

**Project title: The Adventure of Mine**

**Team members:** Xiao Yang  
Shuai Chang  
Chaojie Gong  
Xuewei Ji

# **Overview**

## **Motivation of Our App:**

Due to the Covid-19 pandemic, many facilities have shut down and schools closed, and many people have been forced to quarantine at home. When we started to discuss our project ideas, we considered that the activity that people can currently do is exercise. So we decided to design a running App that our users can carry out simple daily exercise tracking. Our life is an adventure. When faced with the pandemic and various pressures, going out for a pleasant run is the most beneficial way for the body and mind, so we decided to name our App as "*The Adventure of Mine*".

## **High-Level Concept of Our App:**

The main point we want to pass to our user through the app is that sports cultivate healthy lifestyles and life lessons.

Sport is a major contributor to economic and social development. It plays an important role to balance our work and leisure time.

In general, taking part in sport will improve our general health and wellbeing. There are some of the many health and fitness benefits of starting out in a sport. Playing sports helps body fat or controls your body weight. Sports allow you to gain the satisfaction of developing your fitness and skills. Playing sports helps strengthen bones. Sports help aid coordination, balance and flexibility. Sports can help improve stamina and concentration. Sports allow us to experience the highs and lows of both winning and losing! Through sports we can meet people with a similar interest to ourselves and are likely to gain many new friends. Sports are a great way for families to get exercise together. It is a healthy lifestyle.

A lot of times we have constraints from our work such as having insufficient time to do sports, or from any kinds of pressure that prevent us from doing activity. Under such limitations, running is an ideal sport activity that can significantly improve physical and mental health. As a form of aerobic exercise, running can reduce stress, improve heart health, and even help alleviate symptoms of depression.

The other main reason that running is so popular is because it doesn't need a specific court, many equipment, or any time restrictions to perform the activity. Therefore, it is an ideal sport that fits any kind of group of people.

Based on the above reasons, we chose running as our theme object and developed the app so that people can form a good habit of running by observing their running activity through the app and track their achievement.

# **Goals**

## **Accomplished Goals:**

❖ *Allow users to fill in their personal information.*

New users are mandatory to fill in all requested personal information. If they only filled parts of them, when they click the submit button, an alert will show and tell them all requested personal information needs to be filled. We set a default profile photo for users, where they can pick their own image by clicking profile photo. Un-change of the profile photo will not cause them to get the alert. Users can click the “Profile” tab any time to modify their profile when they enter the app.

❖ *Allow users to set up their weekly goals.*

We modified this function to allow users to set their daily goals. We suggest users set their target walking or running steps before they do exercise each day. Since our data is updated in real-time, this feature allows users to check the completion of their set exercise goals at any time. We believe this feature can motivate users to work hard to achieve their daily exercise goals. Users can click the plus button at the bottom right corner on the Goal page. On the pop-up page, they can fill in their “Today’s Goal” of the step number which they want to achieve on that day.

❖ *Set the function of sending notifications to users.*

We designed to send a notification to users at a fixed time each day and display their completion of the day's goal in the notification content. This feature is designed to realize the original intention of reminding users to do exercise of this app. For the purpose of testing this feature, we set the notification to be sent 5 seconds after the user fills in "Today's Goal" and clicks "Confirm".

To test this feature, if you use a simulator, please press Cmd+L immediately after you click the “Confirm” to lock the screen. 5 seconds later, the simulator should wake up with a sound, and show the notification on the locked screen. If you use a device, similarly, lock the screen immediately after you click the “Confirm” to lock the screen. 5 seconds later, the simulator should wake up with a sound, and show the notification on the locked screen.

❖ *Record the number of movement steps by using Apple’s HealthKit.*

The step counts from the past 30 days will be shown automatically in the record view once the user grants the permission for HealthKit data. It works only when using a real iPhone that supports Apple HealthKit. The simulator does not support this feature.

❖ *Implement the function of GPS location.*

The ActivityView shows a map. Our app supports the function of displaying the user's current location and drawing the exercise route in real-time on the map. Following the below steps to test this function. Features -> Location -> CityRun. Then a default location's map appears. Keep following the blue circle sign on the map, which shows we are moving. Click the “RUN” button at the bottom of the map, the exercise route will start to be drawn and shown on the map. When finished doing the exercise, users may

click the “END” button. Then, the drawing of the exercise route will stop. We will generate the total exercise time and the average walking or running speed.

