Mini Project Report on

“SMART FOOD WASTE TRACKER”

Project carried out by

Tamanna 2401201101 BCA Sec A

Priyanshu 2401201068 BCA Sec A

Dipansh 2401021119 BCA Sec A

Under the supervision of

Dr. Meenu

Associate Professor – Engineering & Technology

Department of Computer Science and Engineering

School of Engineering and Technology

K.R Mangalam University , Gurugram , Haryana

Academic year – 2024 – 2025

CERTIFICATE

Department of Computer Science & Engineering

[K.R Mangalam University]

This is to proudly certify that the following students: Priyanshu(2401201068) , Dipansh (2401201119) , Tamanna(2401201101) from Bachelor of Computer Applications (BCA),First Year, have successfully completed their mini project entitled: **"Smart Food Waste Tracker"** as part of their academic curriculum for the academic year 2024–2025, under the supervision of **Dr. Meenu, Associate Professor – Engineering & Technology**. This project involved the design and development of an interactive web and mobile application aimed at minimizing food wastage by tracking food expiry dates, offering AI-based recipe suggestions using nearly expired items, providing timely expiry alerts, and supporting food donation through a user-friendly interface.

The dedication, teamwork, and technical understanding shown by the students during the project development are commendable. Their innovative approach addresses a real-world issue and reflects a commitment to sustainable living and community support.

We congratulate the team for their successful completion of the project and wish them all the best for their future endeavors.

Dr. Meenu (Project Supervisor)

Associate Professor – Engineering & Technology

Acknowledgement

We are deeply grateful to all those who contributed to the successful completion of our mini project titled: **“Smart Food Waste Tracker”**

First and foremost, we would like to express our heartfelt gratitude to **Dr. Meenu, Associate Professor – Engineering & Technology** , for her invaluable guidance, constant encouragement, and insightful feedback throughout the course of this project. Her mentorship played a vital role in shaping our ideas and translating them into a functional application.

We would also like to thank the faculty and staff of the Department of Computer Science for providing the necessary infrastructure, resources, and support which enabled us to carry out our project work effectively.

Our sincere thanks go to our teammates — Priyanshu, Dipansh, and Tamanna — for their dedication, cooperation, and collaborative effort in bringing this project to life. Each member’s contribution in design, development, testing, and presentation was instrumental in completing this project on time.

We would also like to acknowledge the use of open-source tools, online documentation, and web-based APIs , which were vital in enhancing the functionality of our system.

Last but not least, we are thankful to our families and friends for their constant motivation and moral support throughout the project.

This project has been a valuable learning experience and has helped us understand real-world problem-solving using technology.

Table of Contents

1. Introduction

1.1 Problem Statement

In many households and institutions, a significant amount of food is wasted due to lack of monitoring and timely consumption. People often forget about stored food items until they expire, leading to unnecessary waste. This not only impacts individual budgets but also contributes to a global problem of food wastage, while millions of people continue to suffer from hunger and malnutrition.

1.2 Objectives

The primary objective of this project is to develop a smart and user-friendly food tracking system that:

- Helps users track food items and their expiry.
- Notifies users of items that are about to expire.
- Suggests recipes using soon-to-expire items.
- Encourages food donation before items go to waste.
- Promotes awareness about sustainable food management practices.

1.3 Scope of the Project

This project is a beginner-level yet practical web application that

addresses real-world food wastage problems. It is primarily designed for individual users households, and small institutions.

The current scope includes:

- Manual entry of food items with quantity and purchase date.
- Automatic expiry alert classification (fresh, expiring soon,
- expired).
- Recipe suggestions based on tracked items.
- Voice-based input for convenience.
- Interface for donating surplus food locally.

Future versions may include barcode scanning, user authentication, cloud storage, and NGO integration for real-time food donations.

2.System Overview

2.1 System Description

The Smart Food Waste Tracker with AI-Based Expiry Alerts is a web-based application developed to help users manage their food inventory efficiently and reduce wastage. The system allows users to input food items manually, set quantities, and track their expiry status. It features a modern, responsive interface with support for voice input and interactive alerts. By analyzing stored items, the system can suggest creative recipes and provide an option to donate surplus food, making it socially impactful.

