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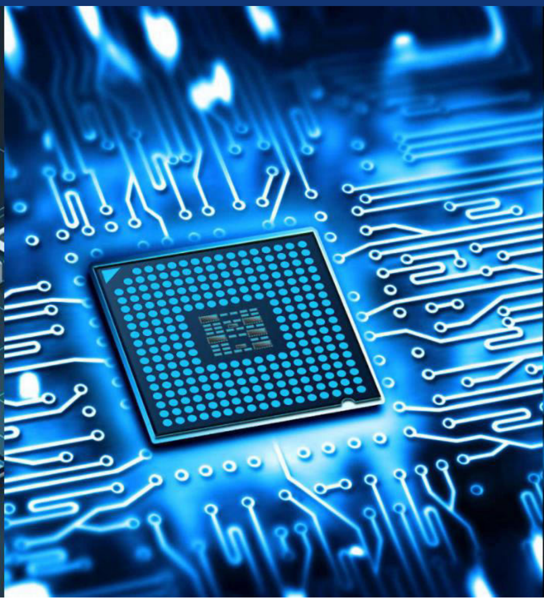


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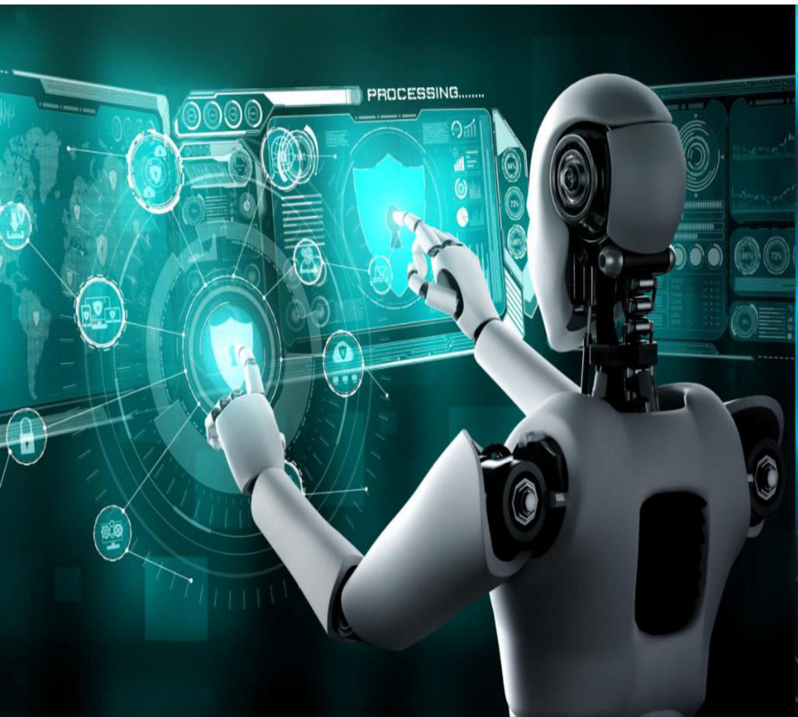

