

HEALTHY RECIPE SUGGESTION CHATBOT

Presented By-

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Introduction

- Aims to provide recipe recommendations tailored to an individual's health conditions and dietary preferences using AI.
- By combining NLP, machine learning, and nutrition science, it generates medically safe and personalized food suggestions.
- The chatbot ensures health compliance, especially for users suffering from lifestyle diseases like diabetes, hypertension, or obesity.

Problem Statement

- Publicly available datasets are either outdated or insufficient to support disease-based nutritional filtering at a practical scale
- Existing systems lack awareness of disease-specific constraints, making them unsuitable for clinical or dietary guidance.
- There's a strong demand for an intelligent system that ensures health-safe, diverse, and context-aware recipe suggestions.
- Our project automates recipe suggestions using: Disease-aware filtering and ingredient based filtering

Objectives



- Suggest recipes that are safe for users with diseases like diabetes, hypertension, or obesity.
- Filter out harmful ingredients and ensure recipes meet disease-specific nutrient limits.
- Ensure fallback recipe suggestions when strict filtering yields few results.
- Enable a smooth, intuitive user interaction via a chatbot interface.

Related Works

- **Recipe Suggestion System (RSS):** Suggested meals using health data and ingredient availability, but lacked conversational interaction.
- **RecipelS:** Used ResNet-50 for image-based ingredient recognition and Edamam API for recipe suggestions. Limited to static input and no dialogue handling.
- **Facebook AI Research (Roller et al.):** Developed open-domain chatbots with large transformer models trained for empathy, personality, and engagement, but not focused on food or health domains.

Research Gaps

- Most existing systems like **RSS** and **RecipelS** rely on static input methods (text or image) without engaging the user in an interactive conversation. They do not adapt dynamically to evolving user needs during a dialogue.
- Previous recipe systems lack **disease-specific** safety features, making them unsuitable for users with medical conditions like diabetes or hypertension. Nutritional constraints are often missing or too generic.
- Many systems fail to support detailed **nutrient-based filtering** (e.g., max sodium, low sugar), which is essential for medically safe recommendations. APIs like Edamam offer limited nutritional filtering compared to Spoonacular.

