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Research Paper**FITNESS APP -GENZ.FIT USING MERN STACK****DR.NAVEEN REDDY NEMILI¹, SONATHI THARUN KUMAR², SANDU BHAVANA³**¹Associate Professor, Dept. of CSE, Guru Nanak Institutions Technical Campus, Ibrahimpatnam, Telangana, India^{2,3}B.Tech, Dept. of CSE, Guru Nanak Institutions Technical Campus, Ibrahimpatnam, Telangana, India

ABSTRACT— GenZ.Fit is a comprehensive fitness application designed to cater to the holistic well-being of its users, focusing equally on physical and mental health. The app provides a diverse range of features to support this goal. For physical fitness, users can access a network of gyms and a wide variety of fitness classes, allowing them to choose activities that best suit their preferences and fitness levels. Additionally, GenZ.Fit offers personalized diet plans, which are crucial for achieving specific fitness objectives and maintaining a healthy lifestyle. Beyond physical aspects, the app places significant emphasis on mental well-being by providing dedicated resources to help users manage stress, improve focus, and cultivate a positive mindset. This integrated approach ensures that users can pursue a balanced and healthy life through one convenient platform. Github Link: <https://copy-of-genz-fit-1000751977771.us-west1.run.app/>

Index Terms – Web Development and designing, Client/server, Distributed applications, mHealth, Fitness app, Mapping

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I. INTRODUCTION

Despite a growing awareness of health, many fitness initiatives struggle to achieve sustainable results. Common reasons for failure include a lack of personalized guidance, inconvenient access to resources, and insufficient attention to mental well-being. In this paper, GenZ.Fit will overcome these problems by offering comprehensive solutions, including access to gyms, diverse fitness classes, and dedicated mental fitness programs.

Our main objective at GenZ Fit is to provide high-quality fitness for all, ensuring user satisfaction through both physical and mental well-being. At GenZ Fit, our foremost objective is to deliver unparalleled fitness experiences accessible to everyone, irrespective of their current fitness level or background. We are deeply committed to ensuring comprehensive user satisfaction, which extends beyond mere

physical training to encompass holistic mental well-being.

The fitness app is meticulously designed with a dual focus: to enhance the physical well-being of its users and to generate sustainable revenue.

Our approach is rooted in the belief that true fitness is a harmonious blend of a strong, capable body and a resilient, positive mind. We offer a diverse range of programs and resources tailored to meet varied needs, from high-intensity workouts to mindful practices, all designed to foster sustainable lifestyle changes. Through our dedicated efforts, we aim to cultivate a generation that is not only physically fit but also mentally robust, capable of navigating life's challenges with confidence and vitality.

II. RELATED WORK

A. *Web-Service Based Fitness Application to Promote Healthy Lifestyle among the Masses using Gamification*

In the scope of their prior research[5], the team developed a web interface tailored to the needs of desktop and laptop users, complementing their existing mobile application. The seamless connection between both interfaces and a unified backend database through Firebase ensures a cohesive user experience. The application[5] showcases a thoughtfully structured 'Reward' and 'User Level' system, implementing gamification principles. This system operates on diverse fitness metrics, encompassing heart rate, calorific expenditure, and steps taken across different time intervals (daily, weekly, monthly, and yearly). Users can input data through various activities like walking, running, or cycling, aligning with individual preferences. Data acquisition is facilitated through direct input on smartphones or by utilizing built-in APIs to gather information from wearables. Within the application, the 'Reward System' serves as an incentive mechanism, allowing users to earn monetary rewards such as gift cards and coupons from online stores and e-commerce websites. Achievement of these rewards is contingent on the completion of designated tasks and challenges, whether routine or event-related. The in-app currency functions as a medium through which users can earn and redeem rewards from a virtual shop. This design choice ensures that users can easily retrieve data for any desired timeline, contributing to a user-friendly and engaging experience.

