



College of Engineering
COMP 491 – Computer Engineering Design Project
Final Report

DIGITAL HEALTH COACH

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Spring 2023

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I. Abstract

The main purpose of our project is to encourage people who want to start a more active life but cannot find motivation, who find the motivation to start but do not continue, to encourage them to a more active and healthy life. In order to achieve these goals in our project, we send regular motivational notifications to users, when they exercise regularly and record them, we aim to gain more motivation from the process and the progress they make. While doing this, we also added a chatbot that users can talk to 24/7 and get advice, we also made exercise recommendations according to the weather by showing the weather on the homepage. We collected all these features in an ios application, we proceeded according to MVVM during the application development phase. In this application, we used firebase to save and pull data. We used GPT4All and Flask Local Server for the chatbot. With all these, we have developed Time to Move, which offers an easy use to the user.

II. Introduction

Our problem is that people lead a sedentary life, or when they start to move, it is not sustainable. In this way, we wanted to provide an application that will increase the motivation of users and enable them to do sports regularly. Similar to this design, there are applications such as NikeApp, Macfit, etc. These applications generally offer services for their own gyms and promote their own products, our app is an application aimed at motivating them by offering suggestions according to the preferences.

II.I Concept

As human beings, it is always easy to decide to start something, the hard part is taking regular action to implement this decision. One of the most common examples of this is diets that start on Monday and end on Tuesday evening. The main purpose of our application is to provide easy access to sports programs for people who aim to be fit at any age, as well as to record and track progress and motivate the user for continuity.

Our project aims to address this motivational issue surrounding exercises and exercise management. We have aimed to develop a user-friendly application for staying healthy and exercising regularly. The project includes several motivation enhancing features such as badges, rewards, motivational reminders, etc., to not only keep our users motivated but also engaged with our app. By offering personalised exercise plans, our aim is to empower users to make daily choices that contribute to their well-being. We recognize how hard it

can be to keep up with keeping healthy. Ultimately, our app strives to make the journey to better health enjoyable and achievable for everyone, serving as a supportive digital coach on the path to wellness.

II.II Objectives

The objective of this project is to give the users a digital health coach that collects the users personalised data which is given to the application by the user and suggests an exercise program. In regular time periods the application asks the user to take a test related to the given exercise program which shows the progress of the user. It is difficult to maintain a healthy exercise routine, this application prioritises motivating the users and uses different motivation techniques to help people continue their routine.

This project was designed to be an IOS application. The app was intended to be addressed to people who are looking for an application which stores the data the user gives about their physical health and gives back an exercise routine which is compatible with the person's calendar. Also, the app is for people who are having difficulties in sustaining a routine since this application gives great importance in motivating people to continue their program.

We have set two outcome goals for our project:

1. An dynamic and personalised exercise program
2. Features that make our health coach a exercise app that is also a digital motivator to make becoming healthy easier for everyone

II.III Background

Maintaining an exercise routine is challenging in many ways. Many people start with a routine and can't continue exercising according to that program. 50% of people who start exercising with an exercise routine stops until the 6th month of exercising [1]. This may have many reasons, one of them and the one that this project focuses on is the lack of motivation.

Additionally, to be able to record the process, different types of assessments should be done. Without knowing the exact process the usefulness of the exercises cannot be estimated. Research shows that same exercises can have different effects in different people [2] and that makes it important to record the process to find the most efficient exercise routine and the continuation of the personalized exercise routine. This project addresses the issue of motivation by recognizing the importance of personalised feedback and continuous assessment in fostering adherence to exercise programs. Existing health

and fitness applications often lack the capability to adapt to individual differences and assess progress effectively, overlooking the diverse needs and responses of users. Our project aims to fill this gap by prioritising user motivation and implementing robust assessment methods to tailor exercise recommendations to each user's unique profile. In an era where online solutions are increasingly preferred over traditional services, our application seeks to provide a modern and accessible alternative to traditional fitness coaching, catering to the evolving preferences of users in the digital age.