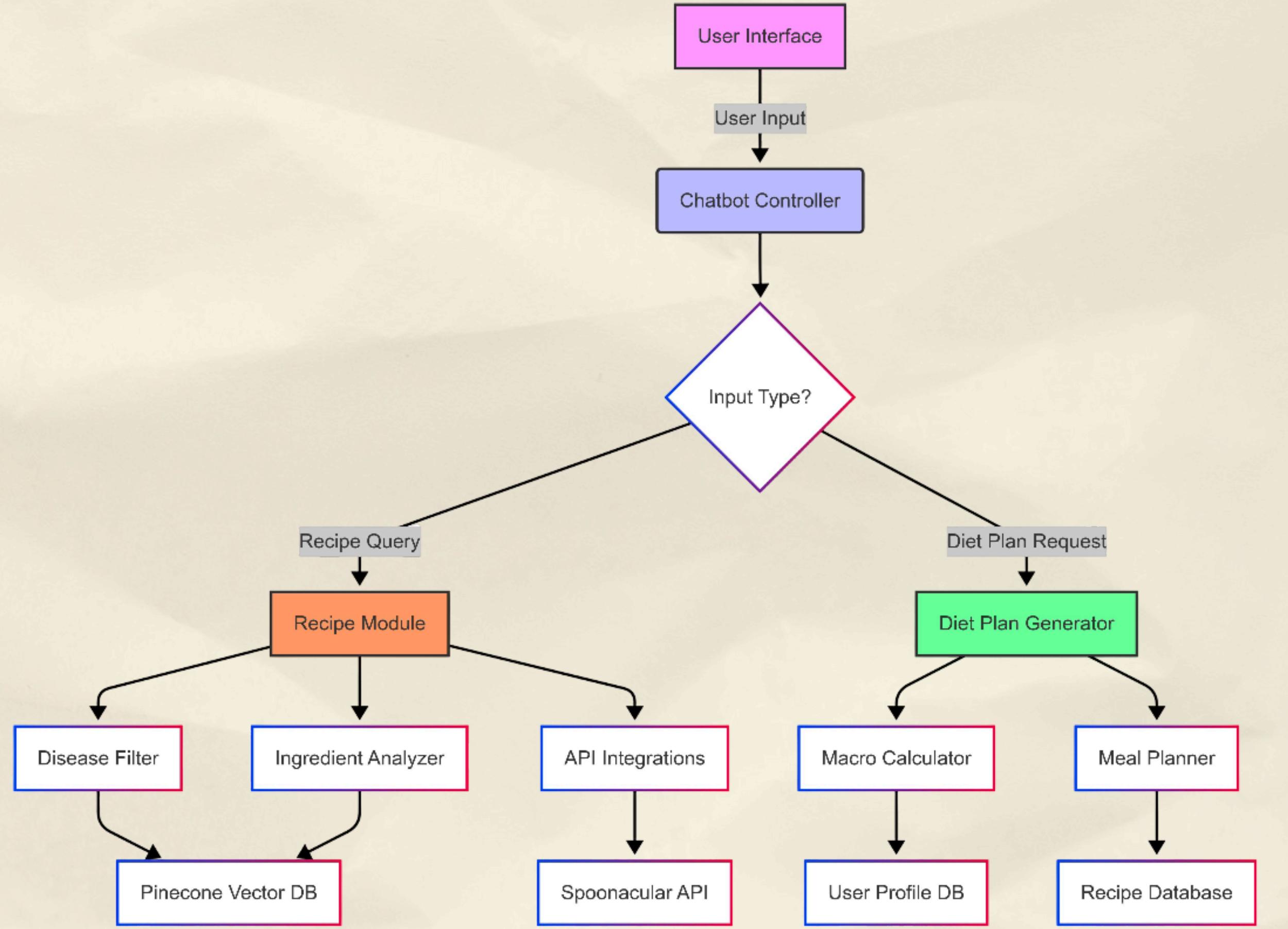
Dataset Overview

- We initially explored Kaggle datasets like Indian Food Dataset, Diet Recommendation Dataset, and Healthy Meal Plan Dataset.
- These datasets lacked nutritional granularity and didn't support disease-specific filtering, limiting their applicability.
- Due to these constraints, we transitioned to using the Spoonacular API, which provides rich, up-to-date, and filterable recipe data.
- For diet-planner, we used kaggle datasets. Cleaned with Pandas, encoded using LabelEncoder and standardized units (mg, g), removed invalid categories.

Models Used

- **Sentence Transformer (all-MiniLM-L6-v2)**: Text embedding for semantic disease/ingredient matching. Converts user queries (e.g., "heart issue") into vectors to match with medical terms (e.g., "hypertension").
- **Gemini AI (Gemini 1.0 Flash)**: Natural Language Processing (NLP) for intent extraction. Extracts diseases and ingredients from unstructured text (e.g., "I can't eat sugar due to diabetes"). Generates user-friendly responses and recipe summaries.
- **Random Forest Regressor**: Predicts daily calorie/macronutrient needs. Trained on user profiles (age, weight, activity level) to estimate personalized nutrition goals. Adapts outputs for diseases (e.g., lower carb limits for diabetes).
- **RapidFuzz (Fuzzy Matching)**: Approximate string matching. Corrects misspelled diseases (e.g., "diabetis" → "diabetes"). Maps layman's terms to medical jargon (e.g., "high BP" → "hypertension").
- **Pinecone (Vector Database)**: Stores/user health profiles and chat histories as embeddings. Enables fast similarity search for past interactions. Isolates user data via namespaces for privacy.

Workflow



Results

Healthy Recipe Chatbot

Welcome, manisha@! [Logout](#)

i have semolina, carrot,onion,tomato,pepper in my kitchen. what should i cook? I have diabetes.

Okay, great! I've got your ingredients and health info. Don't worry, I've made sure to filter out anything that might not be suitable for you, so let's find some delicious and healthy recipes you can enjoy!

