JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue
JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)
An International Scholarly Open Access, Peer-reviewed, Refereed Journal

SNACKTRACK: A JAVA-BASED AI NUTRITION APP

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Abstract : The increasing use of mobile health applications has resulted in the widespread generation of personal fitness and nutrition data. Although many applications provide calorie tracking and health monitoring features, interpreting nutritional information and maintaining consistent diet habits remains difficult for non-technical users. Understanding calorie balance, body metrics, and dietary patterns from raw health data is a challenge for many individuals. This paper presents SnackTrack, a user-centric nutrition and diet tracking application designed to transform raw health inputs into structured, visual, and actionable fitness insights. SnackTrack enables users to calculate BMI and TDEE, track diet and workouts, and receive AI-assisted guidance through intuitive dashboards. Unlike traditional health apps that rely on complex long-term analytics, SnackTrack focuses on simple, real-time tracking to deliver immediate clarity and usability. The system emphasizes simplicity, privacy, and visualization-driven design, thereby reducing cognitive load and supporting informed health decision-making.

Index Terms—Mobile Health, Nutrition Tracking, Artificial Intelligence, Fitness Application, Data Visualization, User-Centric Design

I. INTRODUCTION

Mobile health technologies have transformed the way individuals monitor and manage their fitness and nutrition. Smartphones now provide users with accessible tools to track calories, body measurements, and workout activities. While these applications improve awareness, many present information in complex formats that are difficult for users to interpret.

Health tracking applications typically require users to analyze calorie intake, exercise routines, and biological metrics such as BMI. Extracting meaningful insights from such data requires consistent effort and basic health knowledge, which many users lack. As a result, individuals often struggle to maintain balanced diets and effective fitness routines.

Existing nutrition and fitness systems attempt to address these challenges through automated tracking and recommendation features. However, many of these solutions depend on complex analytics, continuous monitoring, or overloaded interfaces, which may reduce accessibility and user engagement.

SnackTrack is proposed as a lightweight and user-centric solution that prioritizes clarity, usability, and immediate feedback. By focusing on real-time nutrition and fitness tracking, SnackTrack delivers actionable insights through visual dashboards without requiring advanced technical knowledge.

II. LITERATURE REVIEW

Prior research in mobile health systems emphasizes the importance of data visualization in improving user understanding of health metrics. Visualization techniques such as progress rings, charts, and dashboards allow users to interpret nutritional data more effectively than traditional numeric lists.

Several fitness applications focus on predictive analytics and long-term habit tracking. While beneficial for experienced users, these systems may create information overload for individuals seeking quick and simple insights. Studies show that excessive complexity can negatively impact engagement and long-term usage.

Privacy and secure data management remain critical concerns in health applications. Systems that ensure controlled storage and user authentication increase trust and adoption. The reviewed literature indicates a need for tools that combine privacy-conscious design with visualization-driven nutrition tracking.

SnackTrack addresses these gaps by offering a focused health management system that emphasizes simplicity, visual clarity, AI-assisted support, and ease of use.

III. RESEARCH METHODOLOGY

Figure 1: the High-level architecture

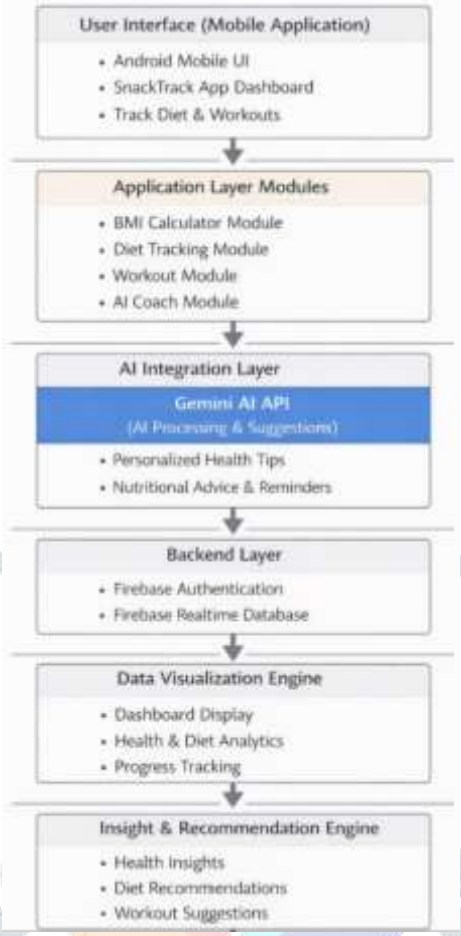

Figure 1 illustrates the high-level architecture of the SnackTrack system, highlighting the flow of data from user input to health insight presentation. The system follows a modular architecture consisting of a mobile user interface, application processing modules, AI integration through Gemini API, and a Firebase cloud backend for authentication and data storage.

The methodology employed in SnackTrack converts user health data into structured insights through clearly defined processing stages. The process begins with user registration and profile setup. Users enter personal details such as age, height, weight, and activity level. The system calculates BMI and TDEE, generates personalized diet goals, and integrates AI-assisted suggestions. Data is securely managed through Firebase services, and visualization modules present results through interactive dashboards.

Figure 1 demonstrates how user inputs are processed across multiple layers to produce actionable health insights.

