AI Nutritionist

Title Page

* **Project Title**: AI Nutritionist
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1. **Abstract**

The AI Nutritionist is an AI-powered application designed to analyze images of food and calculate their calorie content. It provides users with an automated and convenient way to track dietary information. Built using the Streamlit framework and integrated with Google’s Gemini AI, this tool combines image analysis and natural language processing to deliver accurate results.

1. **Objectives**
   1. **Provide an easy way for users to estimate food calories using images.**
   2. **Automate food recognition and calorie calculation for better health tracking.**
   3. **Support custom queries for a personalized nutrition analysis experience.**
2. **Features**

* **Image Upload: Allows users to upload images of food.**
* **Calorie Calculation: Provides calorie counts for individual food items and totals.**
* **Customizable Prompts: Supports user-defined inputs for tailored responses.**
* **Model Exploration: Displays available Gemini AI models and their details.**

1. **Technology Stack**
   1. **Frontend: Streamlit for interactive UI development.**
   2. **Backend:**
      * **Google’s Gemini AI API for image and text analysis.**
      * **Python libraries: dotenv, os, PIL.**
   3. **Environment Management: .env file to securely store API keys.**
   4. **Programming Language: Python 3.8+**
2. **System Requirements**

* **Python 3.8 or higher**
* **A stable internet connection for API calls**
* **A device capable of running a web browser**

1. **Project Workflow**
   1. **Image Upload: Users upload an image of food through the application.**
   2. **Image Processing: The image is analyzed by Google’s Gemini AI API.**
   3. **Calorie Calculation: The tool identifies food items and calculates their calorie counts.**
   4. **Results Display: The calorie breakdown and total are displayed in the app interface.**
2. **How to Use**

Step 1: Installation

* **Clone the repository:**

git clone = https://github.com/931deepak/ai-nutritionist cd ai-nutritionistInstall

* **dependencies:**

pip install -r requirements.txt

* **Add the Google API key to a .env file:**

GOOGLE\_API\_KEY= “AIzaSyDxWQ7Hf\_nW2yNeT2h8AStAhaL4jUNfEks”

Step 2: Run the App

* + **Command:**

python -m streamlit run app.py Step 3: Analyze an Image

* + **Upload a food image in .jpg, .jpeg, or .png format.**
  + **Click the Tell me the total calories button to generate results.**

1. **Results and Outputs Example Output:**
   1. **Input Image:**



AI Analysis Result:

It's impossible to calculate the exact calorie count without knowing the weight/volume of each food item. However, I can provide an estimated calorie range and individual calorie information based on common serving sizes.

Estimated Calorie Breakdown (based on assumed serving sizes):

1. **Salmon (4oz cooked): ~200 calories**
2. **Avocado (1 medium): ~322 calories (two avocados pictured, so ~644 calories total)**
3. **Eggs (Large, 2): ~140 calories (three pictured, so ~210 calories total if all three are considered)**
4. **Dark Chocolate (1.5 oz - about 2 squares of what's pictured): ~230 calories**
5. **Pistachios (1/4 cup): ~170 calories**
6. **Apples (2 medium): ~190 calories**
7. **Bok Choy (1 cup cooked): ~20 calories (several bunches are pictured so likely more calories than this if all are consumed)**
8. **Broccoli (1 cup chopped): ~30 calories**
9. **Red Cabbage (1 cup shredded): ~22 calories**
10. **Brown Rice (1/2 cup cooked): ~110 calories (there appear to be 1/2 cup portions of two types of rice, long and short grain, so possibly ~220 calories total for rice)**
11. **Chia Seeds (1 tbsp): ~60 calories**
12. **Sauerkraut (1/2 cup): ~12 calories**
13. **Kimchi (1/2 cup): ~23 calories**

Estimated Total Calories: ~1940-2300 calories (this is a VERY rough estimate. It will significantly change depending on the quantity consumed of each item.)

