

## Biometric Attendance

**Ashwini Ganapa**

Department of EE

Shri Siddheshwar Women's Polytechnic Solapur India.

[ashwiniganapa@gmail.com](mailto:ashwiniganapa@gmail.com)

**Sneha Charkupalli**

Department of EE

Shri Siddheshwar Women's Polytechnic Solapur India.

[snehacharkupalli@gmail.com](mailto:snehacharkupalli@gmail.com)

**Rakhi Nandanikar**

Department of EE

Shri Siddheshwar Women's Polytechnic Solapur India.

[rakhinandnikar53@gmail.com](mailto:rakhinandnikar53@gmail.com)

**Chandana Dulange**

Department of EE

Shri Siddheshwar Women's Polytechnic Solapur India.

[dulangechandana@gmail.com](mailto:dulangechandana@gmail.com)

**Shriyadidi Madole**

Department of EE

Shri Siddheshwar Women's Polytechnic Solapur India.

[vijaymadole@gmail.com](mailto:vijaymadole@gmail.com)

**Fiza Pathan**

Department of EE

Shri Siddheshwar Women's Polytechnic Solapur India

[shahedap793@gmail.com](mailto:shahedap793@gmail.com)

\*\*\*

**Abstract** - The Biometric Attendance System is an advanced and reliable method used to record the attendance of students or employees using their unique biological characteristics such as fingerprints. Traditional attendance methods like manual registers are time-consuming and may lead to errors or proxy attendance. This project aims to develop an automated attendance system that improves accuracy, efficiency, and security.

The system uses a fingerprint sensor to capture and verify the identity of a person. Each user's fingerprint is stored in the system database during the registration process. When a user places their finger on the sensor, the system compares the fingerprint with the stored data and records the attendance automatically. The data can

be stored and monitored through a computer or microcontroller-based system.

The Biometric Attendance System reduces manual work, prevents fake attendance, and provides a fast and secure way of managing attendance records. It is widely used in schools, colleges, offices, and industries to maintain accurate attendance data.

The system also include programming to control the fingerprint sensor and manage the attendance data. A microcontroller such a Arduino is programmed to read the fingerprint verify the user and record the attendance. The program compared the scan the fingerprinting with the stored database and mark the attendance only when the fingerprint matched. The programming also help in

storing, processing, displaying, the attendance record on the system

**Key Words:** biometric, fingerprint, sensor attendance system authentication, Security,

**1.INTRODUCTION** - In today's modern world technology plays an important role in improvement of efficiency and security in many fields. Attendance management is an essential task in schools, colleges, offices, and industries, but traditional methods such as manual registers or ID cards are time-consuming and can lead to errors or proxy attendance.

A biometric attendance system is a modern solution that uses unique biological characteristics such as a fingerprint to identify individuals and record their attendance.

Since every person has a unique fingerprint, this system provides a reliable and secure method of identification. The system automatically records attendance when a user places their finger on the biometric sensor.

This technology reduces manual work, increases accuracy, and saves time. Biometric attendance systems are widely used in educational institutions, government organizations, and businesses to maintain proper attendance records and improve overall management.

Overall, the Biometric Attendance System is an efficient solution that improves attendance management by providing accurate identification and reducing the chances of fake attendance.

Programming is an important part of the Biometric Attendance System. It is used to control the fingerprint sensor and manage the attendance data. In this project, a microcontroller such as Arduino is programmed using the Arduino IDE software.

The program helps the system to capture the fingerprint from the sensor and compare it with the fingerprints stored in the database. During the registration process, the fingerprint of each user is stored with a unique ID. When the user places their finger on the sensor, the program verifies the fingerprint. If the fingerprint matches with the stored data, the system records the attendance automatically.

The programming also helps in storing the attendance data, displaying the result on the system, and ensuring that the attendance is recorded only once for each

user. This makes the system more accurate, fast, and reliable.

Programming is used to operate and control the Biometric Attendance System. In this project, programming is done using Arduino IDE to connect the fingerprint sensor with the microcontroller. The program is written to capture the fingerprint image, process it, and match it with the stored fingerprint data.

