A

Mini Project Report

on

Food Waste Tracking And Reduction System

Submitted in partial fulfillment of the requirements for the

degree

Second Year Engineering – Computer Science Engineering (Data Science)

by

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CERTIFICATE

This to certify that the Mini Project report on **Food Waste Tracking And Reduction System** has been submitted by Mohit Kadam (24207003), Sakshi salve (24207007), Dhruvraj Wankhede (24207009) who are bonafide students of A. P. Shah Institute of Technology, Thane as a partial fulfillment of the requirement for the degree in **Computer Science Engineering (Data Science)**, during the academic year **2024-2025** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

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ACKNOWLEDGEMENT

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Chapter 1

Introduction:

Food waste is a significant global issue that affects the environment, economy, and food security. Millions of tons of food are discarded every year, contributing to greenhouse gas emissions, deforestation, and resource wastage. A Food Waste Tracking and Reduction System is an innovative solution designed to help individuals, households, and organizations monitor, manage, and reduce food waste effectively. By leveraging technology, such a system provides users with detailed insights into their consumption patterns, expiration tracking, and waste generation habits. These insights empower users to make informed decisions about purchasing, storing, and consuming food more efficiently, ultimately reducing unnecessary waste and promoting sustainability

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1.1 Purpose:

Rapid urbanization and industrialization have led to a surge in waste generation, overwhelming traditional waste management systems. Limited public awareness about proper disposal and recycling contributes to inefficiency, while inadequate infrastructure in some areas worsens the problem. Without proper facilities, waste accumulates, causing sanitation issues and environmental hazards. Addressing these challenges requires public education, improved policies, and better infrastructure for sustainable waste management.

1.2 Problem Statement:

Rapid urbanization and industrialization have significantly increased waste generation, putting immense pressure on traditional waste management systems. Many people lack awareness of proper disposal methods and the importance of recycling, leading to inefficient waste handling. Additionally, inadequate infrastructure in some areas makes waste collection and processing difficult, resulting in environmental pollution and sanitation issues.

1.3 Objectives:

1. **To Track Food Waste**: Allow users to log food waste entries by adding the type of food and quantity wasted (e.g., expired, leftover, spoiled)

2. **To Monitor Food Stock**: Enable users to add and track food items in their stock.

3. **To Generate Reports**: Provides detailed reports on food waste, including Total quantity of food wasted. Generate statistical reports with visualizations (e.g., bar charts, pie charts)

4. **To Raise Awareness**: Help users understand the impact of food waste by o providing insights into their waste patterns.

1.4 Scope:

1. Recycling companies :

o Developing new products and applications for food waste, such as food waste-based packaging or textiles

o Exploring biodegradable alternatives using food waste materials to reduce environmental impact.

2. Food Waste Tracking Apps :

o These apps can help consumers monitor their food waste and make informed decisions about purchasing and consumption.

o Integrating AI-driven recommendations to suggest recipes based on near-expiry ingredients.

3.Food Waste Management Companies :

o These companies can provide innovative solutions and service for food waste collection, processing, and valorization Educational Application.

Chapter 2

Proposed System:

The proposed system integrates recycling, tracking, management, and education to minimize food waste at consumer, industrial, and municipal levels. Recycling companies will collaborate with research institutions to develop sustainable products from food waste, such as biodegradable packaging, textiles, and biofuels, while pilot projects will assess commercial feasibility. AI-powered food waste tracking apps will help consumers monitor their food consumption, provide meal-planning recommendations, and incorporate reward-based incentives for waste reduction. Food waste management companies will implement smart waste collection systems, partner with farms for composting and animal feed production, and utilize anaerobic digestion for renewable energy generation.

Educational applications will raise awareness through interactive platforms, gamification, and collaborations with schools and businesses to promote responsible consumption. By combining these solutions, the system aims to create a sustainable and efficient food waste management ecosystem, reducing environmental impact and promoting resource optimization

2.1 Feature & Functionality:

1. Food Waste Logging:

- Allows users to log food waste by entering details such as food item name, quantity wasted, and reason for waste (e.g., expired, leftover, spoiled).