2.2 Key Features

- **Manual and Voice Input:** Users can add food items either by typing or using voice input through the Web Speech API.

- **Expiry Alerts:** Items are automatically categorized as Expired, Expiring Soon (within 3 days), or Fresh.

- **Recipe Suggestions:** Intelligent recipe ideas are generated based on the ingredients currently tracked.

- **Food Donation Module:** Users can submit surplus food details for donation, encouraging community welfare.

- **Responsive Design:** Works smoothly on both desktop and mobile devices.

- **LocalStorage-Based Tracking:** All data is stored locally in the user's browser, ensuring fast and private access.

2.3 Technology Stack

The Smart Food Waste Tracker utilizes a carefully selected technology stack that aligns with the project’s goals of simplicity, interactivity, and scalability. The following technologies were used during the development:

Frontend

- **HTML5**: For structuring the content of the web application.
- **CSS3**: For styling and enhancing the user interface across various screen sizes.
- **JavaScript**: To add interactivity, form validation, localStorage integration, voice input (Web Speech API), and dynamic UI rendering.

Backend

- **Node.js**: A lightweight and efficient runtime environment used to create the backend server and manage routing.
- **Express.js:** A minimalist web framework for Node.js used to handle HTTP requests and set up backend APIs.
- **MongoDB:** A NoSQL database used to store user data, food tracking records, and donation details.

APIs and Browser Features

- **Web Speech API:** For capturing voice input from users to make the food entry process faster and more accessible.
- **OpenFoodFacts** API (planned/optional): For auto-fetching nutritional and expiry data using barcode input.

Tools & Utilities

- **VS Code:** Used as the primary code editor throughout the project.
- **Google Chrome Developer Tools:** For testing, inspecting elements, and debugging.
- **GitHub:** For version control and code management.

- **MongoDB Compass:** For database management and visual data inspection.

Layer	Technology/Tool	Purpose
Frontend	HTML5, CSS3, JavaScript	UI structure, styling, interactivity
Backend	Node.js, Express.js	Server-side logic, API handling
Database	MongoDB	Data storage (food items, donations, etc.)
APIs	Web Speech API	Voice input for food entry
Planned API	OpenFoodFacts API	Fetch expiry/nutrition info via barcode
Tools	VS Code, GitHub, Chrome DevTools, MongoDB Compass	

3. System Architecture

3.1 Frontend Layer

This is the user-facing part of the system built using HTML, CSS, and JavaScript. It enables users to:

- Add food items manually or via voice.
- View categorized expiry alerts (Fresh, Expiring Soon, Expired).
- Receive smart recipe suggestions.

- Submit food donations through a form.
- Interact with a responsive and intuitive UI.

3.2 Backended Layer

The backend is developed using Node.js and Express.js, which serve as the core for:

- Routing and API creation.
- Handling data requests and responses.
- Communicating securely with the MongoDB database.

3.3 Database Layer

A MongoDB NoSQL database stores all the persistent data, including:

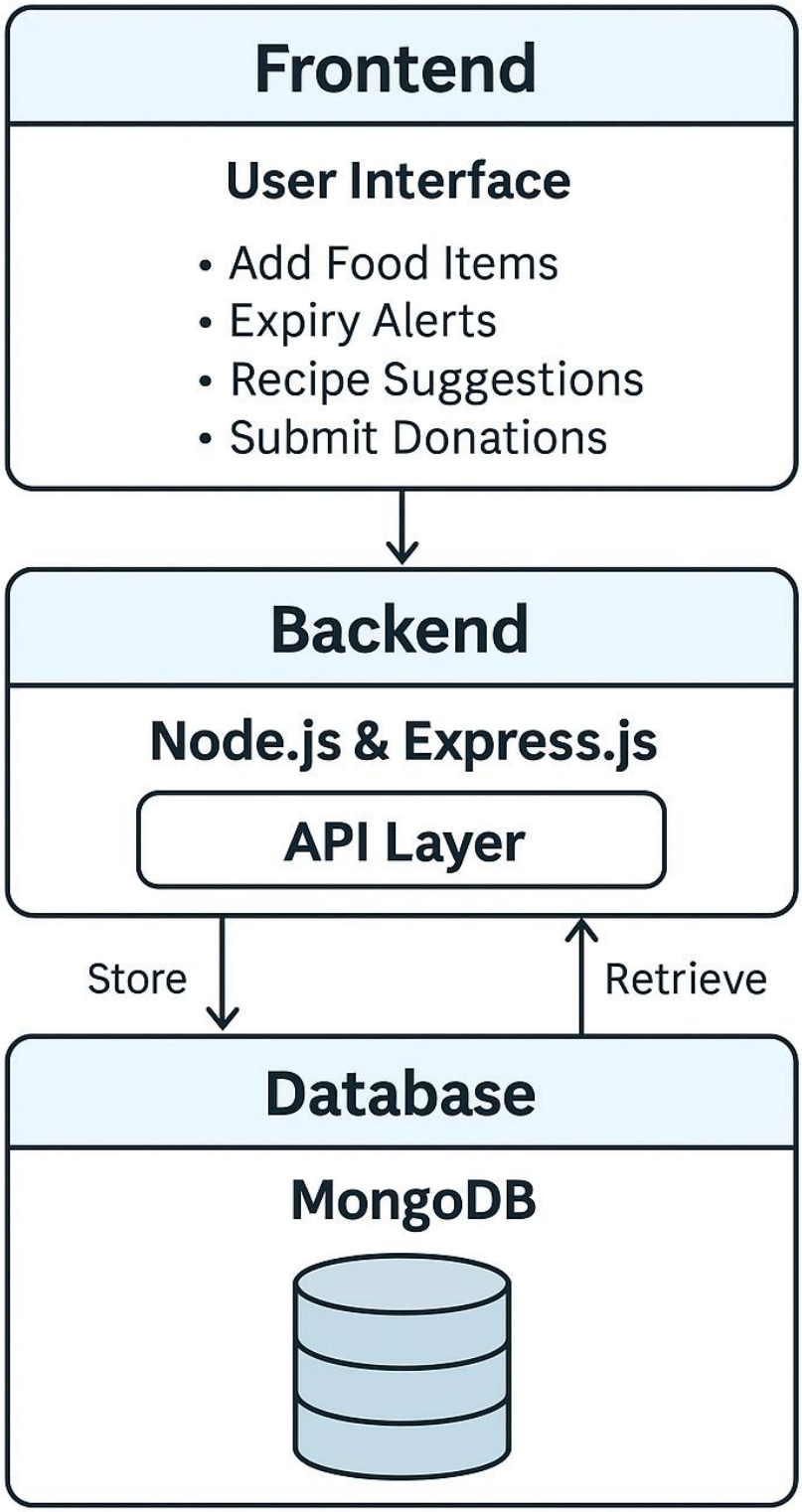
- Food items and expiry dates.
- Donation records.
- User submissions and optional future enhancements.

3.4 Data Flow

1. The user interacts with the frontend (track, donate, alerts, recipes).
2. The frontend sends HTTP requests to the backend (via forms or fetch calls).

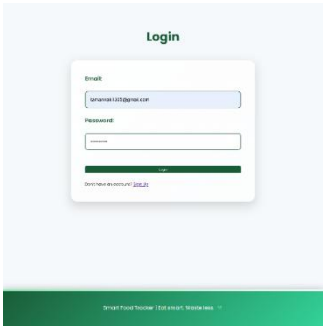
3. The backend processes the request and interacts with MongoDB to store/retrieve data.
4. The response is sent back and dynamically displayed in the UI.

System Architecture



4.Implementation Details

Login page:



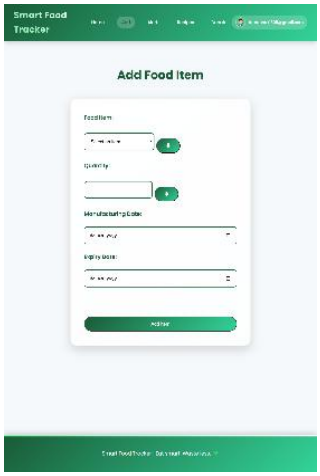
The login interface acts as the gateway to the system. It features a minimalist and clean design with:

- Fields for entering username and password
- A submit button that redirects users upon successful authentication
- A responsive layout, ensuring accessibility across devices

This secure access point ensures that only registered users can track and manage food inventory.