When a user places their finger on the sensor, the program reads the fingerprint and compares it with the database. If the fingerprint is matched, the system records the attendance and displays the confirmation message. If the fingerprint does not match, the system rejects the input.

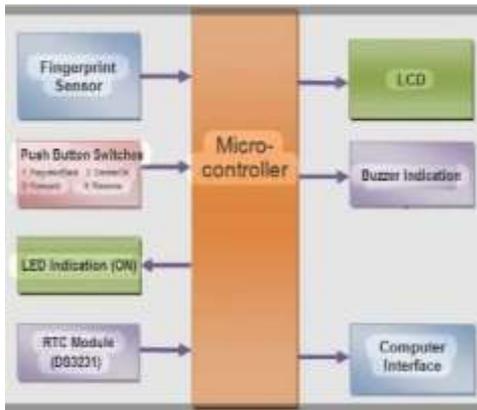
Programming also helps in managing user registration, storing fingerprint IDs, and maintaining attendance records. This makes the system automatic, secure, and easy to use.

## 2 PROBLEM STATEMENT

Traditional attendance systems such as manual registers and ID cards are time-consuming and prone to errors. They also allow problems like proxy attendance, data manipulation, and difficulty in maintaining records. In large institutions such as schools, colleges, and offices, managing attendance manually becomes inefficient and unreliable.

Therefore, there is a need for an automated, accurate, and secure attendance system. The Biometric Attendance System solves this problem by using fingerprint recognition technology to identify individuals and record their attendance with date and time, ensuring reliability and preventing proxy attendance. It also helps in easy data storage and management using a computer interface.

### 3 METHODOLOGY



**Figure 1 .** Block diagram of Biometric attendance system.

The block diagram of the Biometric Attendance System shows how different components work together to record attendance using fingerprint technology. The fingerprint sensor captures the user’s fingerprint and sends the data to the microcontroller, which is the main control unit of the system. The microcontroller processes the fingerprint data and verifies it with the stored database.

The push button switches are used to operate the system for functions like registration, deletion, and navigation. The LCD display shows messages such as user instructions and attendance status. The buzzer and LED indicators provide sound and visual alerts to indicate whether the fingerprint is accepted or rejected.

The RTC module (DS3231) provides the current date and time so that the exact attendance time can be recorded. Finally, the computer interface allows the attendance data to be transferred and stored in a computer for future use.

#### 1.Fingerprint Sensor.

The Fingerprint Sensor is used to scan the fingerprint of a person.

Every person has a unique fingerprint, so the sensor captures the fingerprint image and sends it to the microcontroller for verification.

#### 2. Microcontroller.

The Microcontroller is the main controlling unit of the system.

It receives the fingerprint data from the sensor and compares it with the stored fingerprint data in the system. According to the result, it controls other

components like LCD, buzzer, LED, and computer interface.

#### 3. Push Button Switches.

Push buttons are used for system operations such as:

Register / Back – To register a new user or go back

Forward – To move to the next option

Delete / OK – To delete or confirm data

Review – To check stored attendance These switches help the user operate the system easily

#### 4. LCD Display.

The LCD (Liquid Crystal Display) shows messages to the user such as:

Place Finger

Attendance Marked

Access Denied

It helps the user understand the system status.

#### 5. Buzzer Indication.

The Buzzer gives sound alerts.

Short beep → Fingerprint matched Long beep

→ Fingerprint not matched

#### 6. LED Indication.

The LED indicator shows the working status of the system.

When the LED is ON, it indicates that the system is powered and operating.

#### 7. RTC Module (DS3231).

The RTC (Real Time Clock) module keeps track of the current date and time.

Whenever attendance is recorded, the system stores the exact time and date.

#### 8. Computer Interface.

The Computer Interface is used to transfer attendance data from the system to a computer.

This helps in storing, managing, and analyzing attendance records.

