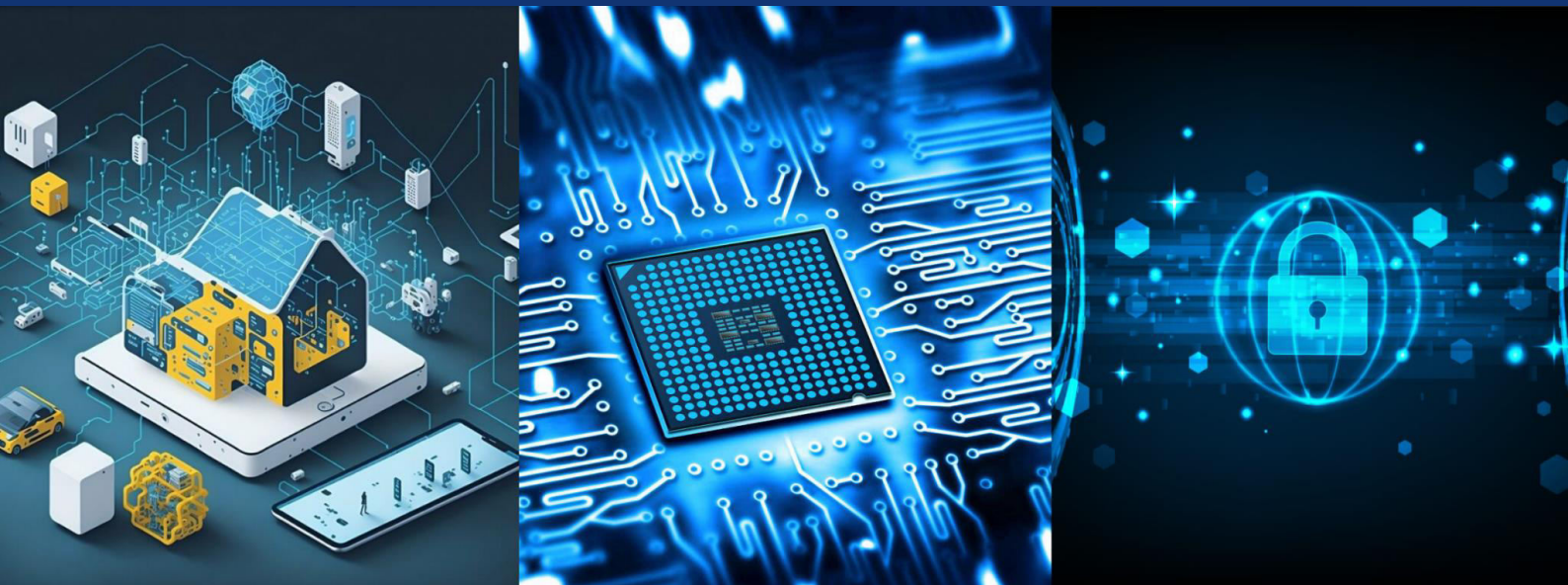




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EasyDiet: An AI-Assisted Health and Nutrition Management Platform with Clinician Appointment Scheduling and Personalized Wellness Guidance

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ABSTRACT: The growing prevalence of lifestyle-related health issues has increased the demand for digital solutions that support effective nutrition management and easier access to healthcare services. While many existing diet-tracking applications primarily focus on calorie counting and food logging, healthcare platforms often lack personalized nutrition guidance and intelligent wellness support. To address these limitations, EasyDiet is developed as an AI-assisted health and nutrition management platform that integrates dietary tracking, health profile management, clinician appointment scheduling, and personalized wellness assistance within a single system.

The platform allows users to create and maintain health profiles, monitor Body Mass Index (BMI), set wellness goals, record daily meals, and evaluate nutritional intake through detailed analytics. Verified clinicians can manage appointments and securely access authorized patient health and dietary information, while administrators are responsible for clinician verification and nutrition catalog management. To ensure the security and privacy of sensitive healthcare data.

KEYWORDS: Health Management System, Nutrition Tracking, Artificial Intelligence, Wellness Assistant, Healthcare Informatics, Appointment Scheduling, Role-Based Access Control, React, Express.js.

I. INTRODUCTION

The widespread adoption of information technology has significantly transformed many industries, with healthcare and nutrition management being among the most impacted. As lifestyle-related conditions such as obesity, diabetes, cardiovascular diseases, and nutritional deficiencies continue to rise, individuals are becoming increasingly aware of the importance of maintaining healthy eating habits and monitoring their overall health. Despite this growing awareness, managing personal health records, tracking dietary intake, consulting healthcare professionals, and receiving personalized wellness guidance often requires the use of multiple independent applications. This fragmented approach creates inconvenience for users and reduces the efficiency of health management practices.