## Changes on Goals:

- ❖ *Based on the user’s movement steps, a corresponding number of gold coins are awarded. Provide rewards (extra gold coins) for users who check in continuously by using the calendar function.*

During our implementation of this app, we make changes to our original design corresponding to the rewarding gold coins. We change the design from setting rewarding gold coins to show the completion of the goal of the day. We have designed a ring on the “GoalView” to show the percentage of the actual number of exercise steps that day with the goal steps set by the user. If users complete their set goal, the ring will be filled and formed into a closed loop. The reason we made this change because we feel that it can more visually show whether the user’s exercise on the day has reached the goal they set. And showing the completion degree by percentage will have a better effect on the user’s exercise motivation.

- ❖ *Generate pictures that reflect achieved weekly goals.*

This is a stretch goal to allow users to generate a screenshot on their “ActivityView” and save it to the photo library. We didn’t manage to accomplish this.

- ❖ *Share the gained gold coins top-ranking and exercise data on social media.*

This is a stretch goal. We didn’t manage to accomplish the function of sharing the information from the app on social media.

- ❖ *Add App icon*

We have noticed that all the apps we wrote don’t have an icon. So we decided to give an icon to our App to make it look nicer!

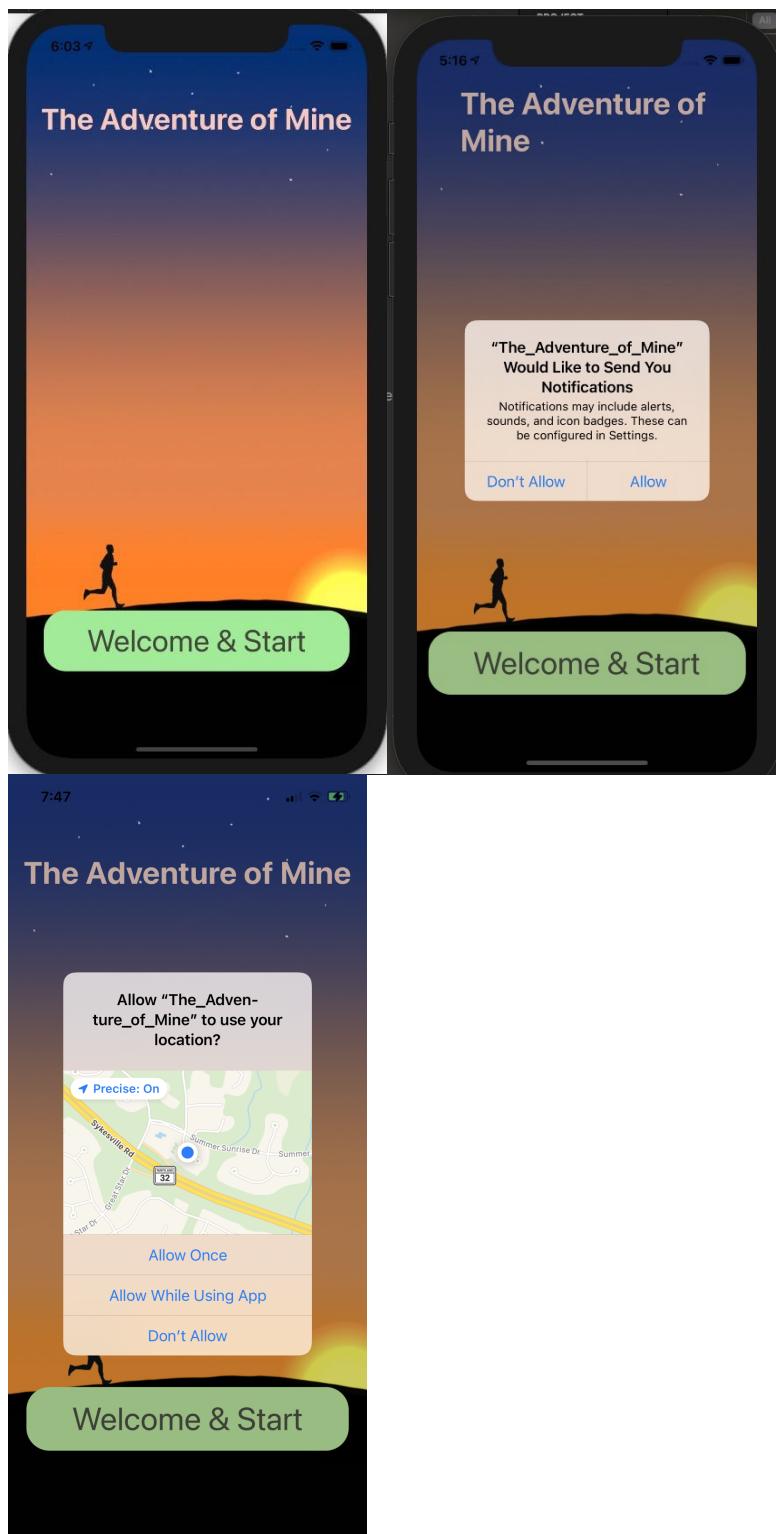
## User Interactions

- WelcomeView

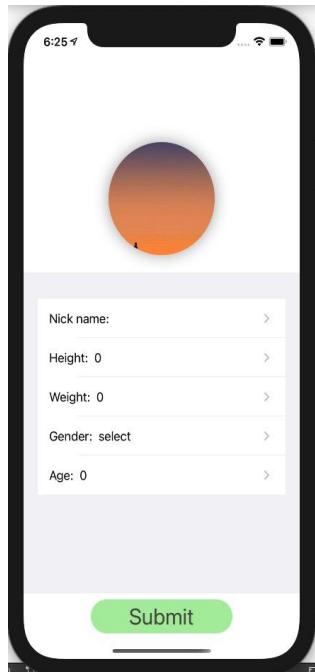
We have two versions of the WelcomeView. One is used for new users; another is used for registered users.

- new users

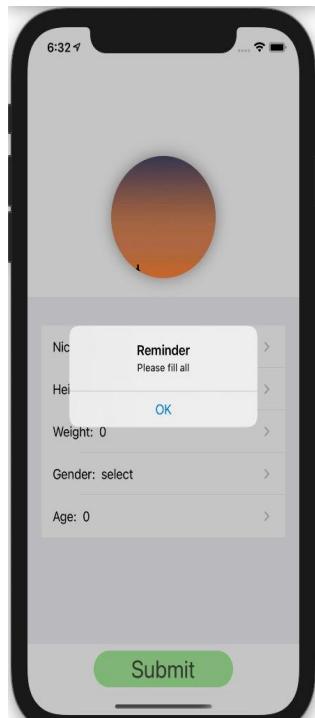
When the new users’ login to our App, they will be asked for permission, send notification, access current location.



When our new users open the app, they will see this welcome page. They should click the “Welcome & Start” button, it will lead users to the page request to enter their personal information.



The details of this view will be introduced in the ProfileView. The main difference between the FirstProfileView and ProfileView is that we add a button called “Submit” in the FirstProfileView. After users fill in all the requested personal information, they click the “Submit” button, which will drive them to the MainInterfaceView. However, if they do not fill in all the requested personal information, but they click the “Submit” button, they will get below Alter.



- registered users

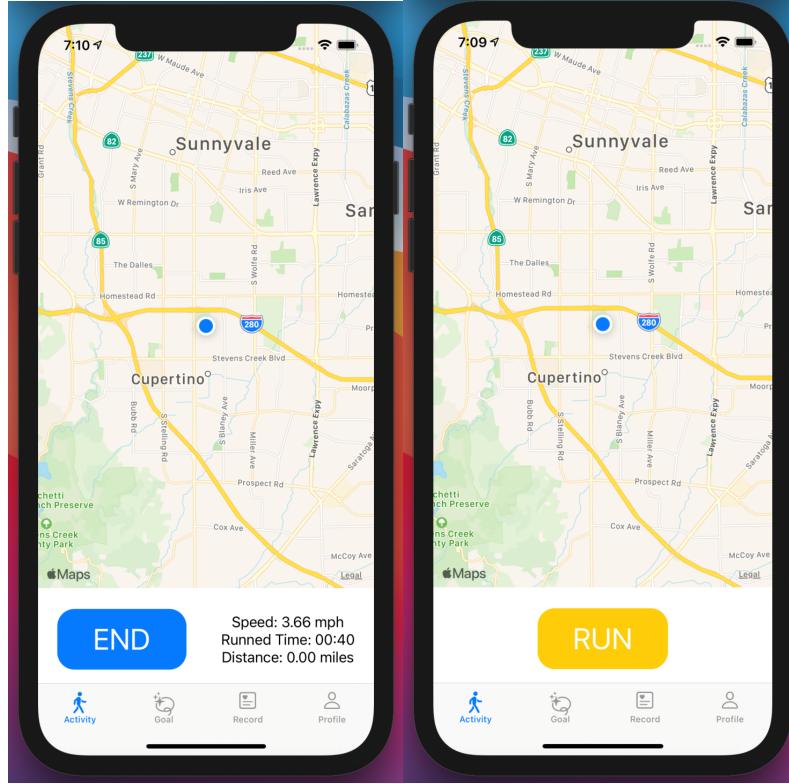
Different from the new users, the registered users will see below WelcomeView when they open the app. The button changed to “Start Working Out”. When they click this button, it will drive them to the MainInterfaceView.