#### 4 ATTENDANCE PROCESS

1. The user places their finger on the fingerprint sensor.
2. The sensor scans the fingerprint and sends the data to the microcontroller.
3. The microcontroller compares the fingerprint with the stored database.
4. If the fingerprint matches, the attendance is accepted; if it does not match, it is rejected.
5. The RTC module records the current date and time of attendance.
6. The LCD display shows the attendance status and the buzzer/LED gives an indication.
7. The attendance data is stored and can be transferred to a computer for record keeping.

#### 5 LOGICAL WORK FLOW

**Image Capture:** The sensor scans the physical trait (fingerprint, iris, or face).

**Feature Extraction:** The system identifies unique landmarks (e.g., minutiae points in a fingerprint) and converts them into a digital template.

**Database Comparison:** The processor compares the live template against the “Enrolled” templates stored in memory.

**Decision & Logging:** If a match is found, the system records the ID and timestamp, often triggering a buzzer or green LED.

Scribd

Scribd

+6

For professional implementations, these systems often integrate with Aadhaar-enabled platforms or enterprise HR software to manage large-scale data securely.

Attendance

Attendance

+3

Are you looking for a circuit-level schematic for a specific microcontroller like Arduino or ESP32, or a high-level system architecture for a corporate office?

Biometric Attendance System with Google Sheet

Integration

Circuit Digest

Design and construction of microcontroller fingerbase ...

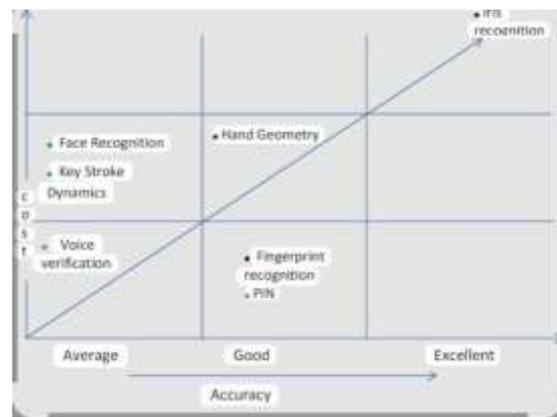
World Scientific News

DIY Biometric Attendance System using ESP32 –

Quartz Components

Quartz Components

Show all.



**Fig2 Biometric attendance curve**

The diagram compares different biometric identification methods based on two factors: cost and accuracy.

The horizontal axis (X-axis) represents accuracy from Average → Good → Excellent, while the vertical axis (Y-axis) represents cost.

##### 1. Voice Verification

Voice verification has low cost but its accuracy is average, so it is less reliable.

##### 2. Face Recognition and Keystroke Dynamics

These methods have moderate cost and average accuracy. They are easy to use but may be affected by lighting conditions or typing behavior.

### 3.Fingerprint Recognition and PIN

These provide good accuracy with moderate cost. Because of this balance, fingerprint recognition is widely used in attendance systems and security systems.

### 4.Hand Geometry

Hand geometry systems have good accuracy but higher cost, so they are used in some specialized

5.security applications.

### Iris Recognition

Iris recognition offers excellent accuracy, but it also has the highest cost, so it is mainly used in highsecurity areas like airports or research labs.

## 6 CONCLUSIONS

The biometric attendance system is effect when reliable method for managing attendance using print out print recognition technology. The system successfully identify individual based on their unique fingerprint and record their attendance automatically.

This project help to reduce a manual work eliminate proxy attendance and improve accuracy compared to traditional attended method such as register or ID cards. The use of a single print sensor LCD display and microcontroller make the system simple secure and user friendly.

The developed system improve that biometric technology can be widely used in school college of peace and industries for efficient attendance management. Over all the project demonstrates a cost effective and automated solution that increasing purity and save time.

## 7 REFERENCES

Can write references in your project report like this:

Arduino Official Website – <https://www.arduino.cc>

Handbook of Biometrics – Anil K. Jain, Arun A. Ross, and Karthik Nandakumar..

Biometrics: Identity Verification in a Networked World – Samir Nanavati, Michael Thieme, and Raj Nanavati.

Electronics For You Magazine – Articles on Arduino and biometric projects.

Arduino IDE Documentation and tutorials.

Online tutorials and project guides related to Fingerprint Based Attendance System.