Development of AI-Based Diet and Exercise Application

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***Abstract*—In today's fast-paced world, maintaining a healthy lifestyle has become a challenge for many. The lack of proper nutrition and physical exercise has led to an increase in health issues among people. To address this problem, an AI-based diet and exercise consultant application is being developed that can provide personalised daily diet plans and physical activities. The main objective of this application is to help individuals achieve and maintain their fittest life by providing an efficient and handy diet plan, eliminating the need for real-world dieticians. A balanced diet is crucial as it provides proper nutrition for the body to work effectively, reducing the risk of disease, infection, and fatigue. Additionally, a good diet can help individuals manipulate their calorie intake based on their needs. The AI-based diet and exercise consultant application can help individuals overcome their unhealthy eating habits and lead healthy lifestyles. This research paper will investigate the effectiveness of an AI-based diet and exercise consultant application in helping individuals achieve their fitness goals and lead healthy lifestyles.**

Keywords—AI-based diet consultant, Health application, Personalized diet plans, Fitness tracking, Health metrics, Chatbots and health , Nutrition and physical activity tracking

I. Introduction

In today's world, people are facing various health issues due to unhealthy eating habits and a lack of physical exercise. To address this issue, an AI-based diet and exercise consultant application is being developed to help individuals lead a healthy lifestyle. The main objective of this application is to create an innovative and efficient way to achieve and maintain an individual's fittest life by providing personalised daily diet plans and physical activities. With this AI-based Diet Consultant application, individuals can have easier accessibility to a new and innovative way of maintaining a healthy lifestyle. A balanced diet is essential as it provides the necessary nutrients for the body to work effectively, reducing the risk of diseases, infections, and fatigue. However, in today's busy day-to-day life, approaching a real-world dietician can be a challenge. The AI-based diet and exercise consultant application eliminate the need for real-world dieticians and provide a handy and efficient diet plan and physical challenges for every day. This research paper will investigate the effectiveness of an AI-based diet and exercise consultant application in helping individuals achieve their fitness goals and lead healthy lifestyles.

II. Literature Review

In recent years, there has been a growing interest in the use of artificial intelligence (AI) in healthcare, particularly in the field of diet and nutrition. AI-powered applications can provide personalized recommendations and advice based on an individual's unique health data, helping to improve overall health outcomes.

One such application is an AI-based diet consultant, which utilizes machine learning algorithms to generate customized diet and exercise plans based on an individual's body mass index (BMI), basal metabolic rate (BMR), and other health metrics. These plans can help individuals achieve and maintain a healthy lifestyle by providing them with personalized recommendations for their unique needs.

Studies have shown that AI-based diet and exercise consultants can be effective in improving health outcomes. A study published in the Journal of Medical Systems found that an AI-based diet and exercise consultant was effective in improving adherence to a healthy diet and exercise plan among overweight and obese individuals. The study concluded that an AI-based approach could be an effective tool for promoting healthy lifestyles.

In addition to generating personalized diet and exercise plans, AI-based diet consultants can also provide real-time feedback and support. For example, chatbots powered by AI algorithms can provide users with instant responses to their questions and concerns, helping them stay on track and motivated.

Moreover, AI-powered applications can also integrate with wearable devices such as fitness trackers and smartwatches to collect health data such as heart rate, steps taken, and sleep patterns. This data can then be used to provide personalized recommendations for diet and exercise based on an individual's unique needs and goals.

Overall, AI-based diet consultants have the potential to revolutionize the way we approach diet and nutrition. By utilizing machine learning algorithms and real-time feedback, these applications can provide individuals with personalized recommendations and support, helping them achieve and maintain a healthy lifestyle.

III. METHODOLOGY

Generating Diet
Method: The new user must sign up and the old user must log in in order to use the application. After registration, the user must enter his user details, such as height and weight, to calculate the BMI and BMR.
Methodology: Research and choose a reliable formula to calculate BMI and BMR, and ensure that the application includes a validation process to check the input data for accuracy.