- Data is stored for future analysis and reporting, helping users understand their waste habits.

- Provides categorization of waste (e.g., dairy, fruits, vegetables, meat) to pinpoint

2. **Food Stock Management :**

- Enables users to add, update, and track food items in their stock, ensuring better inventory control.

- Automatically adjusts stock levels when food is consumed or wasted, minimizing over-purchasing and spoilage.

- Suggests recipes based on available ingredients to promote efficient food utilization.

3. **Database Integration** :

- Stores all data, including waste logs and stock details, in an SQLite database for persistence and scalability.

- Ensures data security and provides easy retrieval for analysis and reporting.

- Supports cloud synchronization, allowing access across multiple devices.

4. **Waste Reports :**

- Generates detailed reports on food waste, including total quantity wasted, most wasted items, and reasons for waste.

- Helps users identify waste patterns and take corrective actions to reduce future waste.

- Allows users to set personal waste reduction goals and track progress over time

5. **Statistical Visualizations:**

- Provides graphical representations such as bar charts and pie charts to analyze food waste trends.

- Offers insights into user behavior, enabling better decision-making for food consumption and purchasing habits.

- Includes interactive dashboards with filters to customize data views.

6. **Smart Notifications & Reminders:**

- Sends alerts for food items nearing expiration to encourage timely consumption.

- Notifies users about high-waste trends and suggests corrective actions to minimize waste.

- Provides shopping reminders based on inventory levels to prevent over-purchasing.

7. **Integration with External Platforms:**

- Allows integration with grocery shopping apps and smart kitchen appliances to optimize food purchase and usage.

- Supports export options for reports and data sharing to encourage community-driven waste reduction initiatives.

- Connects with donation services to redirect surplus food to charities or food banks..

Chapter 3

Project Outcome

Upon the successful completion of the **A Food Waste Tracking and Reduction System** project, the following outcomes are achieved:

1. **User can start the application by clicking get started.**

- The user initiates the application by clicking the "Get Started" button.

- This serves as the entry point into the main functionalities of the application.

2. **User can then add the grocery list or any food item along with its quantity.**

- Once inside, the user can add a grocery list or individual food items along with their corresponding quantities.

- This step helps in tracking food usage and potential waste, forming the basis for future reporting.

3. **User can then select one of the two options to add the items .**

- The user is provided with *two options* for adding items (e.g., manual entry or import from a list).

- Depending on the chosen method, items are added to the internal database or list used for reporting.

4. **User can then generate report by either selecting waste report or statistical report.**

- After adding items, the user can generate reports by selecting one of the following:

- Waste Report: gives details about the amount and type of food wasted.

- Statistical Report: Provides visual insights through charts (e.g., bar graphs or pie charts) to help analyze waste patterns and food management.

Chapter 4

Hardware & Software Requirement:

➢ **Hardware Requirements:**

- **Processor**: Intel Core i3 (minimum) / Core i5 (recommended)

- **RAM**: 4 GB (minimum) / 8 GB (recommended)

- **Hard Disk**: 500 MB (minimum) / 1 GB (recommended)

- **Display**: 1024x768 (minimum) / 1920x1080 (recommended)