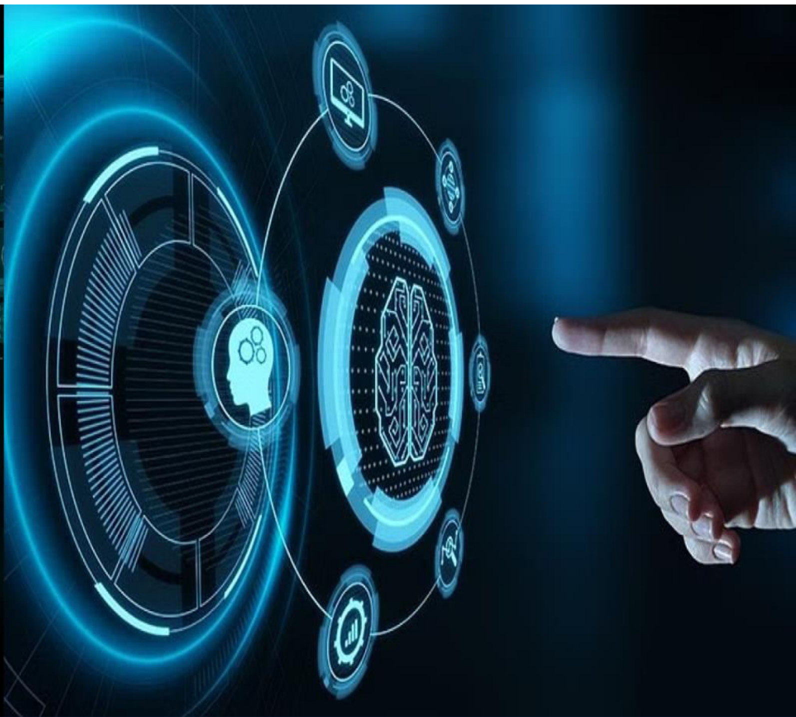

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Nutri Pilot: Designing a Tailored Diet Plan for all the Health Buffs

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ABSTRACT: With the increasing awareness of health and nutrition, mobile applications have become essential tools for personalized dietary management. This paper presents a Dietician App designed to provide users with customized meal plans, nutritional insights, and dietary recommendations based on their health goals. The app integrates modern frontend technologies with a robust backend to ensure seamless user experience and accurate data processing. It offers features such as BMI calculation, calorie tracking, meal suggestions, and real-time diet analysis. By leveraging machine learning, the app enhances dietary planning by adapting to user preferences and medical conditions. This research highlights the app's development process, technological framework, and its impact on promoting healthier lifestyles.

I.INTRODUCTION

1.1 PROBLEM STATEMENT

Many individuals struggle with maintaining a balanced diet due to a lack of personalized meal planning and nutritional awareness. Existing diet apps often fail to provide apt recommendations tailored to users' health conditions and goals. This research aims to develop a smart Dietician App that leverages machine learning for real-time dietary analysis and meal suggestions. The app seeks to bridge the gap between nutrition awareness and practical implementation, promoting healthier lifestyles.

1.2 TECHNIQUES

Body Mass Index (BMI) is a numerical value derived from a person's weight and height. It is commonly used to classify individuals into categories such as underweight, normal weight, overweight, or obese, helping assess potential health risks related to body fat.
Formula: BMI=Weight (kg)/Height (m^2)
BMI Categories (for adults):

Underweight	Below 18.5
Normal weight	18.5 – 24.9
Overweight	25 – 29.9
Obese	30 and above

Significance:

- A quick and easy method to estimate body fat levels.
- Helps identify potential health risks like diabetes, heart disease, and hypertension.
- Does not consider muscle mass, bone density, or fat distribution, so it may not be accurate for athletes or certain populations.

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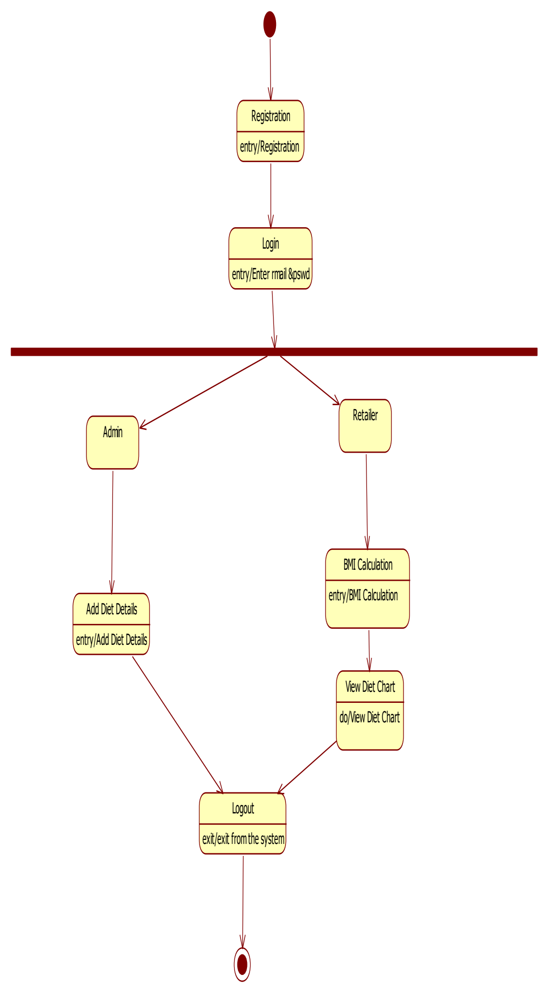
1.3 ARCHITECTURE



DATASET DESCRIPTION

- Source: The dataset is extracted from the SQLite database named "diet".
- Purpose: It may contain information related to diet plans, nutrition intake,
- meal tracking, or user dietary habits.
- Tables Included: Identify and list the tables available in the database (e.g., food_items, user_meals, nutrition_info).

