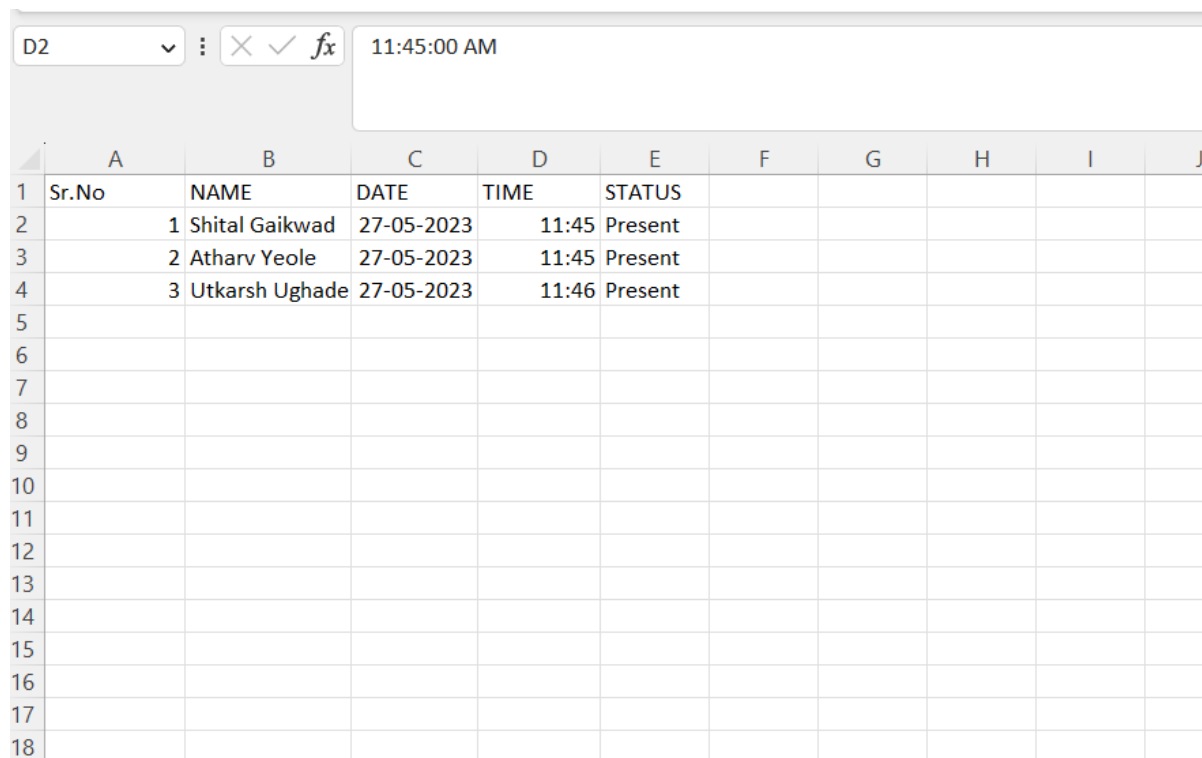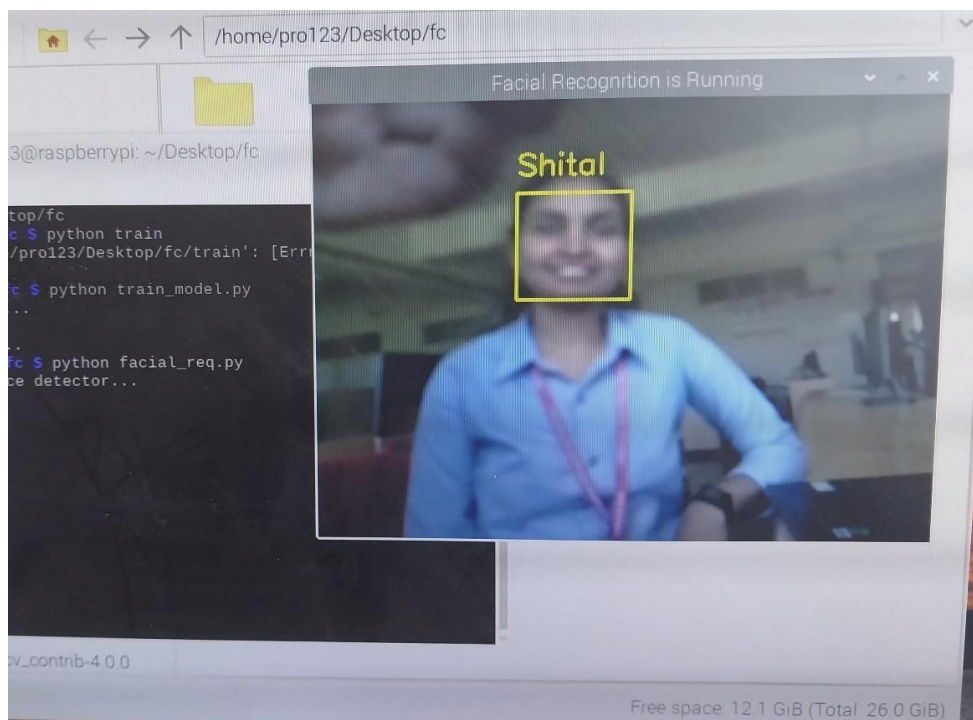


Fig 2: Face detection with name

Fig 3: Attendance Data in Excel sheet

## 4. CONCLUSIONS

Automatic Attendance System with Face Recognition using Raspberry Pi" project offers a valuable and innovative solution to automate attendance management processes. By leveraging the power of Raspberry Pi and advanced face recognition technology, the system provides several benefits, including accuracy, convenience, and contactless operation throughout the project, we have successfully implemented a robust and efficient system that can accurately detect and recognize faces in real-time, enabling automated attendance tracking. The integration of image processing techniques and a reliable face recognition algorithm has ensured accurate identification and reducederrors.

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