## ● MainInterfaceView

The MainInterfaceView is a TabView, which connect four of our main pages:

- ActivityView

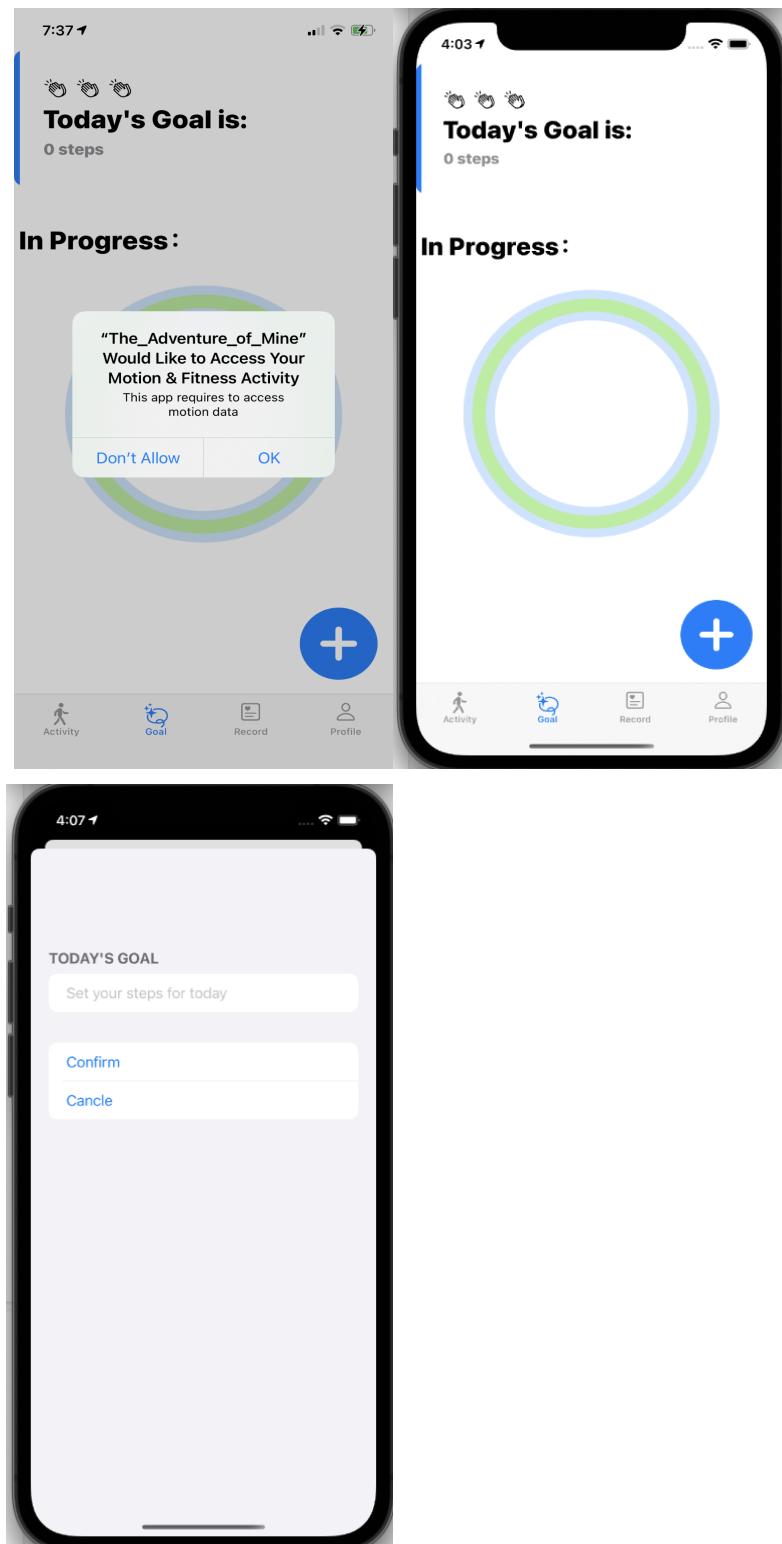
The main view of activity is a map showing the user's location along with the run button. Once user click the run button, the page will show user's running speed, running during. Once the user finishes the running, they simply click the end button.



