



EAST WEST UNIVERSITY

Department of Computer Science and Engineering

Project Proposal On

IoT-Based Fingerprint Attendance System

Course Title: Internet of Things

Course Code: CSE406

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Introduction

Attendance plays an important role in schools, colleges, and offices. In most places, attendance is still taken manually, which can take time and sometimes cause mistakes. A smart and automatic attendance system can solve this problem easily.

This project focuses on creating a fingerprint-based attendance system that uses IoT technology to make the process faster and more reliable. By using a fingerprint sensor, each person's identity is verified through their unique fingerprint. Once the fingerprint is verified, the system records the user's attendance automatically with date and time.

The project also connects to the internet through a Wi-Fi module, so all attendance data is saved directly to Google Sheets. This makes it easy to view and manage records anytime, from anywhere. The OLED display and buzzer give instant feedback to the user, making the system user-friendly and efficient.

In short, this project aims to replace the old manual attendance process with a smarter, accurate, and modern IoT-based solution.

Project Overview

This project is about creating a smart attendance system that works with the help of the internet. The system uses an **ESP8266 NodeMCU** board and an **R307 fingerprint sensor** to record attendance automatically.

When someone puts their finger on the sensor, it checks if the fingerprint matches the stored data. If it matches, the system sends the user's ID, date, and time to a **Google Sheet** through Wi-Fi. An **OLED display** shows messages like "*Attendance Recorded*" or "*Access Denied*", and a **buzzer** gives a short beep as a signal.

This system helps schools, offices, and organizations take attendance automatically without using paper or manual entry.

It saves time and ensures accuracy in keeping attendance records.

Hardware Components

Componet	Description	Function
ESP8266 NodeMCU	Wi-Fi-enabled microcontroller board	Central controller; connects to the internet for IoT operations
R307 Fingerprint Sensor	Optical biometric sensor	Captures and verifies fingerprints
OLED Display (0.96")	Small display module	Displays real-time system messages (success or failure)
BC547 Transistor	NPN transistor	Drives the buzzer or other small load
Buzzer	Sound output device	Gives audio feedback (beep) on success or failure
Resistors	Passive components	Used for current limiting and circuit protection
Veroboard	Circuit mounting board	For assembling and soldering components

Male/Female Headers	Connectors	For easy connection and detachment of modules
Jumper Wires	Connector wires	Used for circuit interconnections

Working Principle

- ❖ When a user places their finger on the **R307 fingerprint sensor**, it scans and compares the fingerprint with pre-stored templates.
- ❖ If the fingerprint **matches**, the **ESP8266 NodeMCU** sends the **User ID, Date, and Time** to **Google Sheets** using a **Google Apps Script web API**.
- ❖ The **OLED display** shows “Attendance Recorded,” and the **buzzer** emits a single beep to confirm success.
- ❖ If the fingerprint **does not match**, the display shows “Access Denied,” and the buzzer gives **two short beeps**.
- ❖ All attendance data is stored **in real time** on Google Sheets for easy monitoring and management.

System Flow Diagram

The overall working process of the IoT-Based Fingerprint Attendance System can be explained with the following flow diagram:

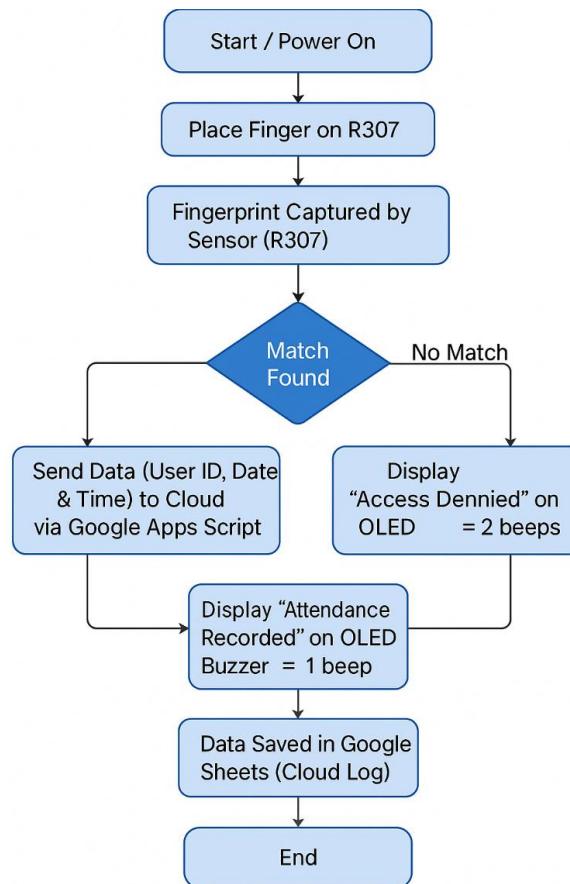


Figure 1: System Flow Diagram of IoT-Based Fingerprint Attendance System

After scanning the fingerprint, the system verifies the user data through the ESP8266 NodeMCU. If the fingerprint matches, the attendance record (User ID, Date, and Time) is sent to Google Sheets via the Internet.

Otherwise, the system displays “Access Denied” and waits for the next input.

IoT Platform and Cloud Integration

- **Google Sheets:** Serves as the cloud-based database for storing attendance records.
- **Google Apps Script Web API:** Acts as a bridge between the ESP8266 and Google Sheets.
- **Wi-Fi Connection:** Enables real-time data transfer to the internet and remote access to attendance logs.

Expected Output

- Fingerprint verification using the **R307 sensor**.
- Automatic update of attendance data (**Name/ID, Date, Time**) in **Google Sheets**.
- Real-time **visual feedback** through the OLED display.
- **Audio confirmation** through the buzzer for user interaction.
- Reliable, automated, and paperless attendance management system.

Conclusion

The proposed **IoT-Based Fingerprint Attendance System** provides a modern, efficient, and secure method for managing attendance.

It combines **biometric authentication**, **IoT connectivity**, and **cloud data storage** to reduce errors, save time, and simplify record management.