

-Expert System

Rapport

Personalized Meal Planning

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Introduction

The Personalized Meal Planning System is a Prolog-based application designed to assist individuals in planning their daily meals based on their nutritional needs. By taking into account factors such as the user's weight, height, age, the system provides customized meal plans.

Knowledge Base

The system's knowledge base is represented using Prolog facts and rules, which define the available foods, nutritional values, user profiles, and the logic for generating personalized meal plans.

- **Facts:** Facts are used to represent static information about the available foods and user profiles. For example, the food predicate contains facts about different types of foods, including their IDs, maximum serving amounts, meal types, and nutritional values. Similarly, the person predicate stores facts about individuals, such as their IDs, names, weights, heights, ages, and pregnancy trimesters.
- **Rules:** Rules are used to define the logic for generating meal plans based on the user's nutritional requirements and the available food options. For example, the `build_meal` rule recursively selects appropriate food items for each meal, ensuring that the total nutritional values of the meal meet the user's needs without exceeding any limits. Additionally, rules are used to calculate the user's daily caloric needs (`bmr`) and to categorize blood sugar levels (`bs_levels`).

Program Structure

The program is organized into several predicates and rules that define its functionality. These include predicates for creating and managing user profiles (`person`), storing nutritional information (`nutrition`), defining food items and their nutritional values (`food`), performing calculations for meal planning, and handling user interactions.

Data Representation:

- **person/6:** Stores information about individuals, including their ID, name, weight, height, age, and pregnancy trimester (if applicable).
- **nutrition/5:** Stores nutritional information for each person, including their total daily calories and the breakdown of calories, carbs, protein, and fat for each meal (breakfast, snack 1, lunch, snack 2, dinner, snack 3).
- **food/7:** Represents different types of foods available in the system, along with their nutritional values such as calories, carbs, protein, and fat. Each food item is associated with a unique ID, maximum amount allowed per serving, type of meal it belongs to, and its nutritional content.

Calculations

The program performs various calculations to determine the user's daily nutritional requirements and to build meal plans accordingly. These calculations include:

- Estimating total daily calories based on the user's weight, height, age, and pregnancy trimester (if applicable).
- Dividing the daily calorie intake into specific proportions for each meal based on predefined ratios.
- Ensuring that the total nutritional values (calories, carbs, protein, fat) of each meal align with the user's needs while considering the maximum amount allowed for each food item.

User Interaction

The program interacts with the user through a command-line interface. It prompts the user to input their personal information, such as name, weight, height, age. Based on this information, the system creates a profile for the user and generates personalized meal plans upon request.

Conclusion

The Personalized Meal Planning System leverages Prolog's logic programming capabilities to provide users with tailored meal plans that meet their nutritional needs. By considering individual factors such as weight, height, age, and

pregnancy trimester, the system ensures that the meal plans are customized to each user's requirements.