

ATTENDANCE LOGIN SYSTEM USING ARDUINO

Title: Attendance System using Fingerprint Scanner, LCD, RTC, and WiFi Module

Abstract: This report presents the development and implementation of an attendance system using a fingerprint scanner, LCD display, real-time clock (RTC), and WiFi module. The objective of the project is to create an automated system that accurately records and stores attendance data, allowing for efficient and convenient tracking of attendance in various settings. The project involves the integration of hardware components and programming to achieve a reliable and user-friendly solution. The system utilizes the fingerprint scanner for identification, an LCD display for user feedback, an RTC module for accurate timekeeping, and a WiFi module for transmitting attendance data to a local server.

1. Objectives:

- **Ensuring Exam Integrity:** Attendance systems play a vital role in maintaining the integrity of examinations. By accurately tracking and recording student attendance, educational institutions can ensure that only authorized individuals participate in exams. This helps prevent impersonation or cheating attempts, ensuring fairness and reliability in the assessment process.
- **Compliance with Examination Regulations:** Many educational institutions have specific regulations or guidelines regarding attendance requirements for students to be eligible to take examinations. Attendance systems provide an automated and objective means to verify students' compliance with these requirements. Institutions can enforce attendance thresholds and policies to ensure that students meet the necessary criteria to take exams.
- **Recording Absenteeism and Make-up Exams:** Attendance systems help identify students who are absent from examinations. This information is crucial for institutions to schedule make-up exams.

2. Materials and Components:

➤ Fingerprint Scanner :

- ➔ Description: A fingerprint scanner is a biometric device that captures and analyzes fingerprints for identification purposes. It detects and matches unique patterns on an individual's fingerprint to verify their identity.
- ➔ Specifications: The fingerprint scanner used in this project is a capacitive type scanner with high-resolution imaging and reliable fingerprint recognition algorithms. It interfaces with the Arduino board to capture and process fingerprint data.

➤ LCD Display :

- ➔ Description: An LCD (Liquid Crystal Display) is a flat-panel display that uses liquid crystals to produce visual information. It provides a user-friendly interface to display attendance-related information such as instructions, prompts, and feedback.

→ Specifications: The LCD display used in this project is a standard 16x2 alphanumeric display. It has a backlight for improved visibility and communicates with the Arduino board using the I2C protocol.

➤ **RTC Module:**

→ Description: An RTC (Real-Time Clock) module is a hardware component that accurately keeps track of the current date and time. It ensures that attendance records are timestamped correctly and synchronized with the system clock.

→ Specifications: The RTC module used in this project is based on the DS1307 or DS3231 chip. It offers high accuracy and supports battery backup to maintain timekeeping even when the system is powered off.

➤ **WiFi Module:**

→ Description: A WiFi module enables wireless communication between the attendance system and a local server or network. It allows the system to transmit attendance data to the server in real-time for storage or further processing.

→ Specifications: The WiFi module used in this project is based on popular options like ESP8266 or ESP32. It provides reliable WiFi connectivity, supports the necessary protocols for data transmission (e.g., TCP/IP), and interfaces with the Arduino board.

Rationale behind component selection:

- **Fingerprint Scanner:** The fingerprint scanner was chosen for its accuracy, reliability, and security. It offers a unique identification method that eliminates the need for physical ID cards or passwords, reducing the chances of proxy attendance.
- **LCD Display:** The LCD display provides a user-friendly interface for attendees to interact with the system. It offers clear instructions and real-time feedback, ensuring that users can easily follow the attendance procedure.
- **RTC Module:** The RTC module ensures accurate timestamping of attendance records. It helps maintain synchronization with the system clock and provides reliable time data for attendance tracking and reporting.
- **WiFi Module:** The WiFi module enables seamless transmission of attendance data to a local server. It allows for real-time data synchronization, facilitating efficient record-keeping and enabling timely analysis and reporting.

Overall, the selected components offer a robust and integrated solution for the attendance system, combining accurate fingerprint recognition, user-friendly interface, precise timekeeping, and efficient data transmission to enhance the functionality and effectiveness of the system.

3. Methodology:

• **System Architecture and Interconnections:**

The attendance system project consists of several components interconnected with the Arduino board. Here's an overview of the system architecture:

- The Fingerprint Scanner is connected to the Arduino board to capture and process fingerprint data for identification.

- The LCD Display is connected to the Arduino board to provide a user interface for displaying attendance-related information and instructions.
- The RTC Module is connected to the Arduino board to maintain accurate timekeeping and timestamp attendance records.
- The WiFi Module is connected to the Arduino board to enable wireless communication and transmit attendance data to a local server.

The components are connected to the Arduino board using appropriate communication protocols, such as I2C or UART, based on their specifications and compatibility.