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## Weekly Meal Planner: A Web-Based User Preference-Driven Menu Planning System

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**Abstract:** The Weekly Meal Planner: A Web-Based User Preference-Driven Menu Planning System addresses the common problem of meal planning being repetitive, time-consuming, and often inefficient for individuals managing busy schedules. Many users struggle to decide meals daily, leading to wasted time and lack of variety. To overcome this, the proposed solution is a simple yet effective web-based meal planner that automates the meal planning process based on user preferences. The system is developed using a user-input-based framework, where users can enter their meal preferences and customize plans according to their needs. The core methodology relies on a JavaScript-based randomization technique that generates weekly meal plans dynamically, providing varied meal plans whenever sufficient meal preferences are available. Key features of the system include the ability to edit meal plans easily, keyword-based allergy filtering, shuffle meals for quick alternatives, and store preferences using local storage, enabling users to access their saved schedules across browser sessions and allowing data persistence without requiring complex databases. The result is a lightweight, user-friendly, and interactive web application that simplifies meal planning while offering flexibility and convenience. Overall, this system demonstrates how a user-centered design combined with basic web technologies can effectively solve everyday problems, making meal planning faster, more convenient, and more engaging for users.

**Index Terms:** meal planning, web application, user preferences, local storage

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### I. Introduction

Meal planning is an essential part of daily life, yet for many individuals and families it remains a challenging and time-consuming task. In modern lifestyles, where people are often occupied with work, studies, and other responsibilities, deciding what to cook or eat on a daily or weekly basis becomes repetitive and mentally exhausting. Individuals frequently struggle to maintain variety in their meals and align food choices with their personal preferences, which often leads to last-minute decisions, unhealthy eating habits, increased food wastage, and inefficient grocery shopping. For households, this challenge grows further as planners must account for the tastes, dietary restrictions, and schedules of multiple members. Notably, meal planning itself has been shown to be positively associated with dietary variety and quality [1], underscoring its value despite the difficulty many users face in sustaining it consistently. As a result, there is a clear need for a simple and efficient system that can help users organize their meals without adding further complexity to their routine. Existing meal planning systems attempt to address this problem, but they often fall short in terms of usability and accessibility. Many currently available applications are heavily focused on diet control, calorie tracking, or fitness-oriented goals. For instance, recent work has proposed large language model-based systems for generating personalized meal plans aligned with nutritional adherence [2], while others use linear optimization solvers such as Gurobi to construct nutritionally optimal meals [12]. Nutrient-based recommended systems combining collaborative filtering with dietary constraints have also been explored [10]. While effective for specialized use cases, such approaches typically require detailed



nutritional databases, model training, or computationally expensive optimization — demands that can overwhelm general users who simply want a convenient way to plan their weekly meals. These systems often require extensive data input, such as nutritional values or strict dietary preferences, which can discourage casual users, and some involve complicated interfaces or subscriptions, making them impractical for everyday household use. Consequently, a clear gap exists between the needs of ordinary users and the functionality offered by existing solutions. To bridge this gap, this paper introduces a Weekly Meal Planner, a user-driven, web-based menu planning system. Its primary aim is to simplify meal planning by prioritizing ease of use, flexibility, and user control over complex dietary analysis. The system allows users to create, modify, and organize weekly meal plans through a straightforward, interactive web interface, accessible via any modern browser without installation. It is menu-based, allowing users to input preferred dishes and generate weekly meal schedules through randomized selection with minimal effort. Unlike many existing tools, it emphasizes simplicity and convenience, making it well suited for students, working professionals, and families seeking a lightweight planning solution. A central feature of the system is its user-driven design, where meal plans are generated directly from user-provided preferences. Capabilities such as meal editing, meal shuffling, keyword-based allergy filtering, and locally stored data allow users to experiment with different combinations while retaining prior choices. This design not only saves time but also improves engagement by keeping the planning process interactive and preference-driven. The lightweight, client-side architecture further ensures the application remains easy to maintain while providing the core functionality needed for effective weekly meal planning. The scope of this project is centered on household use, where simplicity and practicality matter most. The system supports users in planning regular meals rather than offering specialized diet or medical guidance, making it particularly useful for families aiming to organize weekly menus, reduce decision fatigue, and streamline grocery preparation. A key limitation is the absence of advanced nutritional analysis or automated diet recommendations. Even so, by prioritizing user convenience and minimizing unnecessary complexity, the Weekly Meal Planner offers a practical, accessible alternative to conventional systems, making every day meal planning more manageable and user-friendly.

