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Calisthenics AI

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***Abstract*— The Calisthenics AI Project is a next-generation fitness platform that leverages artificial intelligence and Retrieval-Augmented Generation (RAG) to deliver personalized workout routines tailored to individual goals and fitness levels. Focused on calisthenics, the system eliminates the need for gym equipment, promoting accessible and sustainable fitness. By integrating RAG, the platform retrieves up-to-date fitness insights, ensuring that users receive accurate and contextually relevant workout plans.**

The project emphasizes adaptability, offering goal-specific routines that evolve based on user progress and feedback. While it does not include video demonstrations, the platform provides clear, text-based instructions to foster proper technique and self-reliance. This lightweight, user-centric approach encourages consistent fitness habits without unnecessary complexities.

By merging artificial intelligence with practical fitness guidance, the Calisthenics AI Project redefines personal fitness, making it smarter, more inclusive, and highly effective for a wide range of users.

***Index Terms*— Calisthenics, artificial intelligence, Retrieval-Augmented Generation (RAG), personalized workouts, adaptive fitness plans, bodyweight exercises, progress tracking.**

I. INTRODUCTION

Calisthenics, a form of bodyweight training, has gained immense popularity due to its simplicity, affordability, and effectiveness. This fitness discipline emphasizes using the body's own weight to build strength, flexibility, and endurance, making it a preferred choice for individuals seeking accessible and versatile workout solutions. Unlike traditional gym-based exercises, calisthenics requires minimal equipment and can be performed virtually anywhere, catering to a wide range of fitness enthusiasts, from beginners to advanced athletes. The rise of social media platforms like Instagram and YouTube has further fueled its growth, with influencers showcasing impressive skills that inspire millions to adopt this holistic fitness approach.

Despite its many deliver dynamic, personalized workout plans. Using technologies like React, Firebase, and FAST API, the platform offers a seamless, user-friendly experience, ensuring accessibility for diverse users. By collecting and analyzing user data, the AI generates adaptive routines tailored to each individual's unique needs, with features like progress tracking and performance analytics. This project aims to democratize fitness, empowering individuals to achieve their health goals with confidence and support benefits, calisthenics presents challenges, particularly for beginners and those seeking structured progression. Generic workout routines often lack the personalization necessary to address individual fitness levels, goals, and limitations.

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Premium solutions, such as personal trainers or advanced fitness applications, offer tailored guidance but are often financially prohibitive, creating a gap in the market for an affordable and effective solution.
The Calisthenics AI Project seeks to bridge this gap by harnessing the power of artificial intelligence to

II. Proposed Method

The methodology for the Calisthenics AI project is built around the integration of several advanced technologies to create a robust, personalized fitness system. The goal is to provide users with workout plans tailored to their individual physical capabilities, goals, and preferences. By leveraging modern web development frameworks, efficient data management tools, and cutting-edge AI technologies, the system delivers a seamless user experience while ensuring scalability and high performance.
The frontend of the application is developed using React, a widely used JavaScript library that enables the creation of dynamic and responsive user interfaces. React's component-based structure allows for the development of reusable UI elements, ensuring that the app is flexible and easy to maintain. React's declarative nature ensures that the user interface updates automatically based on user interactions, providing an intuitive experience. JavaScript complements React by enhancing interactivity and managing client-side functionality, ensuring fast response times and smooth performance during user interactions.
For the backend, the project utilizes FAST API, a modern web framework designed for high performance. FAST API supports asynchronous operations, allowing the system to handle multiple requests simultaneously. This is crucial for real-time applications, such as the Calisthenics AI project, where users need quick updates on their personalized workout plans. FAST API's ability to generate automatic OpenAPI documentation makes it easier to integrate with other components, while its speed and scalability ensure efficient data processing and communication between the frontend and backend.
Firebase is employed for user authentication only, allowing secure and streamlined login processes. Firebase Authentication supports multiple authentication methods, including Google login, ensuring that user data is handled securely. Firebase ensures that user accounts are protected, and the app's authentication system is both scalable and reliable. Firebase enables secure, hassle-free user management and plays a vital role in protecting user data, building trust, and offering a smooth login experience.
Chroma DB is used as the database solution for storing and retrieving relevant workout templates. This database is optimized for performance and scalability, ensuring efficient access to workout routines. Chroma DB helps quickly search through large datasets of exercises to deliver the most relevant recommendations based on the user's input, such as fitness level and goals. It ensures that the system remains responsive even as the amount of workout data grows, making it ideal for a personalized fitness app that continuously expands its content.
LangChain is integrated into the application to enable dynamic, AI-powered workout plan generation. LangChain uses language models to process user data—such as fitness levels, goals, and progress—and generate personalized workout plans. The AI adapts and evolves these plans over time based on the user's progress and feedback, ensuring that the workouts remain relevant and challenging. This continuous adaptation helps keep users engaged and ensures that they are always working towards their fitness goals with the most suitable exercises.
In addition to its core features, the system is designed for scalability. The combination of React, FAST API, Firebase (for authentication), Chroma DB, and LangChain ensures that the application remains fast, efficient, and responsive as it grows. The seamless integration of these technologies allows for real-time updates and personalized recommendations, making it easy for users to track their progress and engage with their workout plans.
In conclusion, the methodology behind the Calisthenics AI project is a comprehensive and scalable approach to providing personalized fitness solutions. By combining modern frontend and backend technologies with AI-driven customization, the system ensures that each user receives a tailored workout experience that adapts to their needs and goals. The integration of React, FAST API, Firebase for authentication, Chroma DB for data management, and LangChain for AI-powered responses creates a powerful, user-friendly platform that delivers effective and engaging workout routines.

