

GUI FOR MESS MANAGEMENT SYSTEM USING GSM

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Abstract: The main purpose of this project is to build a fingerprint python-based mess attendance monitoring system for Mess Management to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The current old system has a lot of ambiguity that caused inaccurate and inefficient of attendance taking, bill calculation. The technology working behind will be the finger recognition system. The human finger is one of the natural traits that can uniquely identify an individual. Therefore, it is used to trace identity as the possibilities for a finger to deviate or being duplicated is low. In this project, finger databases will be created to pump data into the recognizer algorithm. Then, during the attendance taking session, finger will be compared against the database to seek for identity. When an individual is identified, its attendance will be taken down automatically saving necessary information into a excel sheet. At the end of the day, the excel sheet containing attendance information, meal usage and billing regarding all individuals is monitored.

I. INTRODUCTION

This paper proposes a biometric-based automated mess management system designed to streamline meal distribution and enhance administrative efficiency. The system employs biometric authentication integrated with an ATmega microcontroller to regulate access to mess services. Each student is allotted a monthly quota of 60 meals, with access permitted twice daily upon successful fingerprint verification. This ensures secure, authenticated entry and eliminates the possibility of unauthorized access. An software application provides real-time monitoring for mess administrators, displaying each student's authentication status, attendance, and remaining meal balance. The system architecture includes biometric sensors, a data acquisition unit, and centralized storage in a relational database, with backend processing developed using Python. It also incorporates an SMS-based notification feature for boarding authentication, adding another layer of communication and transparency.

By automating student attendance, meal tracking, and billing calculations, the proposed system significantly reduces human error, administrative burden, and time consumption. It also enable's accurate and timely financial transactions by dynamically updating billing information based on meal consumption. prevail in the mess. Backup of data can be easily taken using this software on the click of a single button. Restoring the data back to the system is also possible in-case-of any-failure.

Also, this software will reduce manpower, thus reducing the capital being invested. Tais project can be merged with with any major projects in future where meals and their monthly calculations need to be done. Overall, this automated solution not only enhances operational efficiency and security but also contributes to a more transparent and user-friendly mess management experience.

II. BIOMETRIC BASED ATTENDANCE SYSTEM

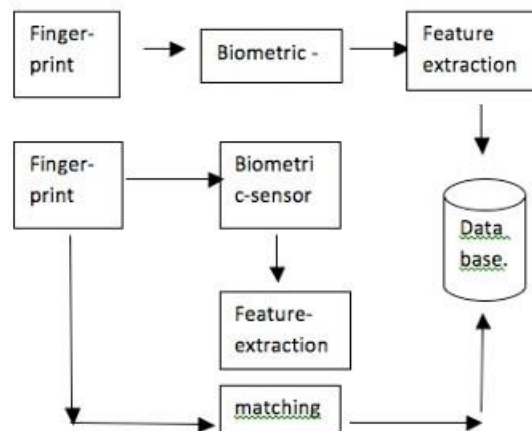


FIG 1. Architecture of Biometric (Fingerprint) Based Attendance system

1. Fingerprint Enrollment Phase (Top Path)

a. Fingerprint → Biometric → Feature Extraction → Database

Fingerprint: A person's fingerprint is scanned for the first time (enrollment).

Biometric: The fingerprint image is captured using a biometric sensor.

Feature Extraction: Unique features (like minutiae points) are extracted from the fingerprint. **Database:** These features are stored in the database, associated with the user's ID or details.

Purpose: This is the registration phase where students/staff are registered in the system for future identification.

2. Fingerprint Verification/Authentication Phase (Bottom Path)

a. Fingerprint → Biometric Sensor → Feature Extraction → Matching → Database

Fingerprint: The student places their finger on the scanner to access a meal.

Biometric Sensor: Captures the fingerprint in realtime.

Feature Extraction: Extracts features from the captured fingerprint.

Matching: Compares the taken out features with those stored in the database.

Database: Used to retrieve stored features and verify the identity.

If the fingerprint matches a stored entry:

The system authenticates the user.

The mess access is granted and can also log the meal taken (for tracking or billing purposes).

III. SYSTEM HARDWARE

Fingerprint sensor:

The R307 fingerprint sensor is a compact biometric module designed for secure and efficient fingerprint recognition. It features both image acquisition and fingerprint matching capabilities, making it ideal for access control and identity verification. With its fast response time, built-in storage, and UART interface, the R307 offers reliable performance in various embedded applications.

