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## NUTRISMART: A FREE DIET PLANNING PLATFORM

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**\*Ashok Kumar, Balasubramani, Chandru, Dhinesh Kalimuthu, Ms. Priyadharshini**

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Department of Artificial Intelligence and Data Science, Sri Shakthi Institute of Engineering and Technology, Coimbatore, India.

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\*Corresponding Author: Ashok Kumar

Department of Artificial Intelligence and Data Science, Sri Shakthi Institute of Engineering and Technology, Coimbatore, India.

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### ABSTRACT

Nutrismart is a diet planning app that users can access on the web. The system is meant to help people live a healthy life by keeping track of what they eat. It lets people make an account and log in safely with their email address. People can enter information about themselves, like their age, height, weight, gender, and fitness goals. The app uses this information to figure out how many calories you need each day. It also gives a list of the important nutrients, such as protein, fat, and carbs. The app has a modern red and black neumorphism user interface that makes it easier to use. The dashboard uses charts to show nutritional data in a way that is easy to understand. Nutrismart is a good choice for personalized diet planning because it works well and is easy to use.

**INDEX TERMS:** Diet Planning, Nutrition Tracking, MERN Stack, MongoDB, Express.js, React.js, Node.js, Calorie Calculation, Protein Intake, Carbohydrates, Fat Analysis, Web Application, User Authentication, Google Login, Dashboard Visualization.

### I. INTRODUCTION

DUE to busy schedules and bad eating habits, it has become harder to eat well and get the right amount of nutrients in today's modern world. A lot of people don't know how many calories they eat each day or how important nutrients like proteins, fats, and carbohydrates are. People who don't know about this often end up with health problems like obesity, malnutrition, and other diseases that are caused by their way of life. So, there needs to be a simple and useful system that can help people understand and meet their nutritional needs.

The Nutrismart app was made to solve this problem by giving people an easy way to plan

their diets. The MERN stack, which includes MongoDB, Express.js, React.js, and Node.js, was used to make it a web-based app. Users can make an account, log in safely, and enter their personal information, like their age, height, weight, gender, and fitness goals, like losing weight or gaining weight.

The system figures out how many calories a person needs each day based on what they say and gives a detailed break-down of the nutrients they need, such as protein, fat, and carbs. This helps people make smart choices about what they eat and live a healthier life. The app also has features like the ability to log in with Google and an interactive dashboard with graphs to help you understand things better.

The user interface of Nutrismart is based on a modern red and black neumorphism theme, which makes it look better and makes it easier to use. A MongoDB database safely stores all user data, making sure it is safe and reliable.

In conclusion, Nutrismart is a useful and effective way for people to use modern web technologies to improve their eating habits and health.

## **II. RELATED WORKS**

The related works section talks about other systems and research studies that are similar to the Nutrismart app. There are many apps that help people plan their diets and keep an eye on their health. These apps help people keep track of what they eat and live a healthy life. These systems can do things like count calories, keep track of what you eat, and keep an eye on your fitness.

Also, many web-based apps use new technologies to verify users, store data, and show health data. But a lot of the solutions that are already out there are either too complicated, don't let you personalize them, or cost money to use. The Nutrismart system looks at these existing methods and tries to improve on them by offering a simple, easy-to-use, and effective way to plan meals that includes all the necessary features and keeps your data safe.

### ***A. Existing Diet Planning Applications***

Several diet planning applications such as MyFitnessPal and HealthifyMe provide calorie tracking and nutrition monitoring features. These platforms allow users to log their daily food intake and analyze their nutritional values. However, many of these applications are complex, require subscriptions, or lack customization based on individual user goals. Nutrismart aims to provide a simpler and more user-friendly solution with essential features.

### ***B. Calorie and Nutrition Calculation Systems***

Many research studies and applications focus on calculating daily calorie requirements using parameters like age, weight, height, and gender. These systems often use standard formulas such as BMR (Basal Metabolic Rate) and TDEE (Total Daily Energy Expenditure). Nutrismart follows a similar approach but integrates it into an interactive web application that provides real-time results and visualization.

### ***C. Web-Based Health Monitoring Systems***

Web-based health applications have become popular for tracking fitness and wellness. These systems provide dashboards, charts, and reports to help users monitor their health data. However, some systems lack proper user authentication or data storage mechanisms. Nutrismart improves this by using the MERN stack, ensuring secure login, efficient data storage, and a responsive user interface.

### ***D. Authentication and User Management Systems***

Modern applications include authentication systems such as email/password login and third-party logins like Google authentication. These systems improve user convenience and security. Nutrismart incorporates both traditional login and Google login, allowing users to access the application while maintaining secure data handling.