- **Network**: Required for remote database access

- **Peripherals**: Standard Keyboard and Mouse

➢ **Software Requirements:**

- **Operating System**: Windows 7/8/10/11, Linux, macOS

- **Python**: Latest version 3.12.2

- **IDE**: NetBeans or Eclipse

- **Database**: MySQL 5.7 or higher

- **JRE**: Java Runtime Environment 8 or higher

- **Database Connectivity**: JDBC driver for MySQL

- **Libraries**: AWT, Swing, JDBC for GUI and database operations

- **Optional**: MySQL Workbench for database management

Chapter 5

Project Design

Project design refers to the structured process of conceptualizing and planning the architecture, modules, and interactions within a system to meet defined objectives and user requirements. It serves as the bridge between the initial analysis phase and the actual implementation, providing a clear and organized roadmap for developers to follow. The design phase takes into account all functional and non-functional requirements and translates them into a comprehensive blueprint that outlines how the system will operate, how users will interact with it, and how different components will communicate. In the context of Commune – Neighbourhood Management System, project design plays a crucial role in visualizing the relationships between residents (users), administrators, and the core system modules. It models key interactions such as complaint submission, event booking, notice management, and payment tracking from both the resident and admin perspectives. This helps in identifying potential bottlenecks early, ensuring that the final product is both efficient and user-friendly. Effective project design also guides future enhancements and scalability by promoting modular development and maintainability.


Fig 5.1: Workflow Diagram

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This flow diagram represents the working process of a Food Waste Tracking and Reduction System. The process begins with a User Action, where the user initiates the activity in the system. The user's first step is to Add a Food Item into the system's database. Once the item is added, the user must Enter the Quantity of the food item. After the quantity is entered, the system allows two pathways based on the condition of the food .If the food is still usable, it will be Added to Stock for future use or consumption. If the food is spoiled, expired, or surplus, it will be Logged as Food Waste Both paths lead to the next step where the system will Generate a report is structured to give meaningful insights on inventory and wastage. If the item was added to stock, a Statistical Report will be produced. This report helps track quantities, usage patterns, and optimize inventory. If the item was logged as food waste, a Food Wastage Report will be generated. This report highlights waste trends and helps identify waste reduction strategies. The flow ensures efficient tracking of food items and minimizes unnecessary wastage. Overall, this system helps in better food resource management and promotes sustainability.

Chapter 6

Project Scheduling

Project scheduling is the process of defining, organizing, and managing the timeline of tasks and activities required to complete a project successfully. It involves identifying key deliverables, estimating the time required for each task, assigning responsibilities, and determining dependencies between activities. A well-structured project schedule helps ensure that the project progresses in a timely, coordinated, and efficient manner. It acts as a roadmap that guides team members through different phases—planning, development, testing, and deployment—while keeping stakeholders informed of progress and deadlines.
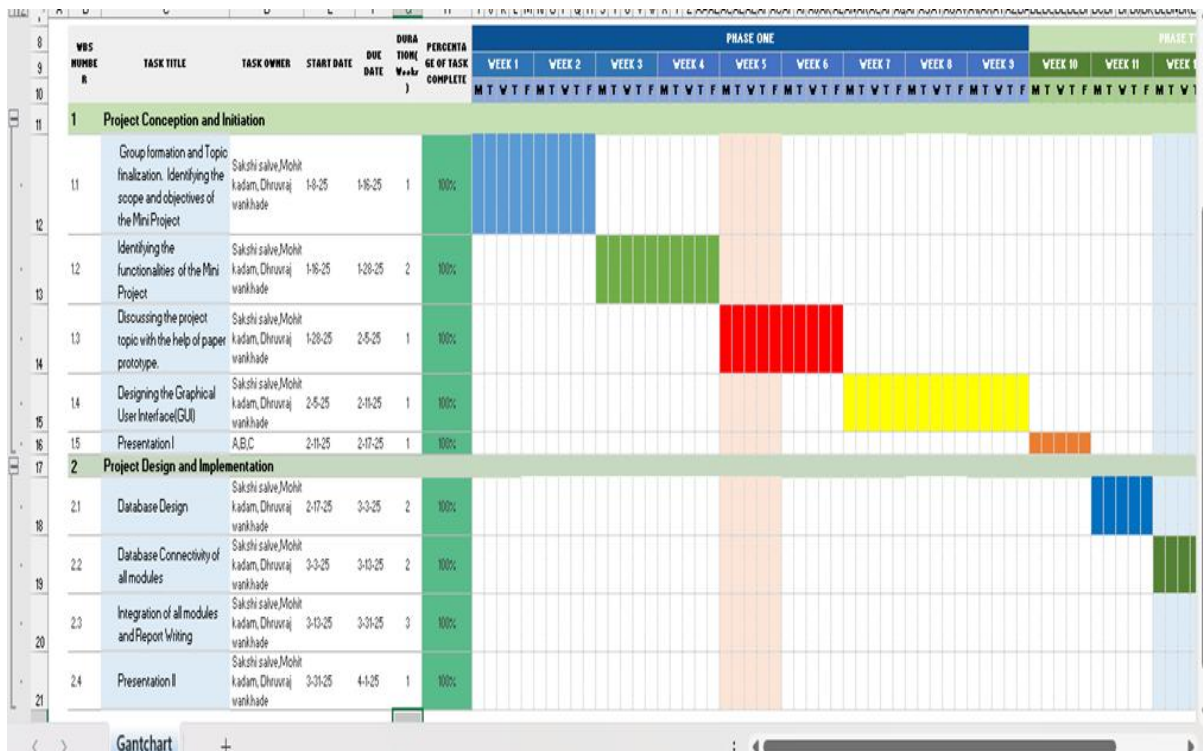
6.1: Gantt chart