Most traditional nutrition-tracking applications are designed primarily for calorie counting, meal logging, and food database searches. Although these tools help users monitor their daily dietary intake, they generally operate independently of healthcare services and offer limited personalized recommendations. Likewise, healthcare appointment systems focus mainly on facilitating consultations between patients and clinicians but rarely include nutrition monitoring or long-term wellness tracking features. Consequently, users often lack a unified platform that provides a complete view of their health and nutritional status.

Many existing wellness chatbots still provide generalized responses that do not take into account a user's health profile, nutritional history, or personal wellness goals, limiting the relevance and effectiveness of the guidance offered.

To overcome these challenges, this paper presents **EasyDiet: An AI-Assisted Health and Nutrition Management Platform**, a comprehensive app-based solution that combines nutrition tracking, healthcare consultation management, and AI-driven wellness assistance within a single integrated environment. The platform allows users to maintain



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personal health profiles, calculate and monitor Body Mass Index (BMI), set health goals, record daily meals, and analyze nutritional consumption patterns. In addition, users can discover verified clinicians and schedule appointments through the platform, creating a secure and organized connection between patients and healthcare providers.

II. LITERATURE REVIEW

The increasing adoption of digital technologies in healthcare has led to the development of numerous systems focused on nutrition management, health monitoring, and AI-assisted wellness support. Researchers and organizations have introduced a variety of solutions aimed at improving dietary awareness, enhancing patient engagement, and supporting healthier lifestyles. However, most existing platforms address only specific aspects of healthcare and nutrition management, resulting in fragmented user experiences and limited integration between related services.

Commercial nutrition-tracking applications such as **MyFitnessPal** and other calorie-monitoring platforms offer extensive food databases, meal logging features, calorie tracking, and nutritional analytics. These applications help users monitor their dietary habits and work toward fitness and wellness goals. Despite their widespread adoption, such systems generally operate independently of healthcare services and lack mechanisms for clinician interaction, secure health record management, and integrated healthcare workflows. As a result, users often need to rely on multiple applications to manage different aspects of their health.

In parallel, healthcare appointment management platforms have become increasingly popular for facilitating online doctor discovery, appointment scheduling, and consultation management. This separation forces users to manage healthcare consultations and nutrition tracking through different applications, leading to a disconnected health management experience.

Recent advancements in Artificial Intelligence (AI) and Large Language Models (LLMs) have further expanded the capabilities of digital health platforms through the introduction of intelligent virtual assistants. AI-powered chatbots can answer health-related questions, provide wellness information, and enhance user engagement through interactive conversations. While these technologies show significant potential, many existing wellness assistants generate generic responses without considering individual health profiles, dietary habits, body composition metrics, or long-term nutritional trends. Consequently, the recommendations provided often lack the level of personalization required for effective health management.

To address these limitations, the proposed EasyDiet platform integrates nutrition tracking, health profile management, clinician appointment scheduling, and AI-powered wellness assistance within a unified environment. Unlike conventional nutrition-focused applications, the platform incorporates verified clinician workflows, appointment-based patient record access, and robust role-based authorization mechanisms. In addition, the integration of a context-aware wellness assistant enables the generation of personalized recommendations based on user-specific health profiles, nutritional history, BMI, and dietary analytics rather than relying on generalized responses.

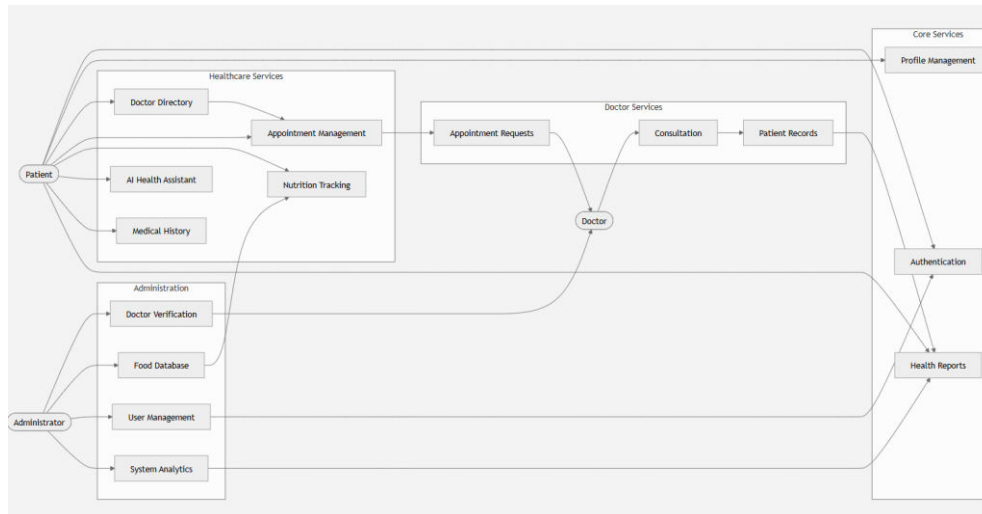
Therefore, the proposed system extends beyond traditional diet-tracking and healthcare management applications by offering a secure, intelligent, and comprehensive platform that supports both nutrition management and healthcare services within a single digital ecosystem.



