# **Requirements**

The core requirements of the app include A.I. meal planning that respects user-defined restrictions such as macronutrient targets, allergies, dietary preferences, and budget constraints. Users should be able to input their desired budget range, which the app will respect while planning meals. The application must be capable of generating a grocery list based on selected meals, including quantities and estimated pricing. Seamless integration with popular grocery delivery platforms such as Instacart and DoorDash is essential to streamline the user experience from meal selection to ingredient acquisition. Additionally, the app must include a calorie tracking feature that automatically logs meals and allows manual entry for other food consumption.

# **Differentiation**

This app stands out by providing AI-driven, personalized meal planning that adapts not only to nutrition goals but also to financial constraints. It simplifies the process of tracking calories and macronutrients, while ensuring meals stay within budget. Unlike many existing apps, this one provides flexibility, allowing users to easily swap meals and receive intelligent alternatives without compromising nutritional value.

# **Nice to Have**

An aspirational feature is the ability to generate recipes based on short videos or images sourced from social media platforms like TikTok or Instagram. This would allow users to recreate visually appealing meals seen online in a healthier and more budget-friendly way.

# **Elevator Pitch**

Eating healthy and tracking calories can feel overwhelming—especially for busy college students. Scrolling through social media, you see appealing low-calorie meals but rarely end up making them, either due to complicated recipes or budget constraints. Our solution? An intuitive app that generates personalized recipes tailored specifically to your nutritional goals, dietary macros, and budget. By removing the stress of meal planning, ingredient sourcing, and budgeting, our app empowers you to spend less time worrying and more time enjoying the activities you love. Whether you're a college student or anyone striving for better nutrition, this app simplifies healthy eating, saving you money, time, and effort—making weight loss achievable and sustainable.

# **General Breakdown of App**

This app is designed to make cooking healthy and nutritious meals easy. At the heart of the app is a smart AI system that tailors recipes to user-defined restrictions like dietary needs, macronutrient targets, budget, and allergies. If a user doesn’t like a suggested meal, they can easily request alternatives.

The app automatically creates a grocery list for selected meals, simplifying the planning process. Items can be edited or removed based on what the user already has.

For convenience, we will integrate DoorDash via its public API. Instacart may require manual cooperation or a workaround such as generating pre-filled shopping links.

Calorie tracking is built-in. Meals from the app are automatically logged, and users can add custom food entries. Tracking is meant to create awareness, not restriction.

# **Architecture, APIs, and Security**

The frontend of the application will be built using React.js and hosted on Vercel to enable scalable and responsive web performance. The backend will use Python 3.11, connected to Supabase for both database management and authentication. Authentication will be handled via Supabase Auth using email and password credentials, ensuring secure and straightforward access for users.

The database schema will include tables for users, meals, grocery lists, calorie and macronutrient trackers, and user-defined restrictions such as budgets, allergies, and meal preferences.

A.I.-driven meal planning will be implemented in one of two ways. The first option is to train a custom large language model (LLM) from scratch using web-scraped recipe data. This offers greater control over output but requires significant computational resources. The alternative is to fine-tune an existing model such as LLaMA or GPT on a curated dataset. This method is more efficient, though it may require further tuning to ensure quality results. In cases where model hosting is not viable, the app can fallback to external APIs such as OpenAI's for recipe generation. The nutritional and ingredient data will be fetched from the Edamam API.

To ensure data security, row-level security (RLS) in Supabase will be employed to isolate user data. Input validation will be enforced across forms, particularly for custom calorie entries and budget limits. API keys will be stored securely on the server or in Supabase edge functions to prevent exposure on the client side.

The budgeting tool will consist of a slider or numeric input field that users can set. This value will act as a filtering constraint for the AI during recipe generation. Price data will be pulled primarily from the Edamam API, with RapidAPI serving as a backup source if necessary.

The grocery list feature will automatically aggregate ingredients across selected meals. It will provide quantity estimates and price breakdowns for each item. Users will be able to remove or mark ingredients they already possess, and the list will be structured to improve usability.

DoorDash integration will leverage its available API to enable direct ordering from within the app. For Instacart, if API access is unavailable, an alternative workflow using generated shopping links will be pursued. This approach ensures a functional experience even if full API integration is not possible.

Calorie tracking will be tightly integrated with the meal planning feature. Meals suggested by the app will be auto-logged, and users will be able to add custom foods by specifying names, weights, and other details. This feature will give users insight into their nutrition without adding friction to their routines.

# **Backup Plans**

If the AI model generates low-quality or repetitive recipes, the app will fallback to a static, curated recipe database. These recipes will be tagged for filtering and rotation. If API access to Instacart is restricted, a shopping list export feature or link-based cart builder will provide an alternative means for users to shop online. In the event that the Edamam API rate limits or becomes unavailable, cached nutritional data or a switch to another food database will maintain functionality. If the AI recipe generation service fails entirely, the app will notify the user and provide a static set of recommended meals for the day.

This architecture is designed to be secure, scalable, and user-friendly, while offering intelligent, budget-aware nutrition support tailored for real-world use.

**Process Diagram**

The app will work according to the process diagram below. All of the connection edges are two way, so you can travel back from the page you are currently on. The four pages that are connected to the homepage and the homepage itself will appear as tabs at the bottom of the devices screen to allow for seamless maneuvering around the app.