Chapter 7

Result:

Screenshot 7.1: Login Screen

Login Screen: The above screenshot is of the Login Screen. The GUI component used here are Labels and Button. The window also consists of an background image. When we click on the button, we are directed towards the main screen of the application The Login Screen is the initial interface presented to the user upon launching the application. It has been designed with a focus on simplicity and visual appeal, providing an intuitive entry point to the main application. The login screen serves as a gateway to the main functionality of the app, and while its current form appears basic, it lays the foundation for further enhancements

Screenshot 7.2: Main interface

Main interface: Once we click the login button, we are directed to the Main Interface of the App. Here it consists of GUI components such as buttons, textfields and labels. In the first textfield, we enter the Food item. Followed by that, we then have to enter the quantity of the item in the quantity field. Finally we have to classify the item as either Lefterover or Expired. If the item is leftover, we add it to the stock and if the item is expired, we add it to the "Log waste". Once we are done logging, we can proceed to either viewing the stock by clicking on the "View Stock" button, or we can also view food waste report normally as well as Statistically.
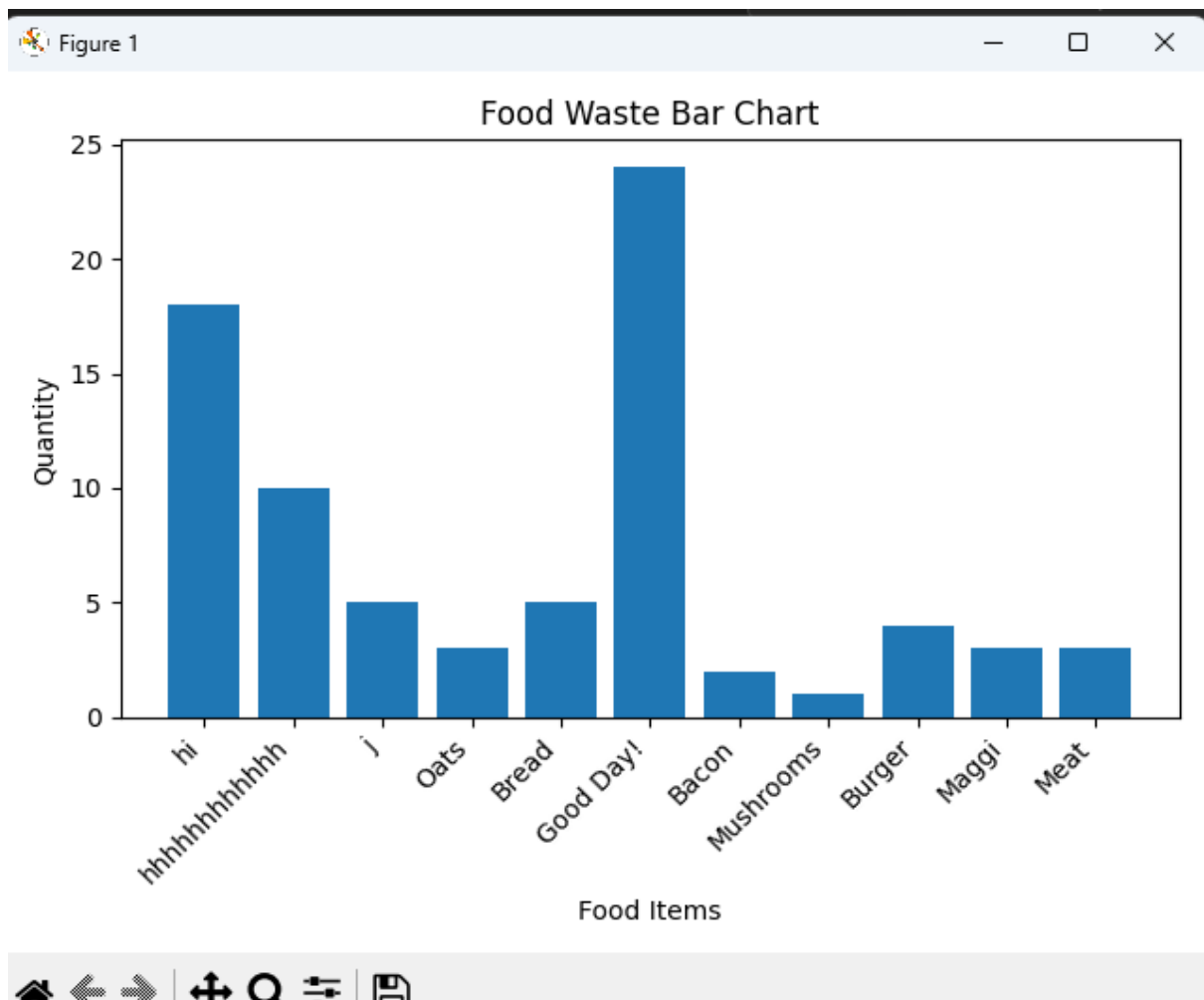
Screenshot 7.3: Food bar chart