GSM :

A GSM (Global System for Mobile Communications) module is a hardware device that enables communication through cellular networks, supporting features like voice calls, SMS, and data transmission, often used in IoT and other applications.

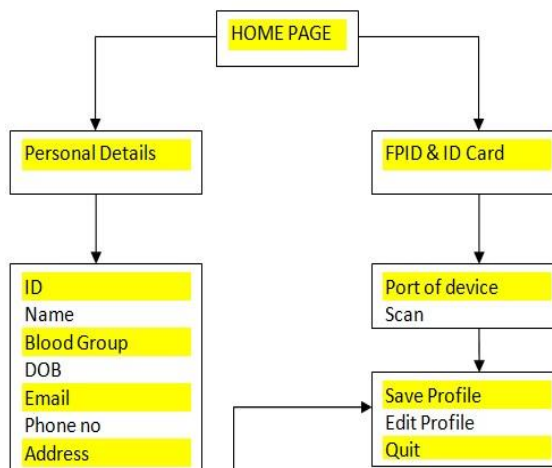
ATMega 328p-pu:

The ATmega328P-PU is a low-power, 8-bit AVR microcontroller with 32KB of flash memory, 2KB of SRAM, and 1KB of EEPROM, commonly used in Arduino Uno boards, offering features like a 20 MHz clock, 14 digital I/Os, 6 analog inputs, and various communication interfaces.

LCD 16*2 :

A 16*2 LCD display subunit that can show 16 characters on 2 lines, commonly used in electronic project. It operates using a controller like HD44780 and works in 4 bit or 8 bit mode. The LCD has 16 pins for power, control, data and backlight. It's often used with microcontroller's like Arduino to display messages or sensor data.

IV. FLOWCHART OF SYSTEM



VI. SOFTWARE GUI EXPLANATION

The snapshots of the software system are as follows:

1. Registration page :



1. Personal Details Section:

Fields:

ID: Unique identifier for the user.

Name: The individual's full name.

Date of Birth: User's birthdate. Blood Group: Medical blood group (e.g., A+, O-).

Phone Number: Mobile contact number.

Email ID: Email address.

Address: Full postal or residential address. **Button:**

"Clear All Fields" (Red button): Resets all personal detail input field

2.FPID Details and I-Card Section:

Fields:

FPID NO: Fingerprint ID number – likely filled after successful scan.

Port of Device: Serial port (e.g., COM3, COM4) used to communicate with the fingerprint scanner. **Button:**

"SCAN" (Yellow button): Initiates scanning of fingerprint to fetch FPID.

3.Action Buttons (Bottom Row):

SAVE PROFILE (Green): Saves the entered data into the system/database.

CREATE I-CARD (Orange): Likely generates an identity card with profile data.

EDIT PROFILE (Pink): Opens existing profile for modification.

QUIT (Red): Exits the application

2. Lunch Screen:



FingerPrint Based Mess System
:5-March-2025 | 13:52:13
**** LUNCH SCREEN ****

ENTER PORT OF DEVICE CONNECT DISCONNECT

PRESENT LUNCH

ID	NAME	DATE	TIME
3	dalcha nikkam	25-03-2025	12:14:50
3	dalcha nikkam	25-03-2025	12:14:50
4	Ravati Halingale	25-03-2025	12:10:31
4	Ravati Halingale	25-03-2025	12:10:31
4	Ravati Halingale	25-03-2025	12:10:31
4	Ravati Halingale	25-03-2025	12:02:16
4	Ravati Halingale	25-03-2025	12:02:16
4	Ravati Halingale	25-03-2025	11:57:12
4	Ravati Halingale	25-03-2025	11:48:12
5	Phutane Marm	25-03-2025	11:28:59
5	Phutane Marm	25-03-2025	11:28:59
5	Phutane Marm	25-03-2025	11:28:59
5	Phutane Marm	25-03-2025	11:28:59

Quit Application Register or Update Profile

3. Dinner Screen:



FingerPrint Based Mess System
:5-March-2025 | 14:01:50
**** DINNER SCREEN ****

ENTER PORT OF DEVICE CONNECT DISCONNECT

PRESENT LUNCH

ID	NAME	DATE	TIME
3	dalcha nikkam	25-03-2025	12:14:50
3	dalcha nikkam	25-03-2025	12:14:50
4	Ravati Halingale	25-03-2025	12:10:31
4	Ravati Halingale	25-03-2025	12:10:31
4	Ravati Halingale	25-03-2025	12:10:31
4	Ravati Halingale	25-03-2025	12:02:16
4	Ravati Halingale	25-03-2025	12:02:16
4	Ravati Halingale	25-03-2025	11:57:12
4	Ravati Halingale	25-03-2025	11:48:12
5	Phutane Marm	25-03-2025	11:28:59
5	Phutane Marm	25-03-2025	11:28:59
5	Phutane Marm	25-03-2025	11:28:59
5	Phutane Marm	25-03-2025	11:28:59

Quit Application Register or Update Profile

Explanation of Interface:**1. Title and Timestamp:**

The current system date and time is displayed: 5-March-2025 | 13:52:13, which helps in logging and real-time monitoring.