## **II. Literature Review**

Meal planning has been widely studied in the fields of nutrition, health informatics, and web-based systems. Meal planning has gained increasing importance in recent years due to changes in lifestyle, dietary awareness, and technological advancement. This section reviews existing literature related to meal planning challenges, current digital solutions, system design approaches, and technological frameworks relevant to the development of a Weekly Meal Planner. Meal planning is often neglected due to time constraints and decision fatigue. Ducrot et al.[1] found that individuals who engage in meal planning tend to have better diet quality and food variety, but many people fail to plan meals due to lack of time and effort. Similarly, Khamesian et al.[2] highlighted that individuals struggle with meal planning because of nutritional complexity, time constraints, and lack of dietary knowledge, making manual planning inefficient. In another study, Cox [3] emphasized that poor meal planning leads to unorganized grocery shopping and unhealthy eating patterns, reinforcing the need for structured planning tools. Existing meal planning systems are often complex and diet-focused. Aberg [4] evaluated early meal planning systems and found that usability and ease of use are critical factors, as complex interfaces reduce user adoption. Moreover, Han et al. [5] observed that many nutrition applications require manual data entry, which is time-consuming and discouraging for users. Amiri et al. [6] proposed CFRL, a reinforcement-learning-based system combined with collaborative filtering to generate adaptive, personalized meal plans, illustrating the level of algorithmic sophistication such AI-driven systems can reach compared to simpler, rule-based planners. Users are often required to input detailed nutritional information, which can be time-consuming and discouraging. Web-based



systems have emerged as effective tools for meal planning. Samonte et al. [7] developed a web-based meal planner integrated with telemedicine, demonstrating how web platforms can support user preference-based meal planning. Similarly, Baldovino and Ferrer [8] introduced MotivEat, a web-based meal planning system that enhances user interaction through personalization and ingredient-based recommendations. Another system by Jayasudhan et al. [9] proposed a web-based nutrition management system that generates meal plans based on user requirements, validating the effectiveness of web technologies. User preferences play an important role in modern meal planning systems. Yang et al. [10] developed a recommendation system that considers user preferences, dietary restrictions, and food habits, improving user satisfaction. Steen et al. [11] demonstrated that personalized web-based interventions improve dietary outcomes, highlighting the importance of user input in system design. These studies support the use of input fields such as meal preferences, allergies, and repetition preferences. Prajapati et al.

[12] used optimization techniques for meal planning but noted that such approaches require complex data and computation. In contrast, user-driven systems often use random selection logic to generate weekly menus efficiently without heavy computation. This supports the idea of using JavaScript-based randomization in simple planners. Meal planning systems commonly adopt a structured format. Divyadharshini et al. [13] proposed a web-based meal planner that organizes meals across days and integrates planning with household management. Meal planning systems typically follow a structured workflow. Jayasudhan et al. [9] described a structured web-based nutrition management workflow involving user input, meal generation, and data management. Similarly, Khamesian et al. [2] emphasized structured frameworks for generating personalized meal plans efficiently. Web-based meal planners are typically built using lightweight technologies. Baldovino and Ferrer [8] used web technologies to create interactive systems that improve accessibility and usability. JavaScript plays a key role in implementing random meal selection, user interaction, and dynamic content updates. The final output of meal planning systems is typically a structured weekly menu. Aberg [4] demonstrated that users prefer systems that generate clear and editable meal plans. Divyadharshini et al. [13] further showed that interactive outputs improve user engagement and efficiency in meal planning. Despite these advances, existing meal planning systems largely fall into two categories: those requiring detailed nutritional databases, optimization solvers, or trained models [1], [2], [10], [12], and simpler tools that, while accessible, rely on manual or non-interactive workflows [3], [4]. Few systems combine a fully client-side, database-free architecture with interactive, preference-driven meal generation. This paper addresses that gap by proposing a lightweight, browser-based Weekly Meal Planner that uses randomized selection with repetition control and keyword-based allergy filtering, requiring no backend infrastructure or nutritional dataset.

### III. Methodology

The Weekly Meal Planner follows a structured, five-stage methodology to generate a personalized weekly meal schedule based on user preferences. The system is designed as a lightweight, user-driven web application built entirely with client-side technologies — HTML, CSS, and JavaScript — prioritizing simplicity, interactivity, and minimal user effort over complex dietary computation.