The Bar Graph helps users analyze food waste patterns over a given period.It provides a clear comparison between different categories, making it easier to identify areas for improvement or optimization in food consumption and waste management. Food Bar Chart: If we proceed to click on the Generate Waste Report, we can get a statistical view of the report in Bar Graph as well as a pie graph. When we Choose to view in Bar Graph, here is the above statistical view of the report
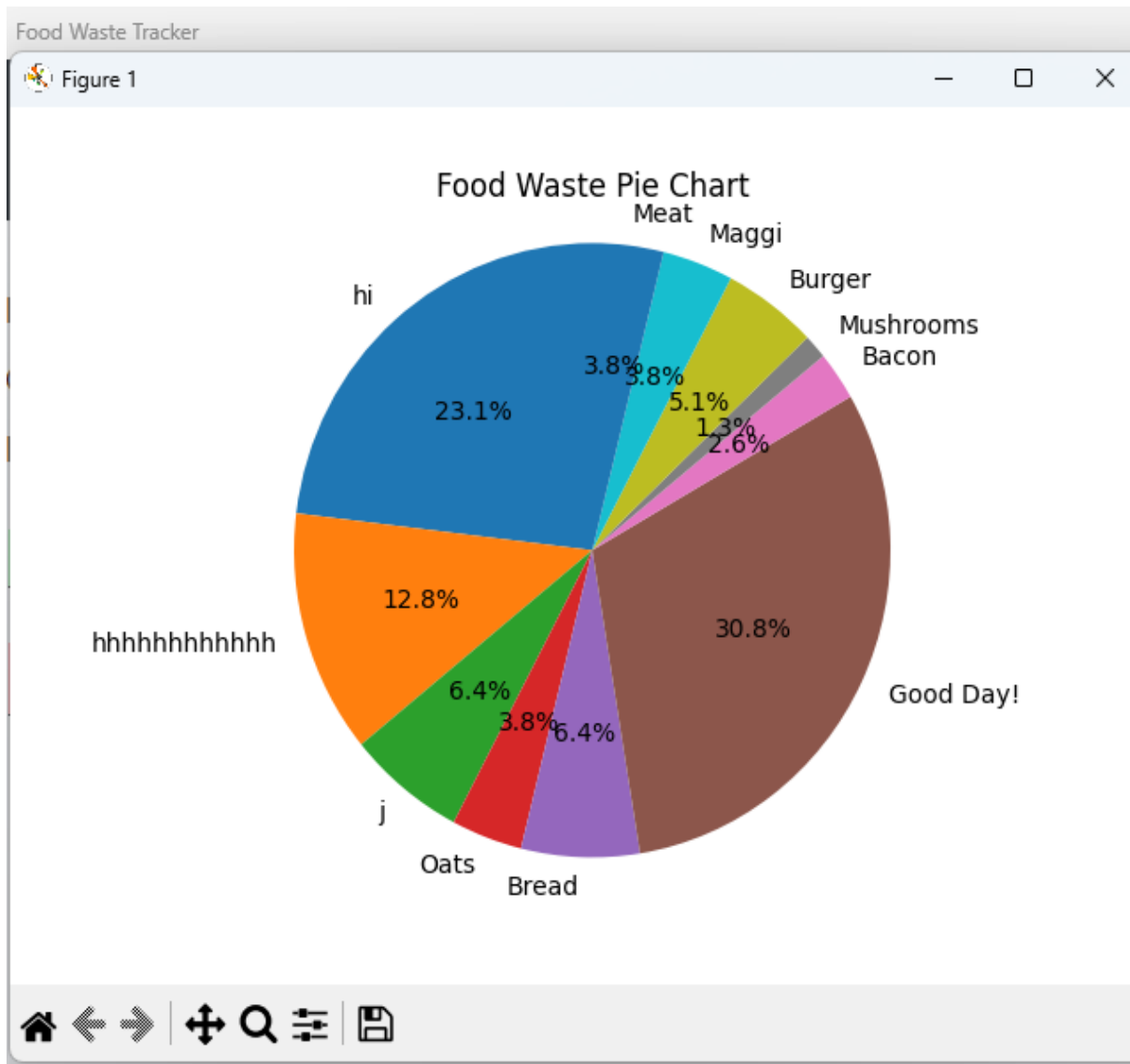
Screenshot 7.4: Food pie chart