IV. RESULTS AND DISCUSSION

The implementation of SnackTrack demonstrates the effectiveness of an interactive and visualization-driven mobile health system in improving user engagement and understanding of personal nutrition and fitness data. The application transforms raw user inputs into structured summaries that support informed health decisions

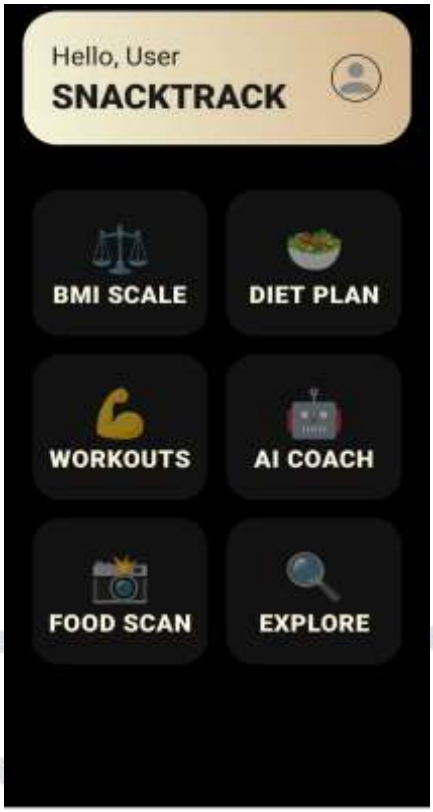

Figure 2: SnackTrack Dashboard Interface

Figure 2 illustrates the main dashboard of the SnackTrack application. The dashboard acts as a centralized control panel that provides users with direct access to core modules including BMI Scale, Diet Plan, Workouts, AI Coach, Food Scan, and Explore features. The clean dark-themed interface enhances usability and allows users to efficiently navigate between different health tracking functionalities.

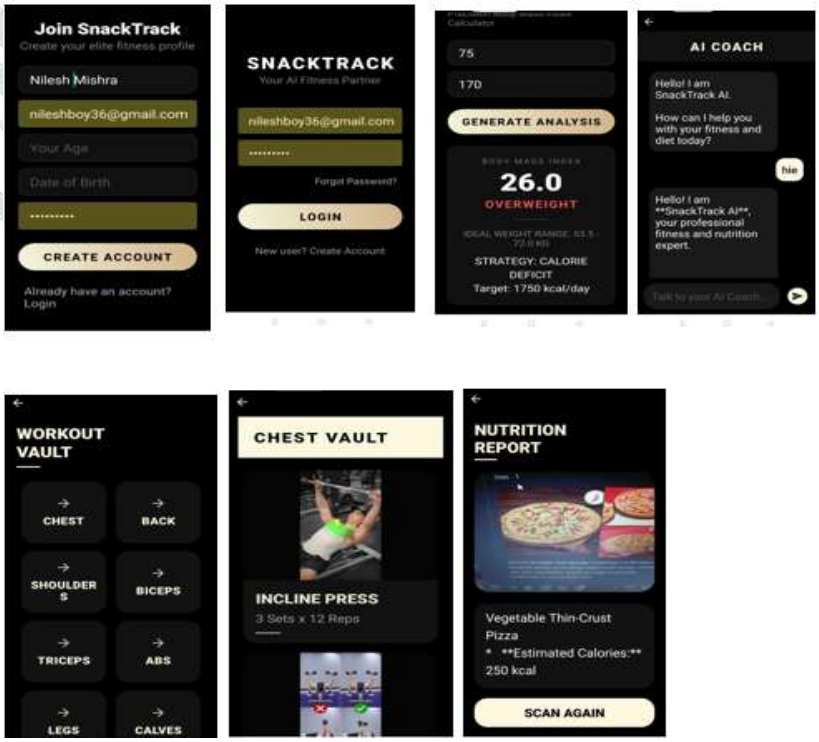

Figure 3: Functional Modules and AI Features of SnackTrack

Figure 3 presents a combined overview of the key functional screens of the SnackTrack application, including user authentication, BMI analysis, workout modules, nutrition search, AI food scanning, and AI coaching features.

The authentication screens allow users to securely create accounts and log in, ensuring personalized data storage. The BMI analysis module calculates body metrics and provides calorie targets based on user inputs. The workout module offers categorized exercise routines with visual guidance to support safe and effective training.

The nutrition search feature enables users to retrieve detailed food information from a nutrition database, including calories and

macronutrients. The AI-powered food scan system analyzes food images and generates estimated calorie values, reducing manual effort in meal tracking.
Additionally, the AI Coach chatbot provides interactive guidance related to diet and fitness through real-time conversational support. These integrated modules collectively demonstrate the versatility of SnackTrack as a comprehensive mobile health management platform.

Overall, the results indicate that SnackTrack successfully combines dashboard navigation, health analytics, workout assistance, and AI-driven interaction into a cohesive and user-friendly ecosystem.

V. CONCLUSION

This paper presented SnackTrack, a user-centric nutrition and fitness tracking application designed to simplify personal health monitoring and dietary management. By emphasizing visualization, usability, and AI-assisted interaction, SnackTrack enables users to understand their health metrics, calorie intake, and workout routines without complex analytical processes.
The findings demonstrate that meaningful health insights can be derived from real-time tracking and integrated AI support, highlighting the value of visualization-driven and intelligent approaches in modern mobile health applications.

VI. FUTURE SCOPE

Future enhancements to SnackTrack may include advanced food image recognition, integration with wearable fitness devices, personalized machine learning–based recommendations, and expanded AI coaching capabilities for real-time health monitoring and predictive analytics.

ACKNOWLEDGMENT

The authors express their heartfelt appreciation to their mentor and faculty members for their continuous guidance, insightful feedback, and academic support during the development of this project. The collaborative efforts and encouragement from fellow students played an important role in the successful completion of SnackTrack.