Generating Exercises
Method: The application uses artificial intelligence algorithms to suggest exercises for the user based on their BMI and BMR.
Methodology: It chooses the machine learning algorithm that can analyse user data and generate a list of recommended exercises for the user. Ensure that the application includes a variety of exercise options to choose from.

Synchronizing Google Fit data
Method: The application uses the Google Fit API to sync and display various health metrics such as Steps, Heart Rate, Blood Pressure, Oxygen Saturation, Blood Glucose, and Body Temperature.
Methodology: Use the step data to send notifications to the user to walk more, and reminders to stay hydrated.

Active Notifications
Method: The application uses the step data to send notifications to the user to walk more, and reminders to stay hydrated, training & Motivational Videos
Methodology: Develop a notification system that can analyse the user's step data and send notifications accordingly. Ensure that the notifications are not intrusive and can be customized to suit the user's preferences.

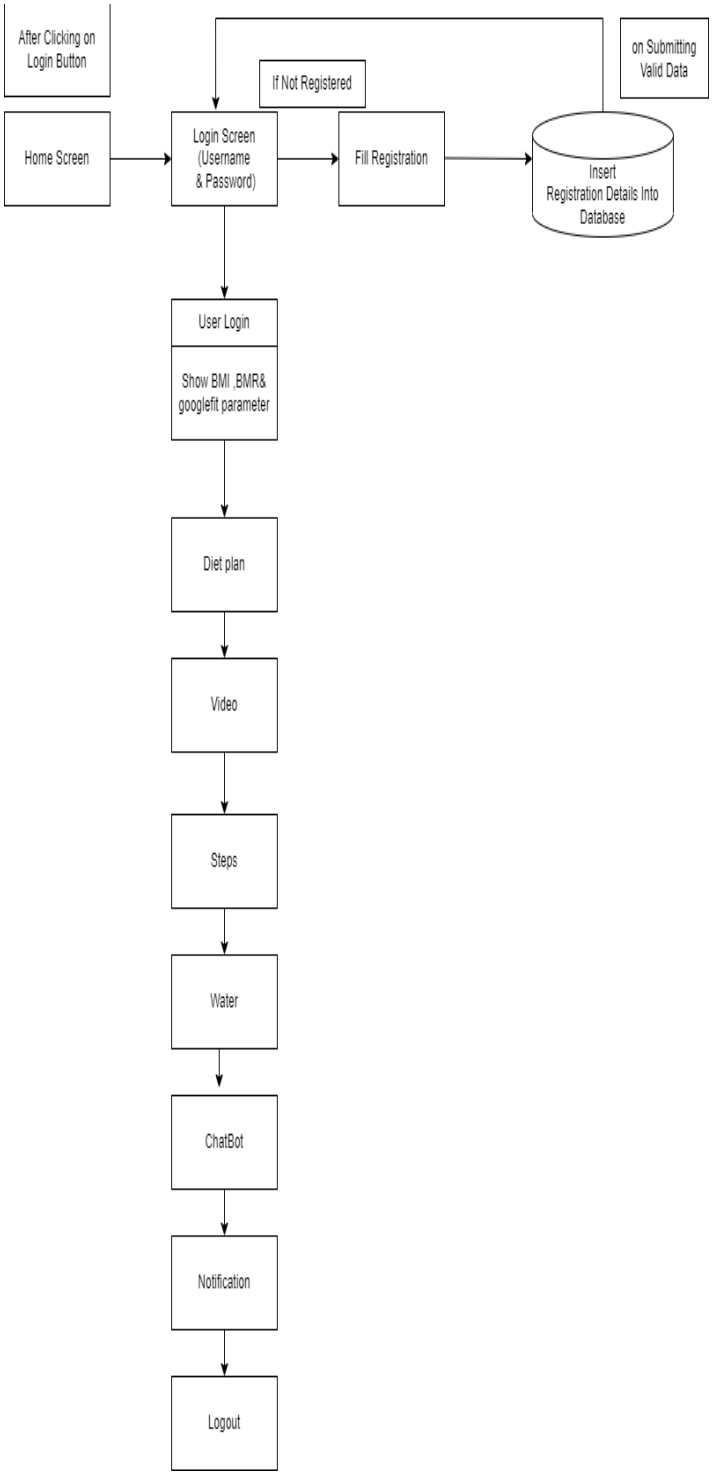
Chatbot

Method: The application consists of a chatbot where the chatbot responds to the user's questions based on artificial intelligence by using Dialogflow essentials
Methodology: Chat bot responds to the user questions based on intents and knowledge-based data which is trained for it.