Furthermore, instead of finding coaches or trainers these days many people find it easier to find online trainers. In many other different sectors, many people may find it more suitable to take online courses or find online teachers instead of going to on site courses. Because of these reasons, we found this application which aims to be a health coach suitable for these times.

III. System Design

Describe the system you designed and developed in the project. Explain the building blocks of your system design. Discuss your solution methods and how you solved the problems encountered in your design.

III.I Programming Language & Platform

We chose Swift as our programming language as we intended to develop the app for iOS devices. Swift and SwiftUI makes developing user interfaces intuitive while also providing us with the necessary tools for the backend. It is also intended for iOS development thus making it well-suited for our iOS application. It's easy to implement and debug, which allowed us to develop a stable application..

III.II Architectural Design

Similar to what is being taught at Koç University iOS class, the Model-View-ViewModel (MVVM) architectural design was chosen for our application. MVVM allows us to separate the scope of our files, with the Model representing the data, the View the user interface, and the ViewModel acting as the intermediary between the two. With this approach, we were able to debug faster by working with isolated systems. This approach also enables a better team development environment as project-wide global attributes can be utilised across all the views, allowing us to achieve a homogeneously looking interface.

III.III Database Management

We chose to use the Firebase Console and its sub-services to use as our database

management systems. Firebase Authentication provided our project with the authentication system. With Firebase, we were able to implement features like login for existing accounts and sign up for new accounts. Firestore allowed us to use a real-time database for our user data. This allowed us to have personalised data for each user, which in turn allowed us to develop a more personalised user experience. With Firestore we were able to synchronise data like user preferences, usernames, logged exercises etc.

III.IV Chatbot Integration

We chose to use GPT4All and its models for the chatbot integration. The GPT4All based chatbot interface allows us to provide our users with an interface where they can get assistance about our app or with their fitness questions. GPT4All provides a python library. As a result, we used a python script with a Flask Local Server to act as an intermediary. Integration with Flask Local Server allowed us to respond to user queries and return with the necessary model outputs.

IV. Analysis and Results

IV.I Project Deliverables Realised

Our implementation of our project design has allowed us to fulfil the following deliverable goals:

1. **Wide Range of Exercises:** With our app, our users have access to a wide range of exercises targeted to their preferences and fitness goals. As seen in Figure 1 in the Appendix, our application provides a library of exercises, allowing users to choose activities that fit best for them.
2. **Personalised Exercise Recommendations:** Through the preferences page, users can select their fitness objectives and preferences. We use this personal information to give the users personalised exercise recommendations, as seen in Figure 2 in the Appendix.
3. **Exercise Tracking Monitoring:** As illustrated in Figure 3 in the Appendix, our app allows for easy tracking of exercise routines and progress monitoring. Users can save their workouts and access information about past exercises.
4. **Weather-Based Exercise Suggestions:** Our application offers exercise suggestions based on daily weather conditions while also providing them with a motivational and relevant message, which can be seen in Figure 4 in the Appendix.

5. **Motivational Rewards System:** Users can earn rewards based on multiple features such as their exercises and logins as observed in Figure 5 in the Appendix. This feature was intended to further improve our user experience and increase motivation
6. **Balance Measurement:** Our app includes a balance measurement feature. With this, our users can check their balance through a balance test. This helps users to track their progress by seeing their improvement with their balance. We hope to see a positive relationship between our app usage and our users' balance improvement.
7. **Chatbot Integration:** We have also implemented a chatbot assistant to help our users with their questions, as seen in Figure 6 in the Appendix. The chatbot answers our users' questions about the app or fitness exercises.

IV.II Evaluation of Design

We can evaluate the success of our application based on the goals we set previously. Our set goals are met if our project provides a personalised physical exercise experience and if our project provides a user-friendly experience. Through multiple features we have implemented, our design successfully focuses on promoting regular physical activity, improving user motivation and providing a personalised exercise experience.