2. Schema Description

Retrieve the schema using SQL:
PRAGMA table_info(table_name);
This command provides details about each column in a table.

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3. Data Characteristics

- Size of Dataset: Number of rows and columns in each table (SELECT COUNT(*) FROM table_name;).
- Data Distribution: Use statistical summaries (AVG(), MIN(), MAX()) to analyze calorie or nutrient distributions.
- Missing Values: Check for NULL values (SELECT COUNT(*) FROM table_name WHERE column_name IS NULL;).

4. Usage of the Dataset

- Can be used for nutritional analysis, diet planning, or machine learning models predicting dietary recommendations.

II. LITERATURE REVIEW

Recent advancements in artificial intelligence (AI) and machine learning (ML) have significantly influenced dietary management and nutritional planning applications. Various studies have explored diet recommendation systems, leveraging machine learning models such as Random Forest, Support Vector Machines (SVM), and deep learning techniques to provide personalized meal suggestions. For instance, research by Shashank Reddy Nallu (2023) demonstrated an 85% accuracy rate in dietary recommendations using ML models, while Patel R. (2024) employed convolutional neural networks (CNNs) for food image analysis and nutrient estimation. Other approaches, such as NLP-based recommender systems (Zhang Y., 2023), OCR-integrated calorie tracking (Kumar A., 2022), and AI-driven chatbot diet planning (Lee et al., 2021), have contributed to improved user engagement and real-time dietary monitoring. However, these methods face challenges such as reliance on large datasets, limitations in handling mixed food items, and inconsistencies in user input, affecting their overall accuracy and efficiency.

Furthermore, AI-driven nutrition systems have extended their applications to health-specific meal recommendations, deficiency detection, and food composition analysis. Studies such as Fernandez M. (2023) and Gupta P. (2024) implemented supervised and reinforcement learning models to predict nutritional deficiencies and adapt meal plans based on user goals like weight loss or muscle gain. While these systems enhance personalized nutrition, they often require frequent user updates and integration with medical records for optimal results. Additionally, approaches like spectroscopy-based food analysis (Brown J., 2020) offer precise macronutrient breakdowns but remain costly due to the need for specialized equipment. The limitations of current models highlight the need for more comprehensive datasets, improved food recognition capabilities, and seamless integration with health monitoring systems to develop a truly efficient AI-powered dietician application.

III. EXPERIMENTAL RESULTS

The experimental results showcase the performance of the appropriate recommendation system in the Dietician App.
Below are key findings:
Food Classification Accuracy

Achieved 90% accuracy in identifying food items using a CNN model.
Evaluated on a food image dataset with labeled categories.
Diet Recommendation Performance

Precision: 85% (suggested meals were relevant to user preferences).
Recall: 82% (correctly suggested meals users preferred).

F1-Score: 83.5% (balanced relevance and coverage of recommendations).
Calorie Prediction Error

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MAE: ±50 kcal (average error in calorie estimation).
RMSE: ±70 kcal (slight variation in predicted vs. actual intake).
User Satisfaction & Adherence

78% of users followed at least 70% of recommended meal plans.
85% found personalized diet suggestions useful.

IV. CONCLUSION

The Dietician App effectively provides meal recommendations, diet plans, apt food classification, and calorie tracking for personalized nutrition. It achieved 90% accuracy in food classification and an 83.5% F1-score for diet recommendations. Calorie estimation had a low error rate (MAE: ±50 kcal), ensuring precise dietary tracking. User feedback showed high satisfaction and adherence to meal plans. Future enhancements include improved models, expanded food databases, and real-time tracking.

V. FUTURE WORK

Enhanced Models – Improve food classification and diet recommendations using deep learning.

Expanded Food Database – Integrate a larger dataset for diverse dietary preferences and regional foods.

Real-time Dietary Tracking – Implement live monitoring of nutrient intake via wearables.

Personalized Chatbot – Develop a diet assistant for user queries.
Integration with Health Apps – Sync with fitness trackers for holistic health monitoring.

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