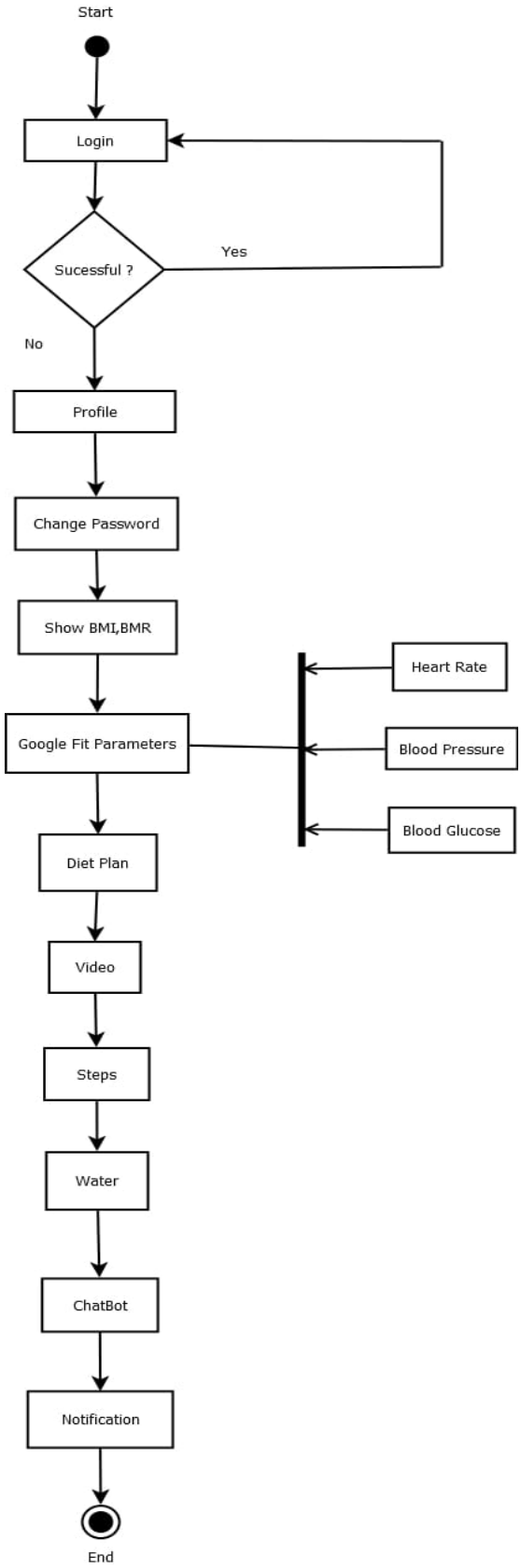
Training & Motivational Video
Method: The application uses artificial intelligence algorithms to suggest workout training and motivational videos to users.
Methodology: It uses a machine learning algorithm that can analyse user data and generate a list of recommended workout training and motivational videos. Ensure that the videos are high-quality and are tailored to the user's preferences and fitness level.