B. *The Effects of 24 Weeks of Non-Face-to-Face Home*

Exercise on Body Composition, Physical Fitness, Cardiovascular Function, and Blood Profiles in PreMetabolic Syndrome Korean Adults [healthcare] In the wake of the COVID-19 pandemic, there was a notable decrease in physical activity participation. Initial concerns

revolved around the increased vulnerability of individuals with obesity and underlying health conditions such as diabetes, high blood pressure, and cerebrovascular disease, raising the risk of severe illness upon contracting the virus. Recent research[3] findings, however, indicated that obesity itself posed a threat to those infected with COVID-19, independent of other health issues. Acknowledging the challenges in achieving complete eradication of the virus, there was a consensus on the need for customized exercise programs tailored to individual physical conditions. With social distancing becoming the norm, numerous social platforms experienced a surge in information aimed at promoting better health through exercise. However, relying solely on generalized information made it challenging to define one's health status[3] on these platforms. To address this, a pilot study introduced a customized healthcare service program utilizing Information and Communications Technology (ICT). Informed by physical examinations, blood profiling, and blood pressure tests, this program facilitated the prompt identification of participants' exercise progress. It provided real-time feedback, aiding participants in understanding their current status and motivating them to enhance their health and physical fitness. This approach aimed to instigate sustained engagement in exercise as a means of improving overall well-being. It was done to check the effects of 24 Weeks of Non-Faceto-Face Home Exercise on Body Composition, Physical Fitness, Cardiovascular Function, and Blood Profiles. **C. *Expanding the Technology Acceptance Model with the Inclusion of Trust, Social Influence, and Health Valuation to Determine the Predictors of German Users' Willingness to Continue using a Fitness***

In this paper we see that, fitness or running apps are hugely popular in Germany. Such a trend prompts the question concerning the factors influencing German users' intention to continue

using a specific fitness app. To address the research question, the expanded Technology Acceptance Model (with the addition of trust, social influence, and health valuation) was tested with 476 German users of fitness apps. Structural equation modeling results reveal that respondents' intention to continue using a specific fitness app[2] is predicated on three factors, namely perceived ease of use, perceived usefulness, and injunctive social norm. Trust in the app developer and descriptive social norm do not have statistically significant effects on repeat usage intention, but they (alongside perceived ease of use and descriptive social norm) both influence users'[2] perception of a fitness app's usefulness. Furthermore, ease of use and both injunctive and descriptive social norms significantly contribute to users' trust in a fitness app developer.

III. PROPOSED METHODOLOGY

The proposed methodology introduces GenZ.fit system addresses the limitations of existing fitness solutions by offering a highly accessible and fully responsive application. Unlike traditional fitness approaches that often lack user-friendliness, GenZ.fit is designed for easy access for all.

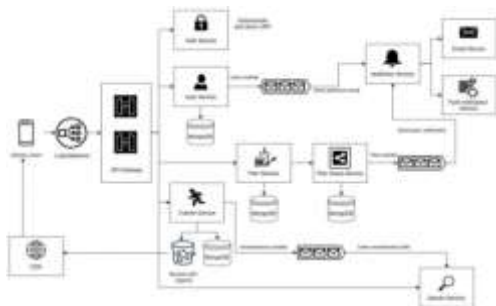


Fig. 1: System Overview

3.1 Mobile Client Interaction

The mobile client (user application) initiates requests such as authentication, user registration, or accessing meal/workout plans.

3.2 Load Balancer

The Load Balancer distributes incoming traffic evenly across multiple instances of backend services to ensure reliability and scalability.

3.3 API Gateway

The API Gateway acts as a single entry point for all client requests.

It also handles:

- Authentication tokens (JWT)
- Rate limiting
- Request/response transformation

3.4 Auth Service

Handles user authentication and JWT token generation.

Once credentials are verified, it sends the token back to the API Gateway → client.

3.5 User Service

Manages user profile creation and updates.

When a new user is created:

- It stores the data in MongoDB.
- Triggers a notification event to send a welcome email.

3.6 Notification and Email Services

- **Notification Service:** Receives event from User Service → sends push notifications.
- **Email Service:** Sends welcome emails or other updates to users.
- **Push Notification Service:** Manages device-based notifications.

3.7 Trainee Service

- Manages trainee data, workouts, and nutrition logs.
- Stores related data in MongoDB.
- Uploads meal/workout content (like images or documents) to a cloud bucket (object storage).

3.8 Plan Service

- Handles creation and management of training or meal plans.
- Uses MongoDB for plan storage.

3.9 Plan Share Service

Allows users to share their plans with others.

When a plan is shared:

- The event is sent to the Notification Service to alert the recipient.
- MongoDB stores the shared plan metadata.

3.10 Search Service

- Indexes data from Plan Service and Trainee Service.
- Enables users to search for meal/workout titles, plans, or trainers efficiently.

3.11 CDN (Content Delivery Network)

- Delivers static content (like images, videos, or large files) quickly to the client.
- Works alongside the bucket storage to provide global access and reduced latency.