#### A. Input Collection

The first stage involves collecting user preferences through a simple and interactive web interface. Users enter preferred meal options as comma-separated values for breakfast, lunch, and dinner, along with an option to allow or restrict meal repetition and an optional field to specify allergies or excluded ingredients.

#### B. Data Processing

After receiving the user inputs, the system processes the data using JavaScript. Input strings are parsed into arrays,



trimmed of whitespace, and filtered to remove any meal containing a specified allergy keyword.

#### *C. Meal Plan Generation*

The processed meal data is used to generate a weekly meal schedule consisting of seven days, with breakfast, lunch, and dinner assigned to each day. A `Math.random()`-based selection mechanism assigns meals from the filtered list across a seven-day schedule (breakfast, lunch, dinner per day — 21 entries total), reducing repetition where sufficient options are available and respecting the user's repetition preference.

#### *D. User Interaction*

To improve usability, the generated meal plan supports several interactive features. Users can edit any generated meal entry directly, shuffle the weekly arrangement, or clear the plan to start over.

#### *E. Data Storage*

The final stage focuses on preserving user data. The generated plan and preferences are saved via the browser's `localStorage`, which allows the schedule to persist across page reloads without a backend database. As a result, previously saved information can be restored when the application is reopened or the webpage is refreshed, eliminating the need to re-enter data and improving the overall user experience.

### **IV. System Architecture**

The Weekly Meal Planner adopts a fully client-side architecture, requiring no server or external database, which makes it lightweight and portable. The architecture consists of three layers:

#### *A. Frontend (HTML and CSS)*

The frontend is developed using HTML and CSS to provide a simple and user-friendly interface. Defines the input structure (preference fields, allergy input, repetition toggle) and displays the generated weekly menu in a tabular layout; CSS handles visual styling and readability.

#### *B. Application Logic (JavaScript)*

The core functionality of the application is implemented using JavaScript. This component is responsible for collecting user inputs, processing the meal data, filtering meals based on allergy restrictions, and generating a weekly meal schedule. Handles input collection, filtering, random meal assignment, and the interactive edit/shuffle/clear features described in Section III.

#### *C. Local Data Storage*

Persists user preferences and generated plans in the browser via `localStorage` enabling offline, database-free operation.

#### *D. System Workflow*

The overall workflow of the Weekly Meal Planner is illustrated below.

The workflow begins with the user providing meal preferences and dietary restrictions through the web interface. The application processes the input, filters meals according to the specified constraints, and generates a weekly meal plan based on the user's preferences. The generated schedule is displayed in a tabular format, while the user's preferences and meal plan are stored using the browser's local storage for future access.

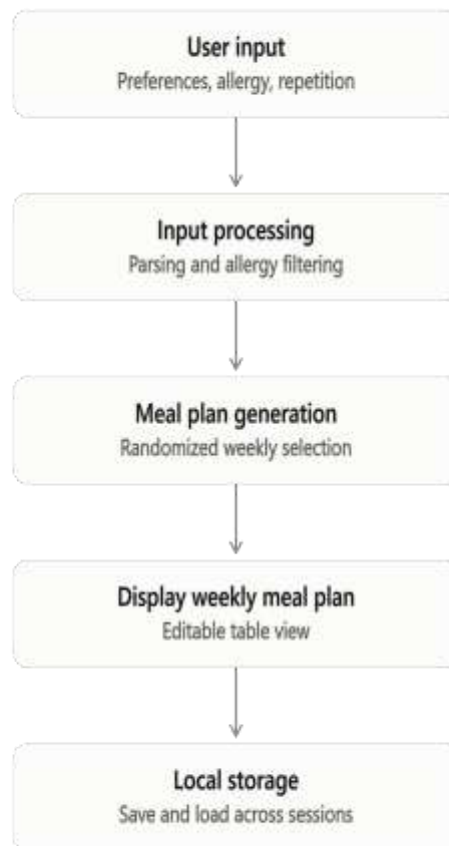


**Fig. 1. Workflow of the Weekly Meal Planner**

## **V. Implementation Details**

The Weekly Meal Planner is implemented as a client-side web application using HTML, CSS, and JavaScript. HTML is used to create the user interface, CSS enhances the visual appearance of the application, and JavaScript implements the core functionality of the meal planner. The application follows a modular design, where each function performs a specific task within the overall workflow, resulting in a simple, maintainable, and efficient implementation.

