

Project Proposal: Sustain-a-Bite - AI-Powered Smart Fridge Companion

Group Name: Sustain-a-Bite

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Project Idea:

Problem Statement:

Food waste is a global issue that contributes to economic loss and environmental harm. Many students and households throw away food due to poor inventory tracking and misinterpreted expiration dates. Sustain-a-Bite aims to reduce food waste using AI-powered expiration prediction and meal planning. (Just to clarify, expiry date is different from best-before date. Actual expiry dates can vary due to food type, storage temperature, and/or conditions. This project will be using multiple inputs like best-before dates, storage location/condition to predict the expiry date of the inventory.)

System Overview:

Sustain-a-Bite will be an AI-driven smart companion that:

- Predicts food expiration dynamically using classification models.
- Send notifications for food nearing expiration.
- Suggest meals based on available ingredients to prevent waste.

AI Techniques used:

- Supervised Learning (Decision Trees/KNN) for food expiration classification.
- Search Algorithms for Meal Planning based on available inventory.

Input/Output Mapping:

- Input: Grocery inventory, best-before dates, storage location/condition (user-input).
- Output: Expiration status, smart meal suggestions, waste prevention alerts.

Tools and Resources:

Programming Languages and AI Frameworks:

- Python: Main development language.
- Scikit-learn: Classification models (Decision Trees/KNN).

Data Handling and Storage:

- Pandas and NumPy: For dataset preprocessing and handling.
- SQLite: To store user food inventory.

Interface Options:

- Flask/Django: if time allows to make a web app.
- Command-Line Interface: For simpler execution without UI.

Dataset Sources:

- Public food expiration dataset: Kaggle, UCI Repository.
- User-Generated dataset: real-world data collection.

Project Plan/Timeline:

■ Milestone 1 – July 2

- Collect and preprocess food expiration datasets.
- Implement baseline classification model (Decision Trees/KNN).
- Evaluation initial accuracy.

■ Milestone 2 – July 30

- Improve model accuracy.
- Implement meal recommendation system using search algorithm.

■ Final Submission – August 11

- Integrate full functionality (expiration predictions + meal suggestions).
- Complete structured documentation and how-to guide.
- Submit final code.

Minimal Viable System:

Core Functionality:

- Users enter food inventory manually.
- AI predicts expiration categories (Fresh, Near Expiry, Expired).
- System provides alerts before food spoils.

Basic Insights:

- Expiration trends for common food items.
- User-specific food waste tracking (e.g., “You waste an average of 5 items/month”).

System Diagram:

