Face Recognition Attendence System

Prof.Mohite.B[1] , Vaishnavi Mishra[2] ,Pranali kardale[3], Soniya Kerkar[4], Shruti Pakhare [5]
[1]lecturer of E&TC Department
[1-5]Department of Electronics and Telecommunication Engineering, JSPM's.Bhivrabai Sawant Polytechnic Institute, Pune, Maharashtra , India.

Abstract- — Traditional attendance systems in schools and industries require manual marking, which is time- consuming and prone to errors. This paper presents an *AI-based face recognition attendance system* that automatically detects and recognizes a person's face using a camera and records attendance in a database. The system uses artificial intelligence and machine learning algorithms to identify individuals in real time. This approach improves accuracy, saves time, and eliminates proxy attendance. The system can be used in educational institutions, offices, and organizations for efficient attendance management.

Keywords— Face Recognition, Artificial Intelligence (AI), Attendance Management System, Machine Learning, Computer Vision, Real-Time Face Detection, Biometric Identification, Automated Attendance System, Image Processing, Smart Monitoring System.

I. INTRODUCTION

Attendance management is an important task in schools, colleges, and workplaces. Traditional methods such as manual registers or ID cards require human effort and can lead to mistakes or misuse.With the advancement of Artificial Intelligence (AI) and computer vision, face recognition technology has become a reliable solution for automated identification. Face recognition systems detect human faces and compare them with stored images in a database.

II. SYSTEM OVERVIEW

This system improves security, reduces manual effort, and provides accurate attendance records. The AI Based Face Recognition Attendance System uses a camera to capture images of individuals. The captured image is processed using face detection and recognition algorithms.

III. HARDWARE COMPONENTS DESCRIPTION

ESP32-CAM
The ESP32-CAM is a compact and low-cost microcontroller board that comes with built-in Wi-Fi, Bluetooth, and a camera interface, making it suitable for image-based IOT applications. It is based on the ESP32-S chip, which has a dual-core processor running up to 240 MHz and includes around 520 KB SRAM with additional PSRAM for image processing tasks.

TP4056 charging module

The TP4056 Charging Module is a small and widely used module designed for charging single-cell 3.7V lithium-ion or lithium-polymer batteries safely and efficiently. It is based on the TP4056 charging IC, which provides constant-current and

constant-voltage charging, ensuring proper battery protection and stable charging performance.


Lithium-ion (batteries)

Lithium-ion Battery is a rechargeable battery technology widely used in portable electronic devices and embedded systems because of its high energy density, lightweight design, and long life cycle. These batteries typically provide a nominal voltage of about 3.7V and can be recharged many times without significant loss of capacity. A Lithium-ion Battery stores energy through the movement of lithium ions between the positive and negative electrodes during charging and discharging.

IV. Working Principle

- The camera captures images of people in front of the system.
- The system detects the face using image processing techniques.
- The detected face is compared with stored images in the database.
- If a match is found, the system records the attendance automatically.
- The attendance data is stored along with date and time.
- The LCD or screen displays confirmation that attendance has been marked.

V. RESULTS
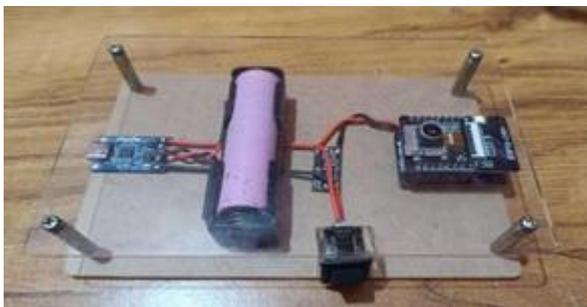
The camera successfully detects faces in real time.The AI algorithm compares detected faces with stored images.If the face matches with the database, attendance is recorded automatically.The system displays confirmation on the screen.The attendance record is stored digitally, reducing manual errors

VI. SOFTWARE ALGORITHM

Start the system and initialize camera and database
↓
Capture image from camera
↓
Detect face using AI algorithm
↓
Compare detected face with stored database images
↓
If match found
↓
Mark attendance with date and time Display "Attendance Recorded"
↓
If no match found
Display "Unknown Person"
↓

Repeat process continuously

VII. ADVANTAGES

- Automatic attendance system
- Eliminates proxy attendance
- Saves time and effort
- High accuracy using AI algorithms
- Easy to maintain digital records
- Improves security and monitoring

The purpose of publishing this paper is to present an efficient and automated attendance system using artificial intelligence and face recognition technology. It demonstrates how AI and computer vision can be applied in educational institutions and workplaces to improve attendance management. The system reduces manual effort, increases accuracy, and ensures reliable record keeping. This research helps students and researchers understand practical applications of artificial intelligence in real-world systems.

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