Project Design

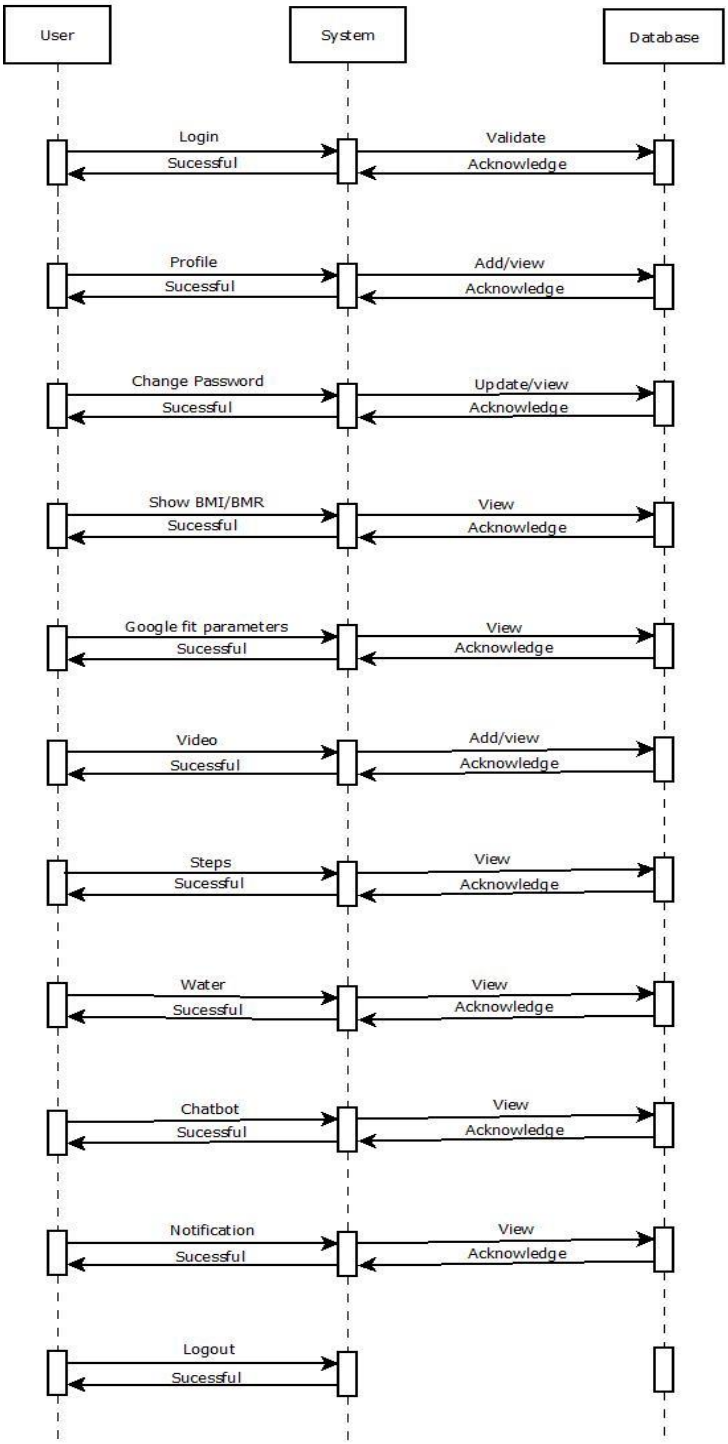
- **System Architecture**



- **Activity Diagram**



- **Sequence Diagram**



PROJECT IMPLEMENTATION

The Project application is loaded in Android Studio. We used Android Studio for the Design and coding of the project.

- **HARDWARE REQUIREMENT**
  LAPTOP OR PC
  Windows 7 or higher
  I3 processor system or higher
  8 GB RAM or higher
  100 GB ROM or higher

- **ANDROID PHONE**
  6.0 or above

- **SOFTWARE REQUIREMENT**
  LAPTOP OR PC
  Android Studio
  Azure Data Studio

OVERVIEW OF TECHNOLOGIES USED

- **Android studio**

Android Studio is the official IDE for developing Android apps, based on IntelliJ IDEA. It offers a flexible Gradle-based build system, a fast emulator, and a unified environment for developing for all Android devices. With features like Instant Run, code templates, and GitHub integration, developers can build apps quickly and efficiently. Android Studio also includes testing tools and frameworks, Lint tools to catch issues, C++ and NDK support, and built-in support for Google Cloud Platform, making it easy to integrate Google Cloud Messaging and App Engine into your app.

- **XML**

XML is a markup language used for designing the user interface of Android applications. It allows developers to create a visual representation of the app's layout, including views such as buttons, text fields, images, and more. XML is used to define the structure, layout, and behavior of UI elements in an Android app. It's also used to specify resources such as colors, strings, and dimensions, which can be reused throughout the app. Android Studio provides a visual editor for XML layouts, making it easy to create and modify UI elements.

- **JAVA**

Java is one of the primary programming languages used for developing Android applications. It is an object-oriented language with a rich set of libraries and frameworks that make it easier to develop complex applications. Java is a popular choice for Android development because it is platform-independent and has a large developer community with extensive documentation and resources.

- **Project Structure**

Android Studio organizes projects into modules containing source code and resource files, such as Android app modules, library modules, and Google App Engine modules. All build files are visible at the top level under Gradle Scripts, and app modules contain the Manifests, Java, and Res folders for organizing code and resources. The view of project files can be customized to focus on specific aspects of app development, including displaying recognized coding and syntax errors in the Problems view.

- **The User Interface**

The Android Studio user interface consists of a toolbar, navigation bar, editor window, tool window bar, and status bar. The toolbar allows users to perform actions such as running an app or launching Android tools. The navigation bar provides a compact view of the project structure, and the editor window is where code is created and modified. Tool windows provide access to specific tasks, such as project management or version control, and can be expanded or collapsed. The status bar displays project and IDE status, as well as warnings and messages. Users can customize the main window by hiding or moving toolbars and tool windows and can access IDE features through keyboard shortcuts. The search function allows users to locate specific actions or elements within the IDE.

- **The Tool Window**

Android Studio has various tool windows, which are automatically displayed based on the context. You can expand, collapse, drag, pin, unpin, attach, detach, and customize these tool windows to suit your needs. You can also restore the default layout or store the current layout as default. To show or hide the tool window bar, click the window icon in the bottom left-hand corner. To locate a specific tool window, hover over the window icon and select the tool window from the menu.

- **Gradle Build System**

Android Studio uses the Gradle build system to customize, configure, and extend the build process. You can create multiple APKs, reuse code and resources, and more. The build files are named build gradle and use Groovy syntax. Android Studio generates the necessary build files when you import a project.

- **Multiple APK Support**

Multiple APK support lets you create different APKs based on screen density or ABI, making it easier to target specific devices. This allows for greater efficiency in development and allows APKs to share certain settings.

- **Code Inspections**

Android Studio's code inspections help identify and correct problems with your code's structural quality. The Lint tool checks for bugs and optimization improvements, covering correctness, security, performance, usability, accessibility, and internationalization.

- **Debug And Profile Tools**

Android Studio has built-in tools for debugging and performance analysis to help you improve your code.

- **Azure Data Studio**

Azure Data Studio is a cross-platform database tool that can be used in conjunction with Android Studio for managing and querying databases. It provides a modern, intuitive interface for performing tasks such as creating databases and tables, executing queries, and analyzing query performance. With Azure Data Studio, you can connect to a wide range of database platforms, including SQL Server, PostgreSQL, and MySQL, among others. The tool also supports extensions, enabling you to add additional functionality to meet your specific needs.

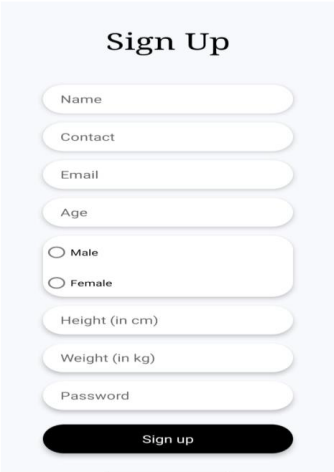
- **Dialogue flow**

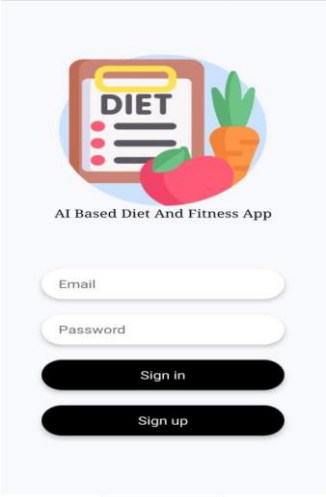
Dialogue flow is a natural language processing (NLP) platform that enables developers to design and integrate conversational user interfaces into mobile apps, web applications, devices, and bots. It uses machine learning algorithms to understand and respond to user requests in a

conversational manner. With Dialog flow, developers can create chatbots, voice assistants, and other conversational interfaces that can be integrated into Android Studio projects.

