

Project Title : Fingerprint-Based Smart Hostel Hot Water Dispensing System

Aim:

To design a secure and automated hot water dispensing system for hostels using fingerprint-based biometric authentication to ensure authorized access and controlled water usage.

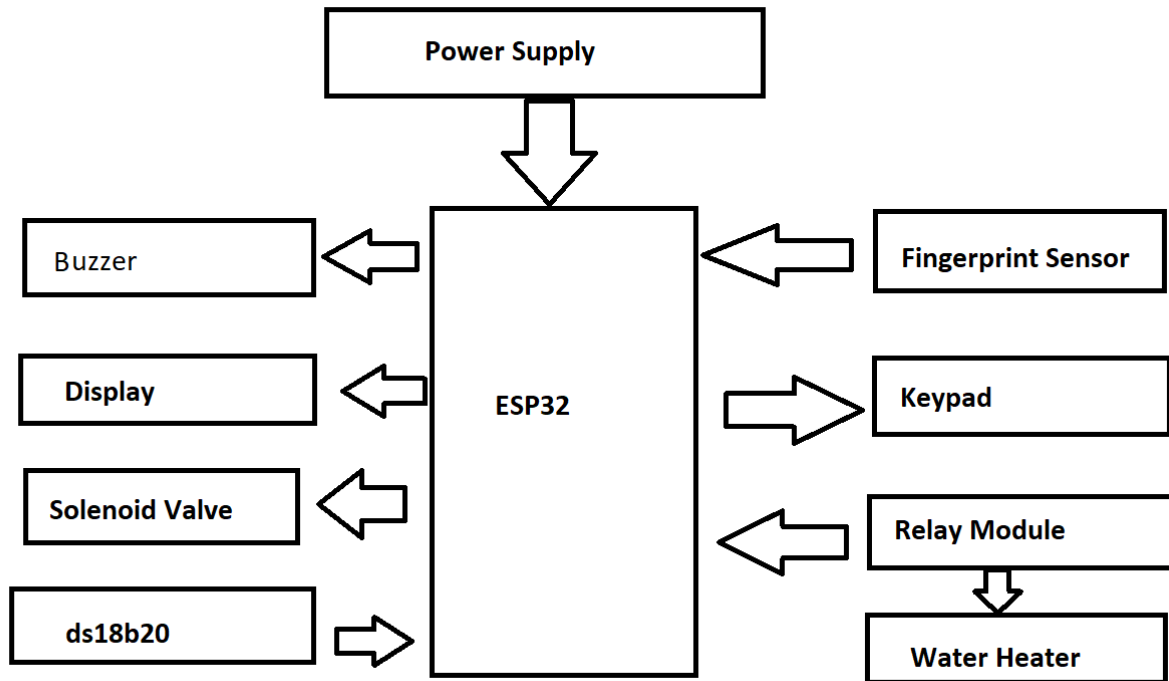
Objectives:

- To provide hot water only to registered hostel users.
- To authenticate users using their fingerprint.
- To control and limit hot water usage per user.
- To reduce wastage of water and electricity.
- To simplify hostel water management and improve hygiene.

Working Principle:

Each user is enrolled in the system with their fingerprint. When a user places their finger on the scanner, the system checks the biometric data. If verified, it activates a solenoid valve or pump to dispense hot water for a fixed time or volume. Once the limit is reached, the valve shuts automatically. The system also logs user access and prevents repeated use within a defined period.

Block Diagram



Hardware Components:

- ESP32
- Fingerprint Sensor (R305 / GT511C3)
- Solenoid Valve
- Relay Module
- Water Heater
- LCD Display
- Buzzer / LEDs
- Power Supply

Software Used:

- Arduino IDE
- Embedded C/C++

Advantages:

- Prevents unauthorized or repeated access
- Contactless and hygienic operation
- Saves water and electricity through controlled usage
- Reduces need for manual supervision

Disadvantages:

- Requires regular fingerprint sensor maintenance
- System may need protection from water exposure
- Biometric mismatch may occur due to wet or damaged fingers
- No remote monitoring without additional modules

Applications:

- Hostel bathrooms
- PG accommodations
- Hotel hot water service control
- Institutional or military barracks

Future Scope:

- Add OTP via mobile or Telegram for double verification
- Link with hostel database for automatic usage reports
- Use prepaid RFID or fingerprint-based usage credits
- Integrate IoT for remote monitoring and analytics
- Add auto shutoff and emergency override features

Conclusion:

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The fingerprint-based hot water dispensing system offers a secure and efficient solution to manage hot water usage in hostels. With biometric access control, it ensures fair usage, prevents waste, and improves overall user management in shared living environments.

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