## **III. METHODOLOGY**

### ***A. User Registration and Authentication***

The first step in the system is user registration and login. Users can create an account by providing basic details such as name, email, and password. The application also supports Google authentication for quick access. All user credentials are securely stored in the MongoDB database using encryption techniques, ensuring data privacy and security.

$$BMR_{men}=(10 \times weight)+(6.25 \times height)-(5 \times age)+5$$

$$BMR_{women}=(10 \times weight)+(6.25 \times height)-(5 \times age)-161$$

### ***B. Data Collection and Input***

After successful login, the user is prompted to enter personal health details including age, height, weight, gender, and fitness goals (weight loss or weight gain). These inputs are essential for calculating the user's daily nutritional requirements. The system ensures that the data entered is valid and complete before processing.

$$TDEE = BMR \times Activity\ Level$$

### C. Nutritional Calculation Process

The core functionality of the application involves calculating daily calorie needs based on user inputs. Standard formulas such as Basal Metabolic Rate (BMR) and Total Daily Energy Expenditure (TDEE) are used. Based on the calculated calories, the system determines the required intake of protein, fat, and carbohydrates. These calculations help users understand their dietary needs accurately.

$$Protein = \frac{Calories \times 0.3}{4}$$

$$Carbohydrates = \frac{Calories \times 0.5}{4}$$

$$Fat = \frac{Calories \times 0.2}{9}$$

The BMR is calculated using  $BMR = (10 \times weight) + (6.25 \times height) - (5 \times age) + 5$ .

### Data Visualization and Output

The calculated nutritional values are displayed on the dashboard in a user-friendly format. Charts and graphical representations are used to visualize protein, fat, and carbohydrate distribution. This helps users easily interpret their diet plan and make informed decisions. The responsive and neumorphism-based UI enhances the overall user experience.

## IV. RESULTS AND ANALYSIS

### A. Macronutrient Distribution

The macronutrient distribution represents the proportion of essential nutrients required for maintaining a balanced diet. In the Nutrismart application, the total daily calorie intake is divided into three major components: protein, carbohydrates, and fats. Each of these nutrients plays a significant role in supporting body functions and overall health.

Protein is primarily responsible for muscle growth and tissue repair, while carbohydrates serve as the main source of energy for daily activities. Fats, although required in smaller quantities, are essential for energy storage and maintaining cell functions. A proper balance of

these nutrients ensures that the body functions efficiently and reduces the risk of health-related issues.

In this system, a standard distribution is followed where protein contributes 30% of total calories, carbohydrates contribute 50%, and fats contribute 20%. This balanced approach is widely used in diet planning applications to provide optimal nutrition. The following table presents the percentage distribution of each macronutrient used in the system.

**TABLE I MACRONUTRIENT DISTRIBUTION.**

<b>Nutrient</b>	<b>Percentage</b>
Protein	30%
Carbohydrates	50%
Fat	20%

### ***B. Input Parameters Analysis***

The input parameters play a crucial role in determining the accuracy of the nutritional calculations in the Nutrismart application. These parameters are collected from the user after successful login and are used to compute daily calorie requirements and macronutrient distribution. The main inputs include age, height, weight, gender, and fitness goals such as weight loss or weight gain.

Each parameter has a specific impact on the calculation process. Age affects the metabolic rate of the body, while height and weight are essential for determining the body mass and energy requirements. Gender is also considered, as metabolic rates differ between males and females. The fitness goal selected by the user helps in adjusting the calorie intake accordingly, either by creating a calorie deficit for weight loss or a surplus for weight gain.

Accurate input data ensures that the system generates reliable and personalized results. Incorrect or incomplete data may lead to improper calorie estimation and nutritional imbalance. Therefore, the application includes validation mechanisms to ensure that all inputs are correctly provided before performing calculations. The following table summarizes the input parameters used in the system.

**TABLE II INPUT PARAMETERS.**

<b>Parameter</b>	<b>Description</b>
Age	User age in years
Height	Height in centimeters
Weight	Weight in kilograms
Gender	Male or Female
Goal	Weight loss or Weight gain

## V. CONCLUSION

The Nutrismart application has been successfully designed and developed as a web-based solution for efficient diet planning and nutritional analysis. The primary objective of this system is to provide users with a simple and reliable platform to calculate their daily calorie requirements and understand their nutritional needs. By incorporating standard formulas such as Basal Metabolic Rate (BMR) and Total Daily Energy Expenditure (TDEE), the system ensures accurate and scientifically valid results.

The application allows users to register and securely log in using both traditional authentication methods and modern Google authentication. This enhances usability and ensures data security. Once authenticated, users can input their personal details such as age, height, weight, gender, and fitness goals. These inputs are processed by the system to generate personalized dietary recommendations.

The core functionality of the application lies in its ability to calculate and distribute calories into essential macronutrients including protein, carbohydrates, and fats. This helps users maintain a balanced diet and achieve their health goals effectively. The use of structured calculations ensures consistency and reliability in the output.

Furthermore, the application provides a user-friendly interface that improves the overall user experience. The integration of charts and visual representations allows users to easily interpret their nutritional data. This makes the system not only functional but also interactive and engaging.

The results obtained from the system demonstrate that Nutrismart can effectively assist users in managing their dietary intake and promoting a healthier lifestyle. The system is scalable and can be enhanced with additional features in the future. Overall, the project successfully meets its objectives and serves as a valuable tool for health and nutrition management.

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