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Mini Project AY: 2024- 2025 SEM IV

ATTENDANCE SYSTEM

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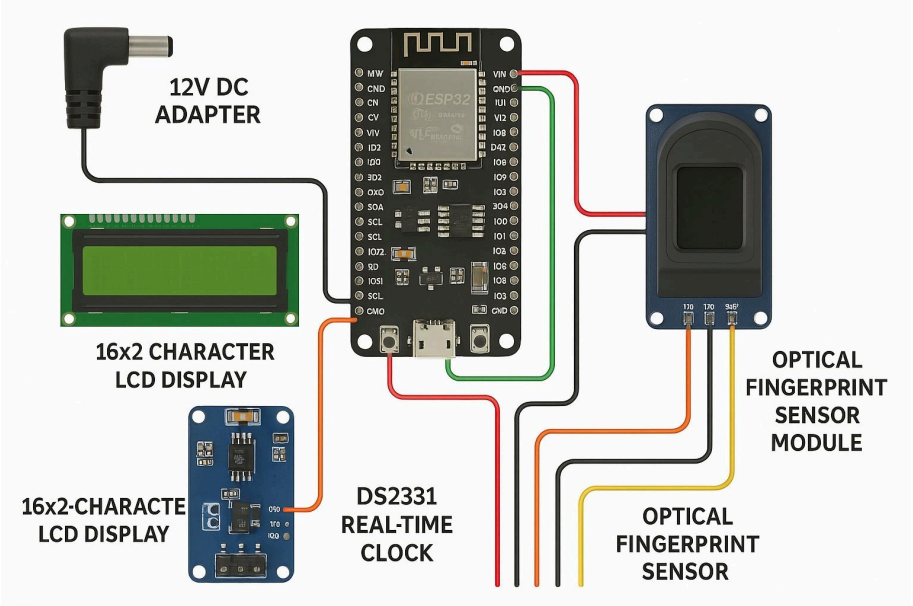
Aim:- To create an Attendance System using Arduino.

Components used:-

1. **ESP32 Development Board x 1**
2. **Optical Fingerprint Sensor x 1**
3. **16x2 LCD Display with I2C Adapter x 1**
4. **DS3231 Real-Time Clock (RTC) Module x 1**
5. **Power Supply (12V Adapter) x 1**
6. **Foamboard**
7. **Jumper wires**

Block diagram/ Circuit diagram:-



Working:-

1. **On powering the system, the LCD displays:**
   `Welcome! Please scan your finger.`

2. **The user places their finger on the fingerprint sensor.**

3. **The system scans the fingerprint.**

- **If the fingerprint is recognized, the LCD shows:**
  `Attendance Marked` **along with the current date and time from the RTC module.**
  The data can be logged in EEPROM or transmitted for external storage.

- **If the fingerprint is not recognized, it displays:**
  `Access Denied! Try again.`

4. **The system can handle multiple users, and each scan is logged as a separate attendance entry.**

Application:-

1. **Colleges & Schools: To automate and digitalize student and faculty attendance.**

2. **Offices & Workspaces: Ensures accurate employee attendance with time logs.**

3. **Libraries & Labs: Can be used to allow time-specific entry and attendance tracking.**

Advantages/ Disadvantages:-

- **Advantages**:-

1. **Accurate & Secure: Fingerprint authentication eliminates proxy or fake attendance.**

2. **Time Stamping: With the RTC module, attendance is marked with exact date and time.**

3. **User-Friendly: Easy for students/staff to mark attendance with a single touch.**

4. **Low Maintenance: No need for physical registers or manual record keeping.**

- **<u>Disadvantages</u>:-**
  1. **Fingerprint Errors: Wet or damaged fingers might not get detected properly.**

  2. **Power Dependency: System needs continuous power or reliable backup.**

  3. **Initial Setup: Enrolling all user fingerprints might be time-consuming initially.**

<u>Conclusion</u>:-

The biometric attendance system ensures a safe, secure, and tamper-proof method of recording attendance. The integration of a real-time clock with fingerprint verification makes it ideal for institutional or office environments.

<u>Future Modifications</u>:-

1. **Adding cloud/database integration to access and store attendance remotely.**
2. **Integration with mobile apps or web portals for real-time monitoring.**
3. **Addition of SMS/Email alerts to notify absent or late entries.**
4. **Using Wi-Fi capability of ESP32 to auto-sync data online.**