The primary focus of the application was increasing motivation, which we believe was achieved. Features we implemented such as motivational messages, rewards were implemented to improve engagement. Our chatbot integration was intended to improve our users experience and provide users with support.

Lastly, features such as real-time data synchronisation and user specific exercise recommendations fulfil our goals of a personalised experience. With given personal information, each user is provided with a personalised exercise routine page where they can check their progress, their personalised exercise recommendations and their personal exercise calendar through which they can log their exercises.

In conclusion, the design of Time to Move is effective in encouraging regular physical activity and motivating users to achieve their fitness goals.

V. Conclusion

V.I Fulfilment of Goals and Achievements

We have developed an iOS application which provides our users with a personalised physical experience, focused on increased motivation. Our application provides our users' with a variety of exercises, allows our users to receive personalised recommendations based on their preferences, and track their progress. With real-time weather data we have implemented exercise suggestions. We have also implemented a rewards system that increases user engagement and motivation. Our application also allows users to check their balance through an easy balance test. The users can also ask their questions about the app or get advice about their fitness journey through our chatbot interface.

V.II Areas for Improvement

As we were limited by time, we were not able to conduct user satisfaction surveys to assess our application. A graphical theme and an application badge could be set to provide a more professional looking application. Rather than one test, multiple ways to check balance could be added to better capture our users balance. This would help us show our users their improvement that they have achieved while using our application. Additional modalities of engagement, such as text-to-speech, speech-to-text, and camera photo logging, could be implemented to enhance user interaction and motivation.

Overall, we were able to develop an iOS application which provides our users with a personalised physical experience, focused on increased motivation . With that being said, there are still areas in our project. With further improvements and user feedback, our application can fill the gap that exists in the digital exercise coaching. It is Time to Move!

VI. References

- [1] L. Kravitz, "Exercise Motivation: What Starts and Keeps People Exercising?," University of New Mexico, <https://www.unm.edu/~lkravitz/Article%20folder/ExerciseMot.pdf>.
- [2] "Study explains why the same exercise have different effects in different people," News-Medical.net, May 27, 2021.
<https://www.news-medical.net/news/20210527/Study-explains-why-the-same-exercise-have-different-effects-in-different-people.aspx>.