Important Considerations:

* + **Serving Sizes: The calorie counts are estimations based on typical serving sizes. The actual calorie content will vary based on the amount consumed.**
  + **Preparation Methods: The way food is prepared (e.g., fried, baked, boiled) also affects its caloric content. This estimation assumes basic preparations.**
  + **Variability: Natural variations in the size and composition of foods can affect their calorie content.**
  + **Missing Information: To provide a more accurate assessment, I would need specific weights or volumes for each food item.**

It's always best to weigh or measure food for accurate calorie tracking, especially if you are on a specific diet or trying to manage your weight. Use a food scale or measuring cups and spoons, and refer to a reliable nutrition database (like the USDA FoodData Central) for precise information.

1. **Input Image:**



AI Analysis Result:

It's impossible to accurately calculate the calorie content of the meal shown in the image without knowing the exact weights/volumes of each food item. However, I can provide a general estimate and a breakdown by food group, along with typical calorie ranges.

Estimated Calorie Breakdown (ranges are per typical serving size unless specified):

* 1. **Whole Wheat Bread (2 slices): 140-200 calories (70-100 calories per slice)**
  2. **Multigrain Roll: 150-250 calories (depending on size)**
  3. **Olive Oil (1 tablespoon assumed): 120 calories**
  4. **Almonds (small handful, ~1/4 cup): 180-200 calories**
  5. **Pumpkin Seeds (1 tablespoon assumed): 50-70 calories**
  6. **Mixed Grains (Quinoa, Millet, Flax, etc. - 1/2 cup total assumed): 150-250 calories (varies depending on mix)**
  7. **Cheese Cubes (1 ounce assumed): 100-120 calories (depending on type)**
  8. **Banana (medium): 105 calories**
  9. **Orange (medium): 60-80 calories**
  10. **Grapefruit (half): 40-50 calories**
  11. **Kiwi (2 medium): 90-100 calories (45-50 per kiwi)**
  12. **Strawberries (1 cup): 50 calories**
  13. **Raspberries (1/2 cup): 30 calories**
  14. **Tomato (medium): 20-30 calories**
  15. **Bell Pepper (medium): 25-35 calories**
  16. **Cucumber (1/2 cup): 8 calories**
  17. **Onion (1/4 cup): 15 calories**
  18. **Carrots (1/2 cup sliced): 25 calories**
  19. **Peach (medium): 60 calories**
  20. **Ginger (1 inch piece): 10-15 calories**
  21. **Spinach (1 cup): 7 calories**

Estimated Total Calories: This meal likely falls somewhere in the 1200-1600 calorie range. This is a very rough estimate.

Important Considerations:

* + - **Portion Sizes: The image doesn't give accurate portion sizes, making precise calculation impossible. My estimates are based on common serving sizes.**
    - **Variability: Calorie content in fruits, vegetables, and even grains can vary based on variety, ripeness, and growing conditions.**
    - **Water: Water contains 0 calories.**

To get a more accurate picture of your own meals, use a kitchen scale or measuring cups and spoons to determine portion sizes, then consult a reliable calorie database (like the USDA Food Composition Databases) for specific food items. A registered dietitian can help personalize your dietary needs and calorie goals.

1. **Limitations**
   1. **The accuracy of the analysis depends on the quality of the uploaded image.**
   2. **Currently limited to calorie estimation; detailed nutrient breakdown (protein, fat, carbohydrates) is not available.**
   3. **Requires an active internet connection for API communication.**
2. **Future Scope**
   1. **Add support for recognizing regional and complex dishes.**
   2. **Enhance nutritional analysis with macronutrient details (e.g., protein, fat, carbs).**
   3. **Allow users to upload multiple images for comprehensive meal tracking.**
   4. **Develop offline capabilities using local models.**
3. **References:**
   1. Generate Google API Key**: https://ai.google.dev/gemini-api/docs/api-key**
   2. **Streamlit Documentation: https://docs.streamlit.io**
   3. **Python Pillow (PIL): https://pillow.readthedocs.io**