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

**Group Name**: Sustain-a-Bite

**Members**: Atharva Sangani – [aas44@sfu.ca](mailto:aas44@sfu.ca)

**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:**

A diagram of a process

AI-generated content may be incorrect.