VII. Appendix

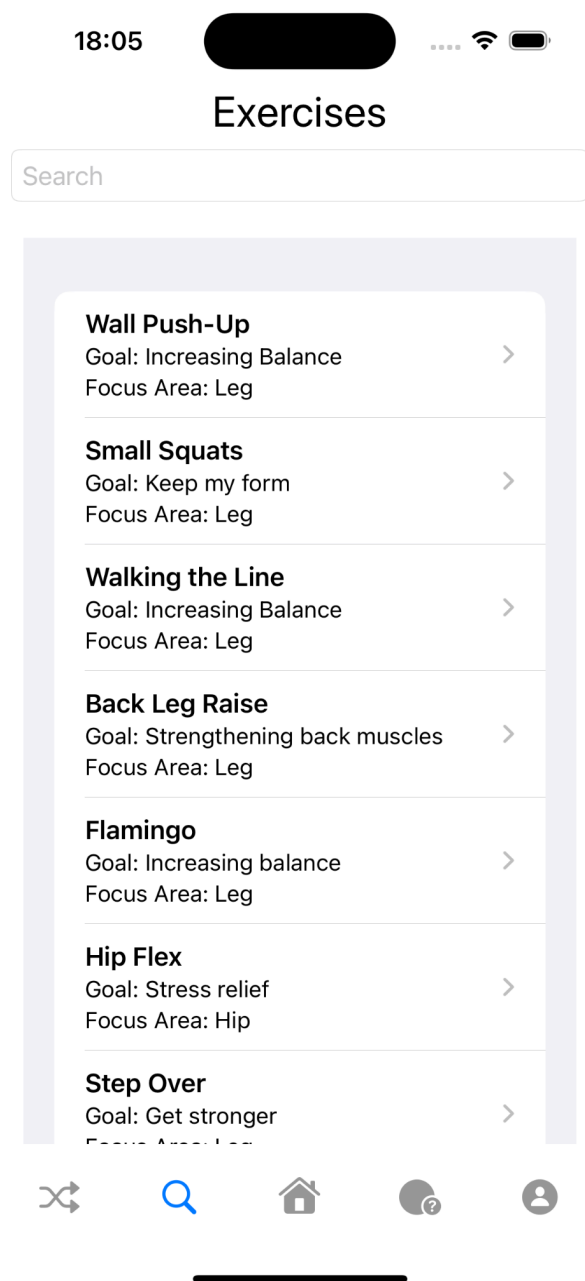


Figure 1: Time to Move’s Exercise Library

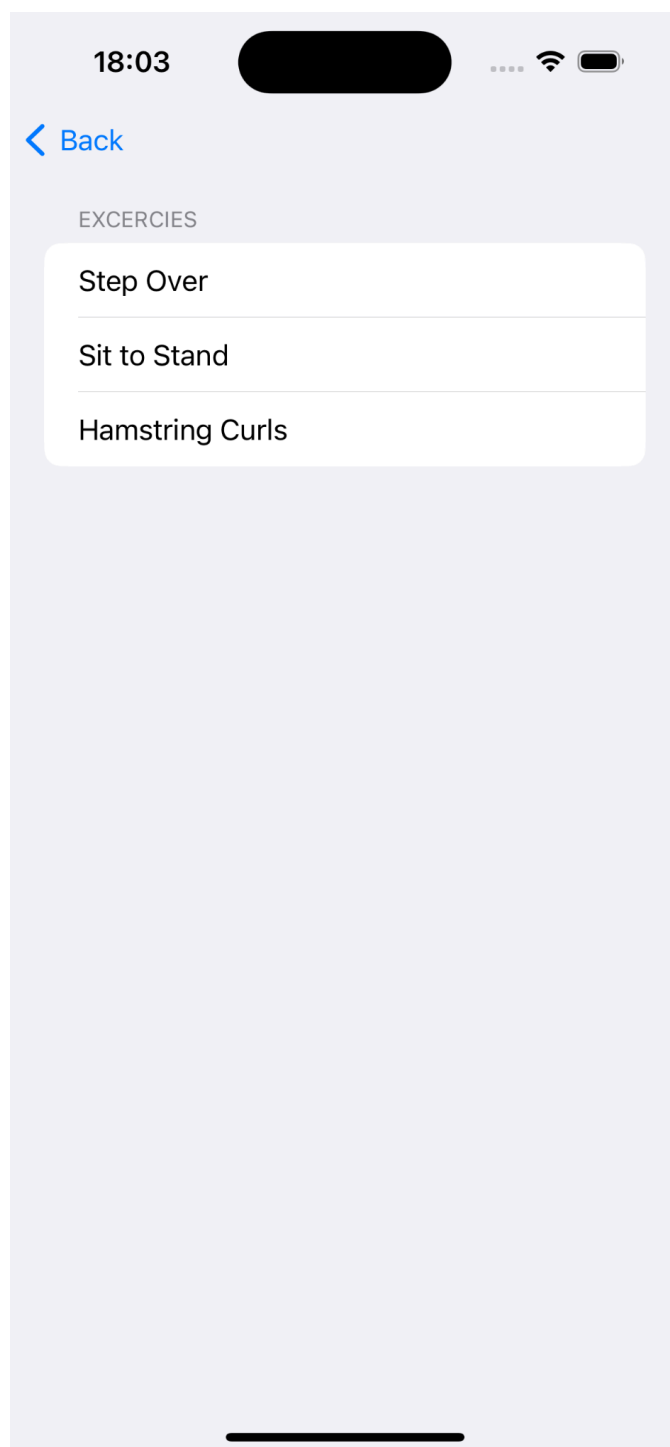


Figure 2: Time to Move's Recommended Exercise Page

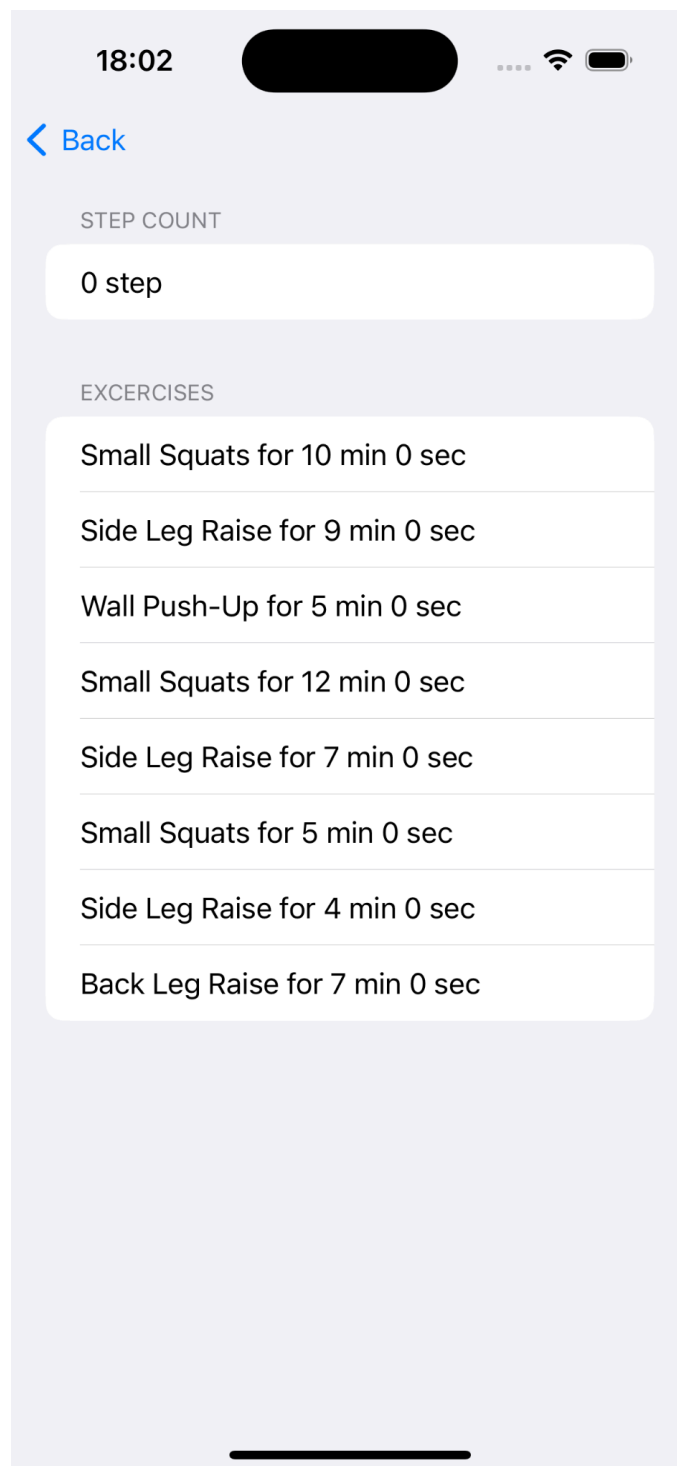


Figure 3: Time to Move's Saved Exercises PageFasda

19:11



Welcome

Weather



Temperature: 19,0°C
Condition: Sunny
Wind Speed: 28,1 kph

It's a beautiful day, how about a walk or a bike ride in the park?