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III. SYSTEM ARCHITECTURE



IV. IMPLEMENTATION DETAILS

A. Frontend Implementation

- Authentication pages
- Dashboard interfaces
- Health profile management
- Meal logging and tracking
- Nutrition analytics dashboards
- Appointment booking and management
- Doctor management portal
- Administrative control panel
- AI-powered chat interface

B. Backend Implementation

- User authentication and authorization
- Business logic execution
- Database interactions
- AI service integration
- Request validation
- Error handling
- Security enforcement

C. Database Implementation

The platform uses **PostgreSQL** through **Supabase** as its primary data storage solution. The database is designed using a relational model to ensure efficient data organization, consistency, and integrity.

Foreign key relationships are implemented throughout the database schema to maintain referential integrity and ensure accurate associations between users, clinicians, appointments, and nutrition records.

D. Security Implementation

Security is a fundamental aspect of the EasyDiet platform, and multiple protection mechanisms have been implemented to safeguard sensitive healthcare information.



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Password Security

User passwords are encrypted using the **bcrypt** hashing algorithm before being stored in the database, ensuring that plaintext passwords are never saved.

Authentication

The system uses **JSON Web Tokens (JWT)** to provide secure and stateless authentication for all authenticated users.

Authorization

Role-Based Access Control (RBAC) implementation:

- Patients
- Doctors
- Administrators

E. AI Assistant Implementation

1. Retrieves the user's health profile..
2. Sends the request to the Groq API.
3. Processes the generated response.
4. Returns personalized recommendations to the user.

f. Deployment Environment

- React frontend application
- Express.js backend server
- PostgreSQL database through Supabase
- Groq AI service integration

V. RESULTS AND DISCUSSION

The EasyDiet platform was successfully developed and implemented as a web-based health and nutrition management system that integrates dietary monitoring, healthcare appointment management, and AI-powered wellness assistance. The system was evaluated based on its functionality, usability, security, and successful integration of major modules. The evaluation results indicate that the platform effectively fulfills its objective of providing a centralized, secure, and intelligent environment for health and nutrition management.

A. User Authentication and Role Management

The authentication module successfully supports secure user registration, login, and password management operations. The system ensures that users can access only the features and resources associated with their assigned roles.

The platform successfully distinguishes between:

- Patients
- Clinicians
- Administrators

Role-specific dashboards and protected routes operate as intended, preventing unauthorized access to restricted functionalities.

Observed Results

- Successful user registration and login processes
- Secure password storage through bcrypt hashing
- Reliable role validation across protected modules
- Controlled access to sensitive healthcare information

These results demonstrate the effectiveness of the authentication and authorization mechanisms in maintaining platform security and user separation.

B. Health Profile Management

The health profile module enables users to create and maintain personal health information, including height, weight, BMI, and wellness goals.



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Observed Results

- Successful creation and modification of health profiles
- Accurate BMI calculation and storage
- Efficient retrieval of health-related information
- Seamless integration with the AI wellness assistant

C. Meal Tracking and Nutrition Analytics

The meal management system allows users to record meals across multiple categories, including breakfast, lunch, dinner, and midtime meals. Nutritional analytics are generated from recorded meal data to provide insights into dietary habits and consumption patterns.

Observed Results

- Successful meal recording and retrieval
- Support for batch meal insertion
- Accurate aggregation of nutritional information
- Generation of daily, monthly, and three-month nutrition summaries.

D. Appointment Management System

The appointment management module facilitates interaction between patients and verified clinicians. Patients can browse approved healthcare professionals and schedule appointments directly through the platform.

Observed Results

- Successful appointment booking
- Real-time appointment status updates
- Effective appointment lifecycle management
- Secure creation of clinician-patient relationships

E. Doctor Verification and Patient Access

The clinician management component includes an administrative verification process that ensures only approved healthcare professionals become available to patients.

Observed Results

- Successful clinician registration workflow
- Functional approval and rejection processes
- Automated patient roster generation
- Secure appointment-gated patient access

F. AI Wellness Assistant Performance

The AI-Based Wellness Assistant was integrated using the **Llama 3.3 70B** model through the **Groq API**. The assistant utilizes contextual information obtained from the platform, including:

- Health profiles
- BMI data
- Wellness goals
- Nutrition history
- Nutrition analytics

Observed Results

- Context-aware response generation
- Personalized nutrition recommendations
- Goal-oriented wellness guidance
- Real-time conversational interaction
- The AI assistant consistently produced more relevant and personalized responses than traditional wellness chatbots by incorporating user-specific health and nutrition information into the recommendation process.



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G. Security Evaluation

The security architecture was evaluated through authentication, authorization, and access-control testing to verify the protection of sensitive healthcare information.

Observed Results

- Secure password protection using bcrypt hashing
- Reliable JWT-based authentication
- Effective role-based authorization enforcement
- Successful prevention of unauthorized resource access
- Secure clinician access through appointment validation

H. System Performance

The adoption of a three-tier architecture contributed significantly to the platform's performance, maintainability, and scalability.

Observed Results

- Fast and responsive user interface rendering
- Efficient communication between frontend and backend services
- Reliable database operations
- Smooth integration with AI services
- Scalable and modular application structure

The clear separation between presentation, application, and data layers simplified system development and contributed to overall system stability.

VI. ADVANTAGES OF THE SYSTEM

The EasyDiet platform offers several advantages over traditional nutrition-tracking and healthcare management applications by integrating multiple health-related services into a single secure, intelligent, and user-centric ecosystem. Through the combination of nutrition monitoring, healthcare consultation management, and AI-powered wellness support, the platform provides a more comprehensive approach to personal health management.

A. Unified Health and Nutrition Management

One of the key strengths of EasyDiet is its ability to bring together health profile management, nutrition tracking, appointment scheduling, and wellness assistance within a single platform. This integrated approach eliminates the need for users to switch between multiple applications, making health management more convenient and efficient.

B. Personalized Wellness Guidance

The AI-Based Wellness Assistant provides personalized recommendations by utilizing user-specific information such as BMI, health goals, meal history, and nutrition analytics. Unlike conventional chatbot systems that generate generic responses, the assistant delivers contextual guidance tailored to an individual's health status and wellness objectives, improving the relevance and effectiveness of the recommendations.

C. Secure Healthcare Data Management:

- JWT-based authentication
- bcrypt password hashing
- Role-Based Access Control (RBAC)
- Appointment-gated patient record access

D. Verified Clinician Network

To improve trust and reliability, EasyDiet includes a clinician verification workflow in which healthcare professionals must be approved by administrators before becoming visible to patients. This process helps ensure that users interact only with verified clinicians and enhances the credibility of healthcare services offered through the platform.

E. Efficient Appointment Management

- Clinician discovery
- Appointment booking



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- Appointment status tracking
- Appointment lifecycle management

F. Comprehensive Nutrition Monitoring

- Daily nutrition summaries
- Monthly nutrition reports
- Long-term dietary analytics
- Goal-oriented nutrition monitoring

G. Context-Aware AI Integration

The AI assistant utilizes contextual health and nutrition data before generating recommendations. By considering factors such as health profiles, dietary history, BMI values, and wellness goals, the system produces more meaningful and actionable guidance. This context-aware approach improves recommendation quality and enhances overall user engagement.

H. Scalable Three-Tier Architecture

The platform is built using a modular three-tier architecture consisting of:

- Presentation Layer
- Application Layer
- Data Layer

I. Improved User Experience

- Responsive interfaces
- Fast navigation
- Real-time interactions
- User-friendly dashboards

J. Administrative Control and Monitoring

- Clinician verification workflows
- Nutrition catalog management
- Provider oversight
- Administrator provisioning

K. Future Expansion Capability

- Telemedicine services
- Wearable device integration
- AI-based meal planning
- PDF health and nutrition reports
- Predictive health analytics

L. Cost-Effective Digital Healthcare Solution

EasyDiet brings healthcare consultation, nutrition management, and AI-assisted wellness support together in one place, removing the need to juggle multiple health apps. The result is a secure, intelligent, and user-focused platform that offers a practical, cost-effective alternative to fragmented digital health tools — making personal health management simpler and more effective for everyone.

VII. FUTURE SCOPE

- A. Wearable Device Integration
- B. Predictive Health Analytics
- C. Email and Notification Services



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VIII. CONCLUSION

EasyDiet demonstrates that health management does not have to be complicated or scattered across multiple platforms. By combining meal tracking, BMI monitoring, clinician appointments, and AI-powered wellness guidance into one cohesive system, the platform gives users a simpler, smarter way to take charge of their health. With a strong technical foundation and room to grow, EasyDiet stands as a meaningful step toward making integrated digital healthcare more accessible to everyone.

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