### *A. User Preference Collection*

The `getUserPreferences()` function collects the breakfast, lunch, and dinner preferences entered as comma-separated values. It converts each input into an array and removes unnecessary spaces to prepare the data for further processing. The allergy preference and repetition option are retrieved within the `generateMenu()` function. The



function then converts the meal list into an array and removes unnecessary spaces to prepare the data for further processing.

#### *B. Meal Selection and Filtering*

Meal filtering is performed using the `filterAllergy()` function, which removes meals containing the specified allergy keyword. The filtered meal list is then passed to the `pickMealsSmart()` function, where a `Math.random()`-based selection mechanism generates the weekly meal assignments while reducing unnecessary repetition whenever sufficient meal options are available.

#### *C. Weekly Meal Plan Generation*

The `generateMenu()` function generates the complete weekly meal plan. It defines the seven days of the week and assigns breakfast, lunch, and dinner for each day using the processed meal list. The function works together with the meal selection logic to ensure that the generated plan follows the specified repetition constraints while providing a structured weekly meal schedule.

#### *D. Menu Rendering*

The `renderMenu()` function displays the generated meal plan dynamically on the webpage in a structured daily layout. Table rows and columns are created dynamically, allowing the weekly schedule to be presented in a clear and organized manner. The generated meal entries remain editable, enabling users to customize the meal plan according to their preferences.

#### *E. Meal Plan Reshuffling*

The `shuffleDays()` function allows users to rearrange the generated weekly meal schedule. The function randomly re-orders the existing daily meal plans while preserving the selected meals, providing users with an alternative weekly arrangement without requiring new meal preferences.

The modular implementation improves code readability, simplifies maintenance, and enables future enhancements, such as nutritional analysis, cloud-based storage, and personalized meal recommendations.

### **VI. Results**

The Weekly Meal Planner was successfully implemented and tested using different input combinations to evaluate its functionality. The application generated weekly meal plans based on user-provided preferences while supporting features such as allergy filtering, repetition preference, meal editing, and local data storage. The functional testing results are summarized in Table I, while the application's user interface and a sample generated meal plan are illustrated in Fig. 2 and Fig. 3, respectively.

**Table I Functional Testing Results**

| Feature Tested         | Expected Outcome                              | Observed Outcome                              |
|------------------------|-----------------------------------------------|-----------------------------------------------|
| Weekly Meal Generation | Generate a complete 7-day meal plan           | Weekly meal plan generated successfully       |
| Repetition             | Allow or prevent meal repetition according to | Meals followed the selected repetition option |



|                  |                                                  |                                           |
|------------------|--------------------------------------------------|-------------------------------------------|
| Control          | user preference                                  |                                           |
| Menu Editing     | Allow users to modify generated meals            | Meal entries were editable                |
| Shuffle Function | Randomly rearrange the generated weekly schedule | Weekly schedule rearranged successfully   |
| Clear Menu       | Remove the generated meal plan                   | Meal plan cleared successfully            |
| Local Storage    | Save and restore generated weekly meal plan      | Generated meal plan restored successfully |

#### A. *Weekly Meal Plan Generation*

The application successfully generated a complete weekly meal plan consisting of breakfast, lunch, and dinner for seven consecutive days. Using JavaScript-based random meal selection, the system automatically assigned meals while presenting the generated schedule in a structured daily layout. The user interface of the Weekly Meal Planner is shown in Fig. 2, while a sample weekly meal plan generated by the application is presented in Fig. 3.

#### B. *Performance with Different User Inputs*

The system was tested using different combinations of user-entered breakfast, lunch, and dinner preferences. It successfully generated weekly meal plans for various input sets while applying allergy filtering and the selected repetition preference. The application also accepted custom meal names, demonstrating flexibility for different user requirements.