- GoalView

When users click on the Goal icon, it will lead them to our GoalView Page. Users can set their Goal by clicking the blue icon on the right bottom. Enter the daily goal in steps. Users can save their goal by clicking confirm or cancel to quit the

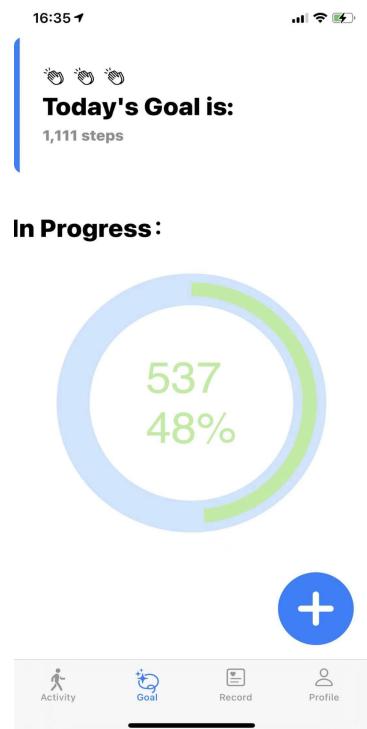
current page. Same as the welcome page, goal page will ask for user permission for access health data.



After entering their goal for today, we have set a notification reminder after 5 second for testing, so the user should see notification after they set up the goal and close the screen in 5 second. When users first set a goal, we will send a request to users to gain the permission of sending notification to them.

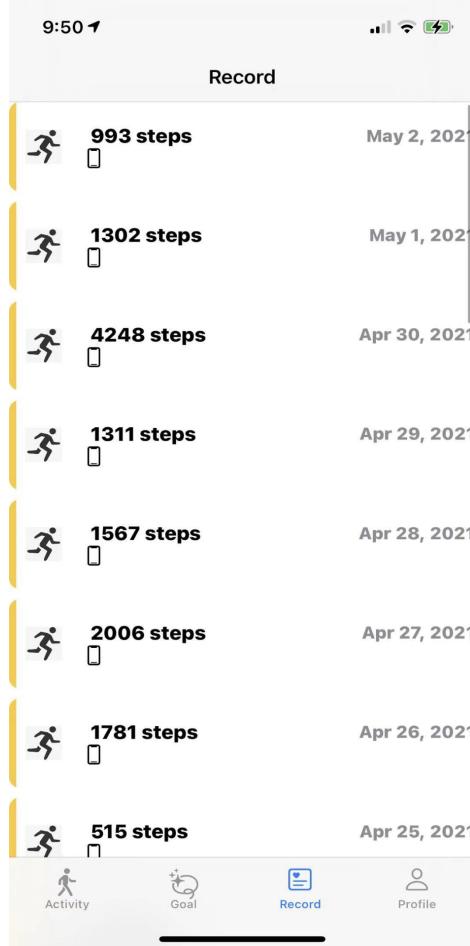


After using our App, we will access users' health date to calculate the process they have completed in percentage.