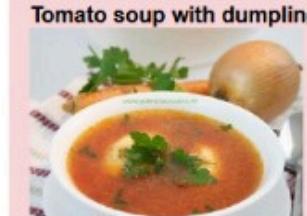
Peppers, Carrot, and Tomato Upma (Savory Semolina Porridge)



Number of missed ingredients: 2
Number of used ingredients: 5

[Get Details](#)

Tomato soup with dumplings



Number of missed ingredients: 5
Number of used ingredients: 4

[Get Details](#)

Enter ingredients...

Fig: Disease filtered recipes

Healthy Recipe Chatbot

Welcome, manisha@! [Logout](#)

These are some recipe suggestions according to your health conditions:

How to Make the Cheesiest Bowtie Mac and Cheese



[Get Details](#)

Enter ingredients...

Fig: Suggested recipes

Results contd.. Demo

Recipe - Presentation Const variable reassignment fix Contact Us - Logica Infoway Ltd how to screen record in windows Healthy Recipe Chatbot

127.0.0.1:5000

Gmail YouTube Maps Google Meet Industries | My Inter... Superset : Universit... unsolved tech prob... Mock Interview E 250+ TOP MCQs on... Data Structure MCQ... Unix MCQ Question...

New Chat

Get Diet Plan

Your Chats

- Chat 10
- Poha? R...
- Diet Plan
- Chat 7
- Diabetic ...
- Masala K...
- Chat 9

Healthy Recipe Chatbot

Welcome, manisha@! [Logout](#)

Tomato soup with dumplings



Number of missed ingredients: 5
Number of used ingredients: 4

[Get Details](#)

These are some recipe suggestions according to your health conditions:

Enter ingredients:

Diet Chart

Inputs:

Age: 23, Gender: Male, Height: 178, Weight: 86, Activity level: Very active, Disease: no, Dietary Preference: vegan

	Sun	Mon	Tues	Wed	Thurs	Fri	Sat
Breakfast	Red Hot Craneberry Applesauce	Banana breakfast shake	Banana smoothie	Storm smoothie	Raw food almond based berry smoothie	Cinnamon apple crisps	Spicy watermelon
Lunch	Roast Butternut squash with matle syrup and ginger	Sesame roasted asparagus	Creamy linguine with shrimp and veggies	Veggie casserole	Bruschetta with tomatoes and basil	Southwest stove top scalloped potato	Zesty caesar mix
Snacks	Orange pineapple banana smoothie	Strawberry orange julius smoothie	Layered cashew with mushroom nut roast	crunchy apple salad	fruit smoothie	Em and mommies need it fast smoothie	Alcohol free pina colada smoothie
Dinner	Easy italian edamame	Celery salad	Linguini with prosciupto and asparagus	Cheesy zucchini patties	Tortilla corn soup	Greek salad	Herb and veggie yoghurt dip

Daily macronutrients needed:

Calories- 2175 kcal, Protein- 163g, Carbohydrate- 218g

Comparative Study: Dataset Vs API

DATASET

- ★ contains limited recipes with minimal diversity across cuisines, diets, and ingredient combinations.
- ★ typically lack a full nutrient profile per recipe
- ★ static and outdated, requiring manual preprocessing to keep them relevant.

SPOONACULAR API

- ★ offers 360,000+ recipes with extensive variety across global cuisines and dietary categories like vegan, keto, low-carb, etc.
- ★ provides over 30+ nutrient values per recipe, enabling precise disease-specific filtering
- ★ delivers fresh, real-time results that reflect new recipes and ingredient combinations daily.

Future Work & Conclusion

- Reinforcement learning for personalized suggestions.
 - **Multimodal input:** images and voice.
 - **IoT integration:** smart nutrition scales and health devices.
 - Support for regional languages, seasonal menus, local cuisine.
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- Chatbot simplifies healthy eating using AI.
 - Combines medical, nutritional, and conversational intelligence.
 - Modular design enables continuous improvements.
 - Transforms food search into smart, personalized meal planning.

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THANK YOU