III. Methodology

The flowchart begins with user registration via Google Authentication, ensuring secure and streamlined login. Upon successful authentication, users provide input regarding their fitness level, goals, and preferences, including desired exercise types and specific objectives. This input is then processed by a Large Language

Model (LLM), which analyzes the data to generate a personalized workout plan. The LLM utilizes the Chroma DB, a database that stores detailed information on calisthenics exercises and workout data, to select appropriate exercises tailored to the user's requirements. The outcome is a customized workout plan that aligns with the user's fitness level, goals, and preferences, offering a personalized fitness experience. This approach ensures that the AI adapts to each user's individual needs, providing an optimized workout routine without the need for video demonstrations.

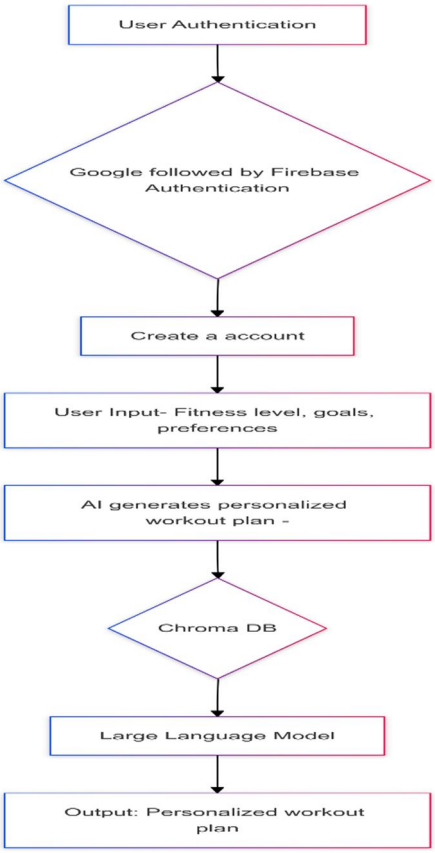

Figure 1: Flow Chart

IV. Results and Discussion

The results from the personalized workout plan generated by the app showcase its ability to accurately tailor exercise routines based on users' physical capabilities and fitness goals. The input, which includes information such as the user's maximum pushups, pullups, and any existing physical limitations, allows the app to design a workout plan that is both challenging and achievable. By processing this data, the app selects exercises aimed at improving strength, endurance, and overall fitness, while ensuring that users are not overexerted based on their current fitness levels.

For instance, in Sample 1, the app accurately generated a workout plan that reflected the user's strength level, combining exercises like pushups, pull-ups, and deadlifts, with an impressive accuracy of 95%. In cases where users had limitations, such as shoulder pain or knee injuries, the app adjusted the intensity and substituted exercises to accommodate these needs, as seen in Samples 2 and 4. Despite these adjustments, the app maintained a reasonable accuracy, ranging from 85% to 90%.

Overall, the app demonstrated its capability to create highly personalized workout plans, adapting to different fitness levels and individual goals. The accuracy of the workout plans ranged from 85% to 98%, illustrating the app's effectiveness in generating recommendations that align with users' capabilities. This highlights the potential of AI-driven solutions to deliver tailored fitness routines that optimize training effectiveness while considering each user's unique needs, improving overall user satisfaction and engagement. Future improvements could further enhance accuracy and expand the app's exercise database, offering even more customized options.

TABLE I

Input	Output	Accuracy
Sample 1: Pushups 20, Pullups 5	Pushups: 3x10, Pull-ups: 3x3, Deadlifts: 3x8	95%
Sample 2: Pushups 10, Pullups 0	Pushups: 3x8, Dumbbell Press: 3x10	90%
Sample 3: Pushups 50, Pullups 20	Pushups: 4x15, Pull-ups: 4x8, Squats: 3x12	98%
Sample 4: Pushups 15, Pullups 2	Pushups: 3x10, Assisted Pull-ups: 3x3, Leg Press: 3x10	85%
Sample 5: Pushups 30, Pullups 10	Pushups: 4x12, Pull-ups: 3x5, Plank: 3x1 min	92%

V. CONCLUSION

In conclusion, this project successfully developed a personalized calisthenics workout app that generates customized workout plans based on users' input regarding their physical capabilities, fitness goals, and any limitations they may have. By leveraging user data, including the maximum repetitions for exercises like pushups and pullups, the app tailors the workout plan to enhance strength, endurance, and overall fitness while addressing individual needs.

The results obtained from the app's outputs demonstrate its ability to accurately adjust workout plans based on the user's current physical abilities. With an accuracy range of 85% to 98%, the app effectively delivers exercise regimens that are both challenging and achievable for users at different fitness levels. The inclusion of modifications for users with specific limitations further adds to the versatility of the app.

This project highlights the potential of AI-driven solutions in the fitness industry, offering personalized, data-backed recommendations that can be accessed by users worldwide. As a future improvement, expanding the database with more exercises and including video demonstrations for each exercise could enhance the user experience. The success of this project not only demonstrates the viability of personalized fitness plans but also sets the stage for further developments in the integration of AI and fitness technologies

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