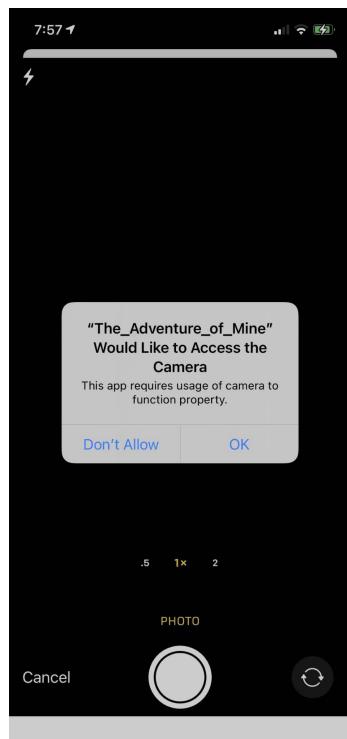
- RecordView

Same as many running Apps, our users can view their running record by clicking the Record icon it will display their past activity and date.



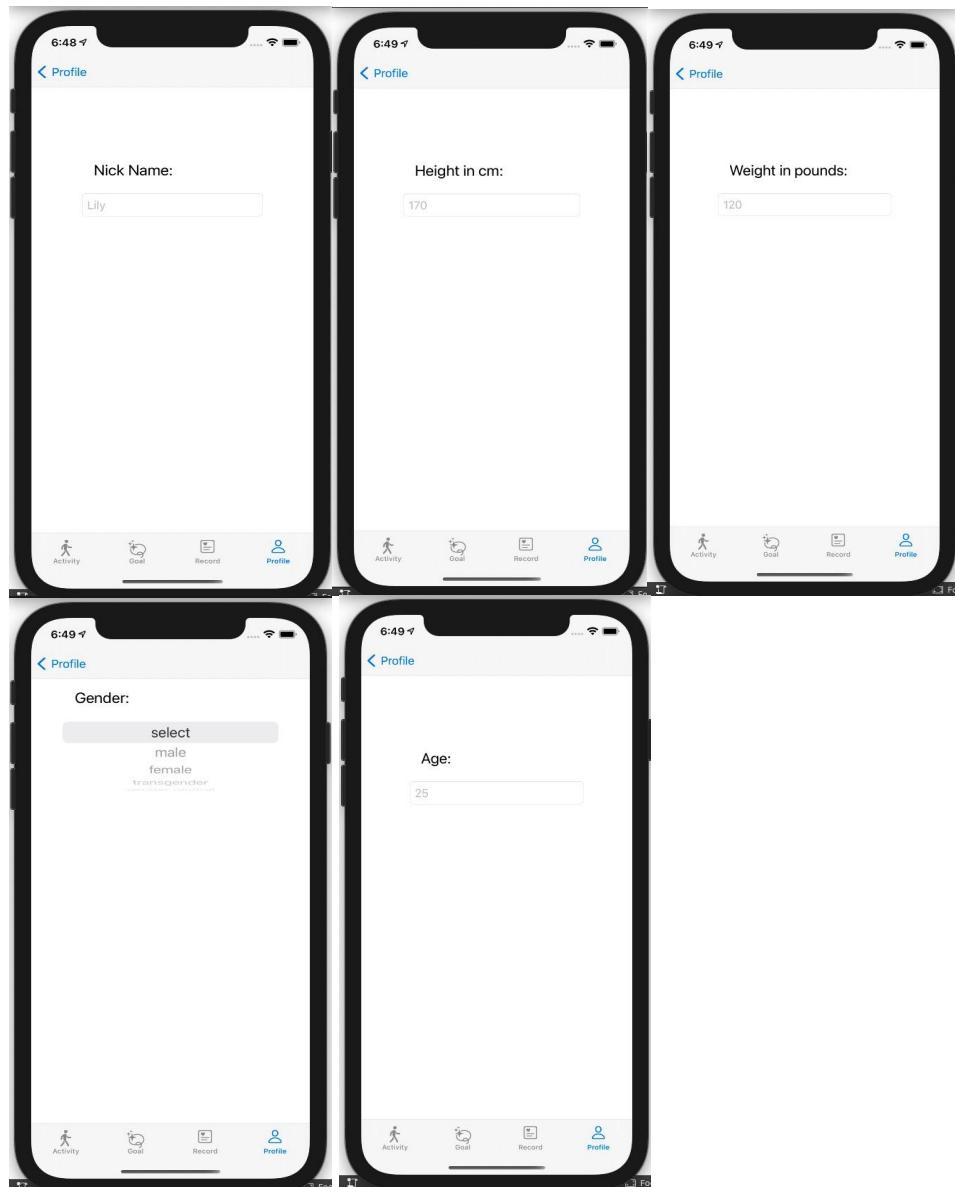
- ProfileView

The ProfileView shows the users' personal information. They can modify it anytime. Users can change their photos by clicking the circular picture area on the upper part of the view. When they click, they can choose to get the photo from their photo library or from their camera.



