🧩 Problem Statement

❓ What Problem Does the Application Solve?

The modern home cook often seeks inspiration from existing recipes but lacks effective tools for:

- **Modifying, versioning,** or **personalizing** recipes,
- **Understanding recipe changes** made by others,
- **Searching semantically** for variations that fit dietary or taste preferences.

There is no existing platform that combines collaborative recipe editing (like GitHub for code) with intelligent assistance for personalizing and understanding recipes.

🔧 Main Functionality

The application is a **Git-like collaborative recipe platform**, enabling users to:

- **Create, fork, and branch recipes**, enabling experimentation without losing original versions,
- **Track version history and view diffs** between recipe iterations (e.g., ingredient or instruction changes),
- **Search semantically** using natural language queries, thanks to GenAI integration,
- **Collaborate or share recipe variants**, similar to open-source contributions.

🎯 Intended Users

- **Home cooks and food enthusiasts** looking to customize or improve recipes,
- **Food bloggers and creators** who want to showcase their variations,
- **Diet-conscious users** searching for recipes matching their needs (e.g., vegan, gluten-free),
- **Beginner cooks** needing recipe alternatives.

🤖 How GenAI Will Be Integrated

We will build a modular, containerized **LangChain-based microservice** that:

- Uses **cloud-based (OpenAI)** and **local LLMs (e.g., GPT4All)** to process recipe content,
- Provides **semantic recipe search** via **Weaviate vector store** for **Retrieval-Augmented Generation (RAG)**,

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📌 Example Scenarios

🔍 Scenario 1: Semantic Search

User Query: “Easy high-protein breakfast without eggs.”
🔁 **AI Response**: Retrieves and ranks semantically relevant recipes like tofu scrambles, protein smoothies, or chickpea pancakes.

🛠️ Scenario 2: Forking and Personalizing Recipes

User Action: Bob forks a lasagna recipe and modifies it to be gluten-free.
🔄 **System**: Tracks changes, tags it as a gluten-free variation, and makes it discoverable for others with similar preferences.

📂 Scenario 3: Branching for Meal Prep

User Action: Sarah creates a new branch of her curry recipe for a weekly meal prep version.
🔄 **System**: Saves the branch with modified serving sizes and prep instructions, keeping it separate from the original.

🔁 Scenario 4: Version History Navigation

User Action: Tom reviews the past versions of his chocolate cake recipe.
🔄 **System**: Displays a timeline of changes with commit messages like “reduced sugar” or “added almond extract.”

⭐ Scenario 5: Bookmarking Favorites

User Action: Nina bookmarks her favorite pasta recipe variants from different users.
🔄 **System**: Saves them in a personal collection accessible from her dashboard.

🏷️ Scenario 6: Tagging and Categorization

User Action: Leo tags his new stew recipe as “winter,” “hearty,” and “vegan.”
🔄 **System**: Adds tags to help users filter and discover relevant recipes.