#### C. *Repetition Control*

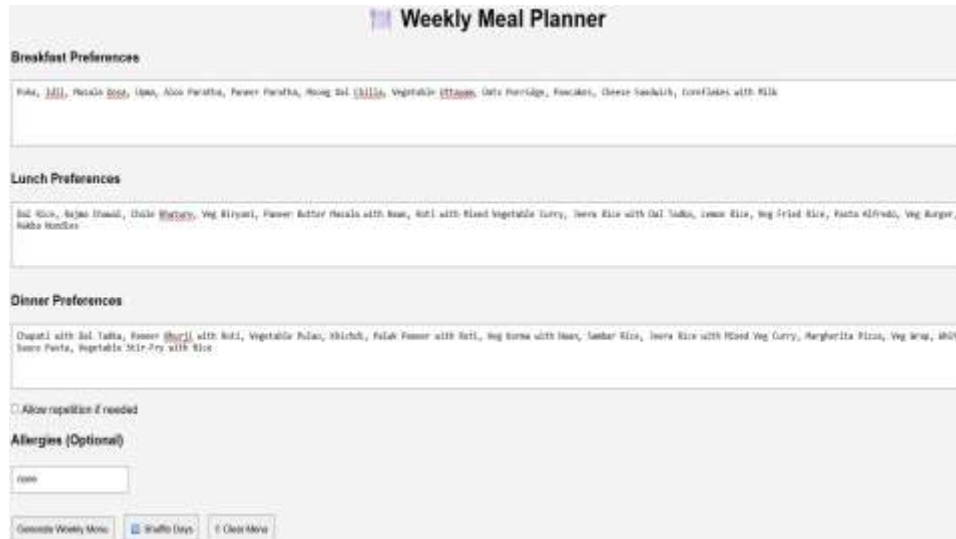
The repetition preference functioned as intended by allowing users to either permit or avoid meal repetition whenever sufficient meal options were available. This helped promote meal variety while respecting the selected repetition option.

#### D. *Data Persistence*

The application successfully utilized the browser's localStorage to save the generated weekly meal plan. The stored information remained available after refreshing or reopening the application, allowing previously saved data to be restored without requiring users to enter their preferences again. This functionality improved the overall usability and convenience of the system.

#### E. *Discussion*

The testing results indicate that the Weekly Meal Planner performs its intended functions reliably within a client-side web environment. The system successfully generated weekly meal plans based on user preferences, applied allergy-based filtering, supported the selected repetition preference, and preserved user data using browser local storage. The combination of these features provides a simple and efficient solution for weekly meal planning while maintaining ease of use and flexibility for different user preferences.



**Weekly Meal Planner**

**Breakfast Preferences**

Poha, Idli, Poha Dosa, Upma, Aloo Paratha, Paneer Paratha, Moong Dal Chilla, Vegetable Uttam, Oats Porridge, Pancakes, Cheese Sandwich, Cornflakes with Milk

**Lunch Preferences**

Bal Rice, Rajma Chawal, Chole Bhature, Veg Biryani, Paneer Butter Pheeta with Naan, Roti with Mixed Vegetable Curry, Jeera Rice with Dal Tadka, Jeera Rice, Veg Fried Rice, Pasta Alfredo, Veg Burger, Noodle Noodles

**Dinner Preferences**

Dhupai with Dal Tadka, Paneer Bhurji with Roti, Vegetable Pulao, Khichdi, Pula Paneer with Roti, Veg Korma with Naan, Lambar Rice, Jeera Rice with Mixed Veg Curry, Margherita Pizza, Veg Wrap, White Sweet Potato, Vegetable Stir-Fry with Rice

☐ Allow repetition if needed

**Allergies (Optional)**

Fig. 2. User interface of the Weekly Meal Planner.

## VII. Limitations

Although the Weekly Meal Planner provides a simple and user-friendly solution for generating weekly meal plans, it has certain limitations due to its lightweight client-side design.

### A. Absence of Intelligent Meal Recommendations

The application does not incorporate artificial intelligence or machine learning techniques for meal recommendation. Meal selection is based on randomization rather than user behavior or historical preferences. Consequently, the system cannot provide intelligent recommendations or adapt to individual usage patterns over time.

### B. Limited Nutritional Analysis

The current implementation does not perform nutritional analysis, such as calorie estimation, protein calculation, or dietary balance assessment. Its primary objective is to generate weekly meal schedules rather than evaluate their nutritional value. Therefore, the application may not be suitable for users requiring medically supervised or fitness-oriented meal planning.