Project Description

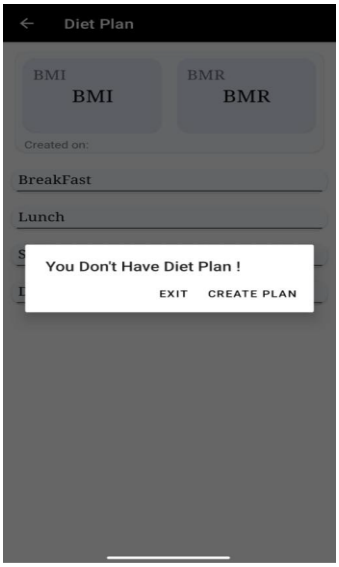
- **USER SIGN-IN/SIGN UP**



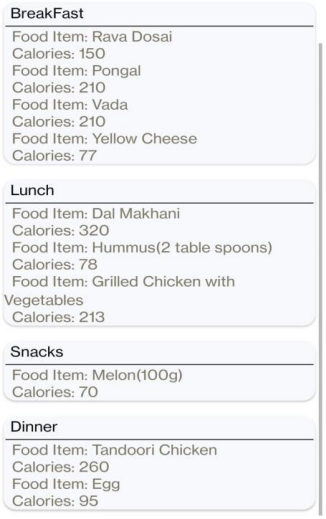


- **GOOGLE FIT PARAMETERS**

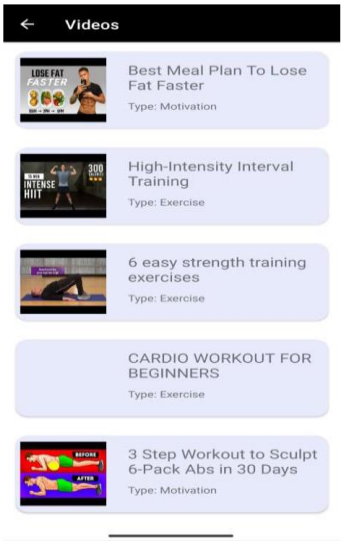
- **SEEKING A DIET PLAN AND FITNESS**



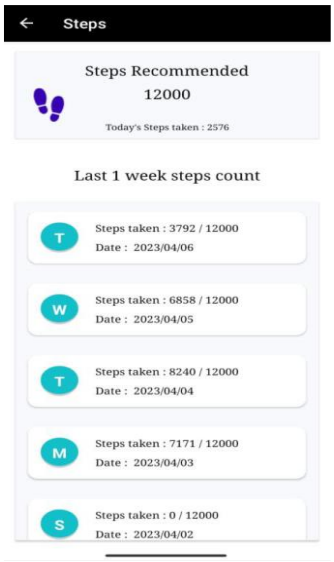
- **DIET PLAN**



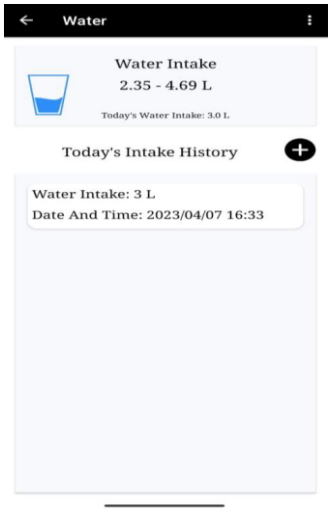
- **FITNESS VIDEOS**



- **STEPS**

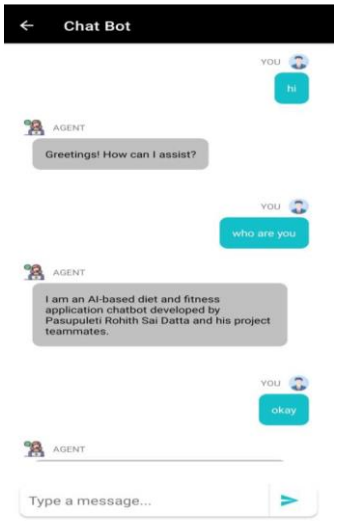


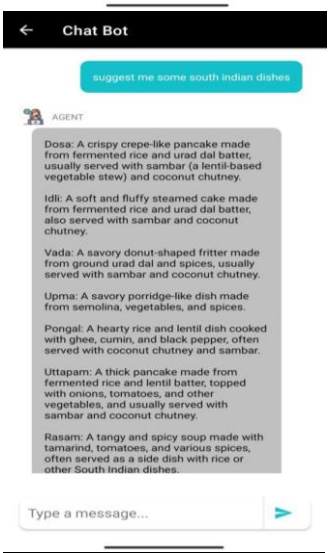
- **DRINKING WATER**

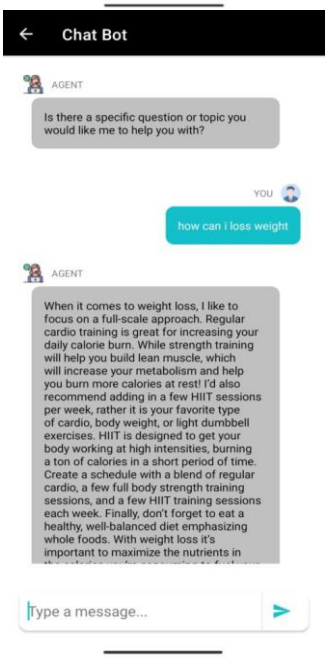


- **NOTIFICATION OF STEPS**

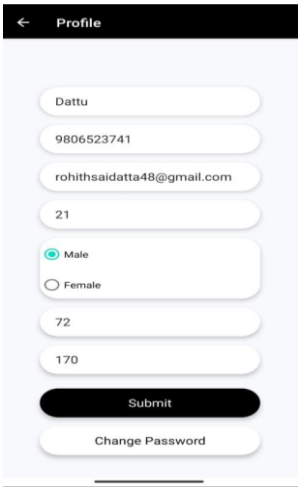
- **CHATBOT**







- **USER PROFILE**



Benefits of this Application

- **Load Balancing:**
  Benefit: By limiting the amount of load on the server during admin access, the system can operate more efficiently and handle the workload more effectively.

- **Easy Accessibility:**
  Benefit: This feature allows for easy storage and access to records and information, which can save time and improve productivity. Users can quickly retrieve the information they need without having to spend a lot of time searching for it.

- **User-Friendly:**
  Benefit: A user-friendly website or application can increase user engagement and satisfaction, leading to more positive experiences with the system. This can result in increased usage and better adoption rates.

- **Efficient and Reliable:**
  Benefit: Maintaining a secure database on a server can be more efficient and reliable than storing data on spreadsheets or physical record books. This can save time and reduce errors, while also improving data security.

- **Easy Maintenance:**
  Benefit: A system that is easy to maintain can save time and money on maintenance costs. This can free up resources to focus on more critical tasks, such as improving the system's functionality and adding new features.

Conclusion

This was our project of System Design for an Android AI Diet with Fitness App developed in Java programming language. The Development of this system takes a lot of effort from us. We think this system gave a lot of satisfaction to all of us. Though every task is never said to be perfect in this development field even more improvement may be possible in this application. We learned so many things and gained a lot of knowledge about the development field. We hope this will prove fruitful to us.

ACKNOWLEDGMENTS

- We are pleased to present the “Development of AI-Based Diet and exercise application” project and take this opportunity to express our profound gratitude to all those people who helped us in the completion of this project.
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