2. Device Port Entry & Connection Controls:

"Enter Port of Device": The serial port can be inputted by user using a text box(e.g., COM3) to which the fingerprint scanner is connected.

"CONNECT" / "DISCONNECT" buttons enable or disable the communication between the fingerprint reader and the system.

3. Meal Attendance Log Table (Present Lunch):

Displays the list of individuals who have registered their fingerprint for lunch on a specific date.

ID: Unique numeric identifier assigned to each user.

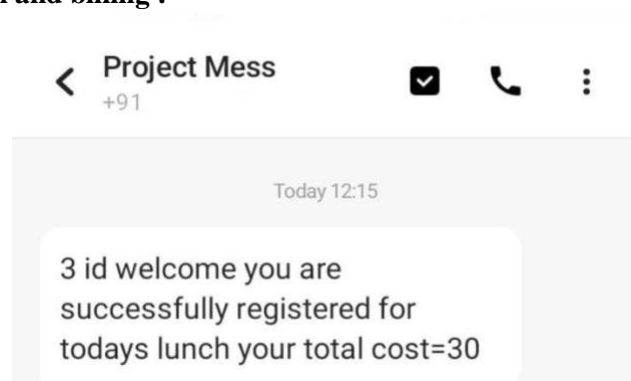
Name: Full name of the person.

Date: The meal date (e.g., 25-03-2025). Time: Exact time the fingerprint scan was successfully recorded.

4. User Interaction Buttons:

Quit Application: Allows the user to exit the system safely.

Register or Update Profile: Opens a user registration or update form to manage biometric data and user information.

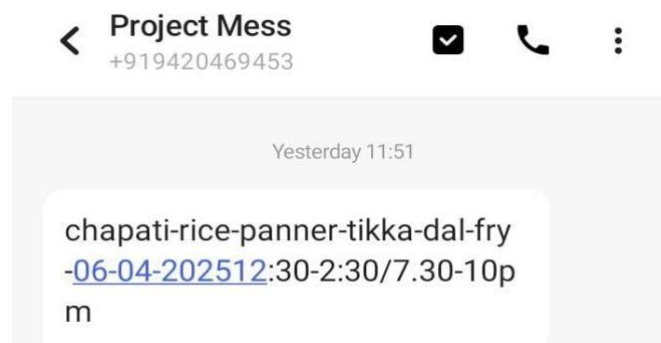
VIII. SMS ALERTS**1. Token generation and billing :****Message Details:**

"3 id" – This refers to the user's unique ID, which is "3". It is not indicating the number of people, but rather identifying a single person by their assigned ID in the system.

"Welcome you are successfully registered for today's lunch" – Confirms that the user with ID 3 has been registered for lunch.

"Your total cost = 60" – This indicates the cost for the lunch booked by the user, which is ₹60.

2. Menu :



Message Details:

Menu Items:

chapati-rice-panner-tikka-dal-fry

These are the food items available on the specified day. The use of hyphens indicates a simple format for listing multiple dishes.

Date:

06-04-2025

This is the date for which the menu is applicable. Users receive this message a day in advance or on the same day.

Timings:

12:30–2:30 / 7:30–10:00 pm

These represent the meal serving time slots:

Lunch: 12:30 PM to 2:30 PM

Dinner: 7:30 PM to 10:00 PM

CONCLUSION

This software will be useful to any school/college hostel or in general to any institute maintaining a mess or canteen. Security is maintained as the complete control of the system is only under the hands of an authorized person. It will enable mess managers to refer diet charts and plan healthy, nutritious diet accordingly for the cadets. Since easy calculations and bill generations are done in minutes, therefore, it will lessen the work/load of mess managers. Using this software, alerts regarding the stock of commodities will be easily generated. It will never let scarcity prevail in mess. This software makes it easy to take data backup with just one click. If there is any failure, it is possible to restore the backup data to the system.

The use of this software will result in a reduction in manpower, which will result in a decrease in the amount of capital invested.

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