Awards

You can test your balance from there



Figure 4: Time to Move's Weather Recommendations

17:23



[Back](#)

Awards

The Form is Protected!

You've kept your form. Keep it up!

Best Balanced Person!

You are more balanced now. Keep it up!

Powerful Back!

You have powerful back muscles now.
Keep it up!

First Exercise!

Congratulations on completing your first exercise. Keep up the good work!



Figure 5: Time to Move's Awards Page

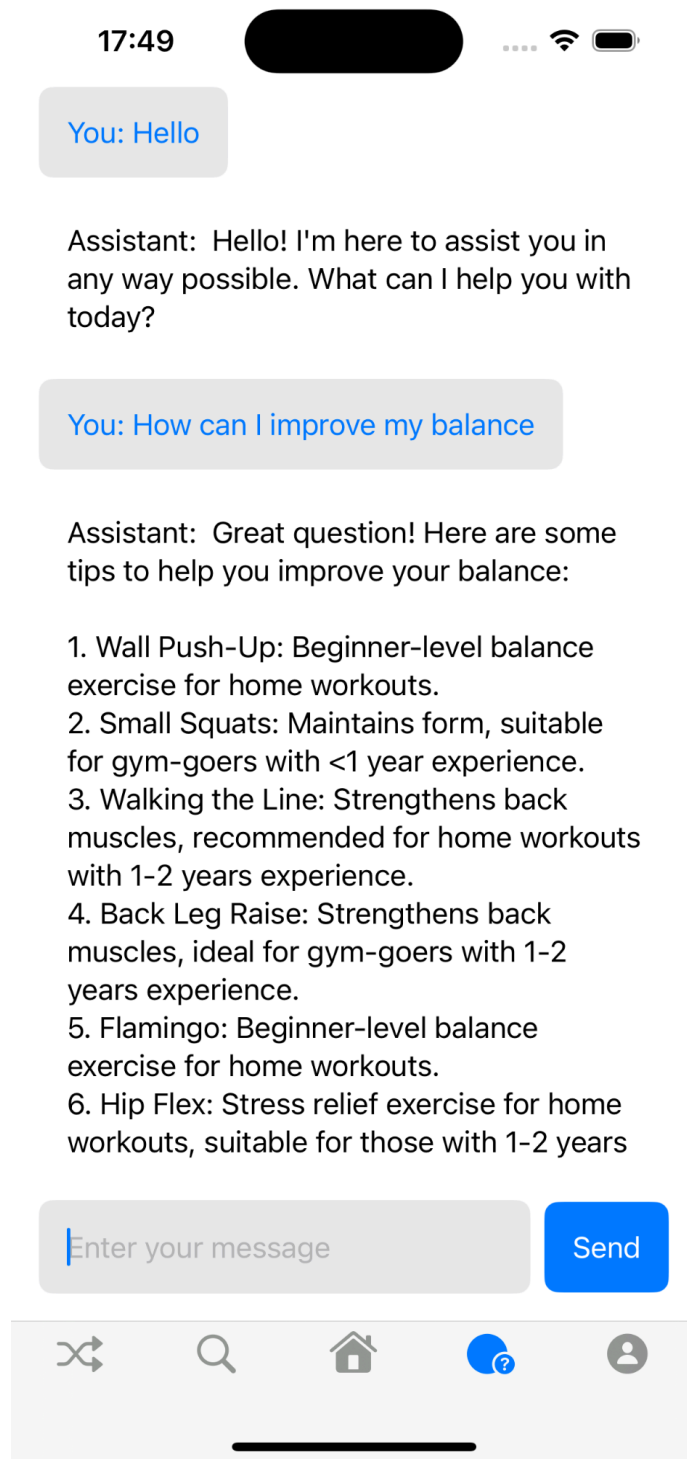


Figure 6: Time to Move's chatbot interface