Add Food Page:

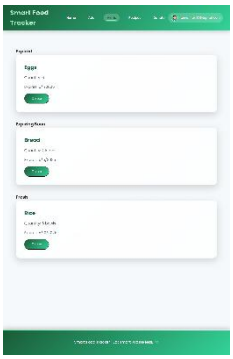
This page enables users to input details about food items they wish to track. It includes:



- Input fields such as Food Name, Quantity, and Expiration Date
- A structured form layout with validation to prevent incomplete entries
- A submit button that saves the data locally or to a database

This functionality forms the core data entry process for the system.

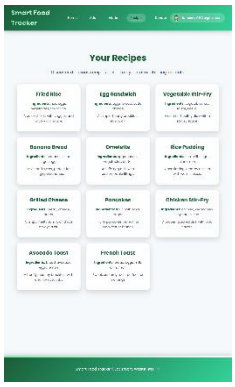
Alerts Page:



The Alerts page notifies users when food items are close to expiring. Key features:

- A table or list-based view showing items with upcoming expiration dates
- Color-coded alerts (e.g., red for urgent, yellow for upcoming)
- Encourages timely consumption or donation to prevent waste

Recipes Page:



This module suggests recipes based on food currently available in the system. Features include:

- A dynamic list of recipes matched to stored items
- Promotes creative reuse of ingredients
- Helps users avoid discarding food by using it innovatively

Donate Page:

This interface facilitates food donation by:

- Allowing users to select food items for donation
- Connecting to local donation centers (optionally)
- Supporting community-based food redistribution

5. Testing and Evaluation

5.1 Functional Testing

We performed manual testing of all modules to ensure proper functionality. Each feature was tested against expected behaviors, including:

- **Login Module**: Tested with valid and invalid credentials.
- **Add Food**: Validated input fields and form submission.
- **Alerts**: Confirmed correct categorization of items as Fresh, Expiring Soon, or Expired.
- **Recipes**: Checked recipe generation based on available items.
- **Donation**: Verified donation form functionality and data handling.

6. Limitations and Future Scope

6.1 Current Limitations

- No user authentication implemented in the deployed version.
- Data is stored locally in the browser unless extended with a backend.
- Donation feature does not integrate with external organizations or NGOs.

6.2 Future Enhancements

- Add login authentication with JWT and session management.
- Integrate barcode scanning and fetch expiry data from product databases.
- Use cloud storage (e.g., Firebase or MongoDB Atlas) for real-time syncing.
- Partner with local NGOs for seamless food donation coordination.
- Add push notifications for expiry alerts.

7. Conclusion

The “Smart Food Waste Tracker” project has been a valuable learning experience in designing and developing a practical web application that addresses a real-world issue — food wastage. Through its user-friendly interface and essential features like expiry alerts, AI-powered recipe suggestions, and a donation system, this project aims to empower individuals to make more conscious and efficient use of their food resources.

From a technical standpoint, the project provided hands-on experience with full-stack development using HTML, CSS, JavaScript, Node.js, Express.js, and MongoDB. It also introduced browser APIs like the Web Speech API and emphasized responsive design practices.

This system not only fulfills academic objectives but also promotes sustainability and community support. With future enhancements, this project holds potential to scale and integrate with external services for greater societal impact.

8. References

1. **Mozilla Developer Network (MDN)** – HTML, CSS, JavaScript documentation
   https://developer.mozilla.org
2. **Web Speech API Documentation** – Voice input integration
   https://developer.mozilla.org/en-US/docs/Web/API/Web_Speech_API
3. **Node.js Official Docs** – Backend environment
   https://nodejs.org/en/docs
4. **Express.js Guide** – Routing and backend server
   https://expressjs.com

5. **MongoDB Documentation** – NoSQL database
   https://www.mongodb.com/docs
6. **OpenFoodFacts API (optional)** – Product and nutritional data
   https://world.openfoodfacts.org/data
7. **W3Schools & GeeksforGeeks** – General coding references and UI design tips
   https://www.w3schools.com
   https://www.geeksforgeeks.org