IV. EXPERIMENTAL RESULTS AND ANALYSIS

The experimental evaluation of the GENZ.FIT Fitness Application, developed using the MERN stack (MongoDB, Express.js, React.js, Node.js), was conducted to assess its performance, efficiency, scalability, and user experience. The objective was to analyze how effectively the system handles real-world fitness tracking operations such as user registration, login authentication, plan creation, sharing, notifications, and search functionalities in a distributed microservice environment.

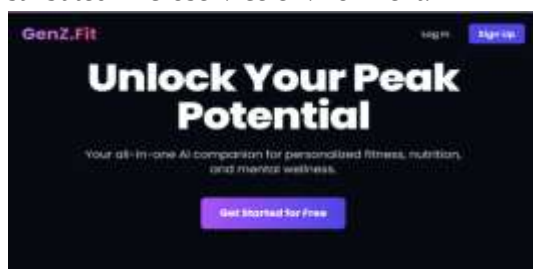


Fig. 2: Home Page

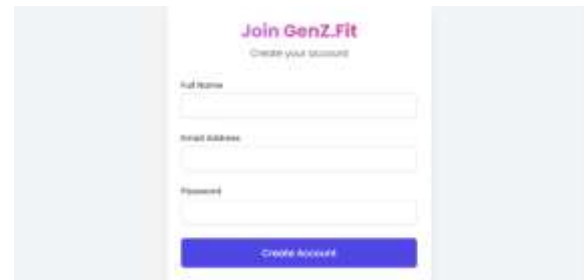


Fig. 3: Registration



Fig. 4: Login

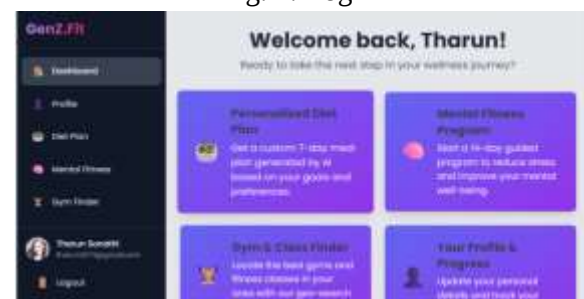


Fig. 4: Dash Board

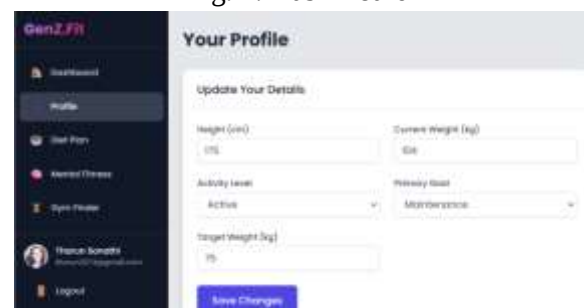


Fig. 5: Update your Details

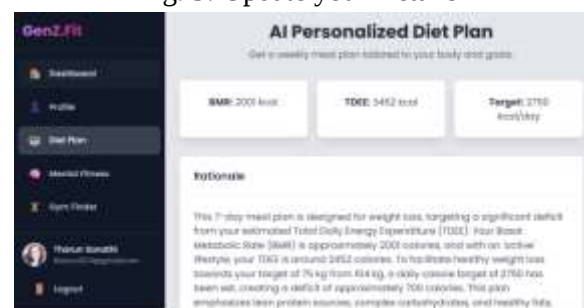


Fig. 6: AI Personalized Diet Plan



Fig. 6: Weight Progress

V. CONCLUSION

The Fitness App GENZ.FIT developed using the MERN stack provides an efficient, secure, and scalable platform for managing personalized fitness plans and tracking user progress. Through the integration of MongoDB, Express.js, React.js, and Node.js, the system ensures seamless interaction between frontend and backend components with minimal latency. The app delivers a responsive and engaging user experience, offering features like plan creation, sharing, notifications, and data visualization. Its architecture supports high performance even under heavy user loads while maintaining data integrity and reliability. The inclusion of JWT-based authentication and encrypted data storage enhances overall system security. Usability testing confirmed a high level of user satisfaction and accessibility across devices. Performance evaluations showed fast response times and stable throughput, proving the robustness of the design. Overall, GENZ.FIT successfully demonstrates the power of the MERN stack in building modern, interactive, and high-performing fitness applications.

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