When the Pie Chart option is selected, the application presents a circular chart that breaks down food waste data into proportional segments. Each slice of the pie represents a specific category of food (e.g., fruits, vegetables, dairy, meat, etc.), with the size of each slice indicating the percentage or relative share of waste attributed to that category. This visual approach makes it easy to grasp the distribution of food waste across various categories at a glance. Often accompanied by a legend or color-coded labels, the pie chart provides a user-friendly way to analyze the proportion of waste for each item

Chapter 8

Conclusion:

The Food Waste Tracking and Reduction System represents a significant advancement in the effort to combat one of the most pressing global challenges food wastage. By seamlessly integrating technology into everyday food management, this system promotes not only operational efficiency but also responsible and sustainable consumption patterns. It encourages users to track, monitor, and reflect on their food usage, offering clear visibility into consumption habits and waste generation.

Through real-time monitoring and data-driven insights, users gain a deeper understanding of where and why food waste occurs, enabling them to make informed decisions that minimize unnecessary waste. This proactive approach not only supports personal budgeting and efficient resource utilization but also contributes to the broader goal of environmental conservation by reducing the strain on food production and waste management systems.

Moreover, the system helps foster long-term behavioral changes, encouraging individuals and organizations to adopt smarter food planning, portion control, and storage techniques. On a larger scale, widespread adoption of such systems can lead to a meaningful reduction in global food waste, alleviating pressure on supply chains, lowering greenhouse gas emissions, and supporting efforts toward achieving global sustainability targets.

Ultimately, the Food Waste Tracking and Reduction System is more than just a technological solution it is a step toward cultivating a culture of mindfulness, accountability, and sustainability. Its implementation can pave the way for a future where food resources are respected, waste is minimized, and both the environment and society thrive in harmony.

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