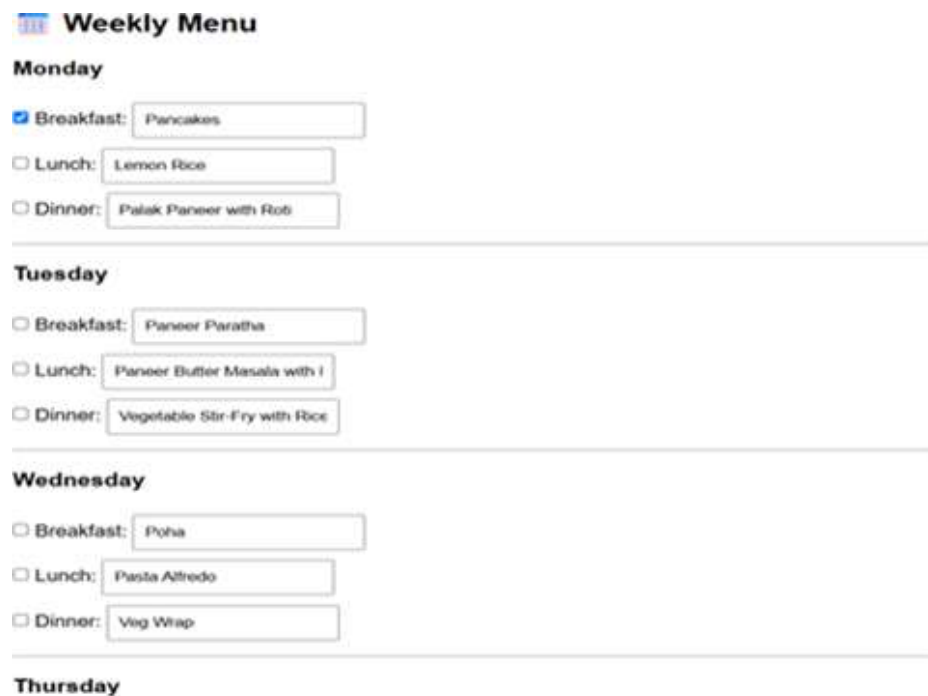
### C. Limited Food Classification

Although users can manually enter different meal types and cuisine preferences, the application does not categorize meals based on food type (e.g., vegetarian or non-vegetarian) or cuisine (e.g., Indian or Chinese) during meal generation. As a result, advanced filtering and category-specific meal planning are not supported.

### D. Dependence on User-Provided Data

The quality of the generated meal plan depends on the accuracy and diversity of the meal options entered by the user. Since the application does not use an external food database or predefined meal repository, limited or incomplete input may reduce the variety and relevance of the generated weekly plan. Additionally, the current implementation was not explicitly tested against edge cases involving zero or minimal user-entered preferences,

which may produce incomplete or undefined meal entries; addressing this gracefully is left for future refinement. The functional testing described in Section VI was conducted by the developers using self-generated input scenarios rather than a formal study with external users; a broader usability evaluation involving diverse participants is left for future work.



**Weekly Menu**

**Monday**

☒ Breakfast: Pancakes

☐ Lunch: Lemon Rice

☐ Dinner: Palak Paneer with Roti

**Tuesday**

☐ Breakfast: Paneer Paratha

☐ Lunch: Paneer Butter Masala with I

☐ Dinner: Vegetable Stir-Fry with Rice

**Wednesday**

☐ Breakfast: Poha

☐ Lunch: Pasta Alfredo

☐ Dinner: Veg Wrap

**Thursday**

Fig. 3. Sample weekly meal plan generated by the application.

## VIII. Conclusion

The Weekly Meal Planner addresses the common challenge of planning daily and weekly meals by providing a simple and user-friendly web-based solution. The application generates weekly meal plans based on user-provided preferences, helping reduce the time and effort required for meal planning while promoting a more organized weekly schedule. The system is implemented using HTML, CSS, and JavaScript, resulting in a lightweight client-side application that is easy to use and does not require a server or external database. Features such as random meal generation, repetition preference, editable meal entries, and local data storage enhance the usability and practicality of the application for everyday household meal planning. The experimental results demonstrate that the application successfully generates weekly meal plans, supports different user preferences, applies allergy-based filtering, and preserves the generated weekly meal plan using browser local storage. These features provide a practical and efficient solution for users seeking a structured approach to meal planning. Future enhancements may include the integration of intelligent meal recommendation techniques, nutritional analysis, and advanced meal filtering based on food type or cuisine. Incorporating external food databases, cloud-based storage, or fitness and health applications could further improve the application's functionality and provide more intelligent meal planning capabilities.



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