When they click Nickname, they will enter a sub-view called NickNameView to modify their nickname. Similarly, they can enter into HeightView, WeightView,

GenderView, and AgeView to modify their corresponding personal information. Those views show below.



## Development Process

We held weekly meetings to discuss our recent update. The main purpose of the meeting is to assign the tasks to each teammate before we start a new milestone each time. Most of the time, each of us implements a feature at each milestone. For some difficult features, we arrange two team members to work together.

Before the deadline of each milestone, we also schedule a meeting. The content of the meeting is to discuss if we implement each feature successfully or if we meet any problems that cannot be solved. If a feature is not successfully implemented, we conduct discussions and seek everyone's opinions. After that, we arrange with other team members to implement it in the next milestone until the feature is successfully implemented. Next, we merge everyone's code and deal with any conflicts. Then, we jointly test our code, and each one will explain and show the feature they implemented. Thus, the successful implementation of this app is inseparable from the close cooperation between our team members.

From the beginning of the project, what we decided was to write all the interface pages first, Shuai designed our "Welcome page". Our idea was to write two different views when the user logs in. The very first page is showing when a user first-time logs in and there will be a button that lets our user's profile set up a page, users can enter their information such as a nickname, height, weight, etc. The other page is that when the user re-opens our App, it will show a different button that says welcome back and if the user clicks it will let them to our main page. The problem we had here was that we haven't decided how we can connect the welcome page and other interfaces.

At this phase, we also design the TabView and the ProfileView. Since we learned how to use TabView in class, this part was implemented very smoothly. When designing the ProfileView, we used NavigationView and List to show users' personal information and allow modification. We created sub-views for each item of personal information that the user may use to input or modify the item. We apply a Picker to allow users to easily choose their gender.

Meanwhile, we stored the user's profile so that a user does not need to input those details each time they open the app. We use UserDefaults to store the user's profile because the nickname, gender, age, height, and weight are all short text and it is easy to save by using UserDefaults. Saving the profile picture and user's goal is not difficult to save by using UserDefaults as well. Most data persistence was done by milestone 2. The persistence of the profile picture was done in milestone 3.

In addition to displaying past exercise records, our app can also display the recent day's exercise, such as the percentage of goal completion and the step count of the day. At the same time, we achieved a real-time update of the total step count of the day, which is shown in the goal view. We import CoreMotion to obtain the steps, which is also where the Apple HealthKit obtains the step count data. The difference between the step counts from CoreMotion and HealthKit is that CoreMotion provides real-time data, which is why we use CoreMotion instead of HealthKit here. The advantage of using HealthKit is that it provides statistical information. It can show the step count for each day in the past 30 days, so we use it in record view. The step count update in real-time was done last week.

To obtain the HealthKit data and CoreMotion data, we need to ask user permission. This task was specified in the Info.plist.

Our App shows the last 30 days' step count in record view. Apple provides a convenient API called HealthKit. We use it to retrieve the step count data and put it in the record view so that a user can learn how much activity has been done in the past 30 days. HealthKit provides many different kinds of statistical data such as step count, distance, heart rate, and etc. As we do not have an Apple Watch, the heart rate is not available to use. The distance can be obtained by CoreLocation because we want the distance of a specific workout. Thus, the step is the only data we use HealthKit to retrieve. This part was done in milestone 3.

During the time, we added a GPS picture to the Activity Interface for now and also a button called "Start" when the user wants to run. For the Goal page, we created a list of things to allow users to pick their goal, in later we can add more functions such as users can pick a certain day and set up a goal. For the record, we create some circles that will display what kind of achievement our user has complicated. Then the user can view their achievements by click circles. For the Welcome page, we add navigationview into it, so right now if the user is the first time using our app, the start button will lead them to the profile page, and when the second time they log in, will automatically save the user profile and lead our user to the MainPage. However, we found out that there are some problems, for example since we use a double Navigationview in our app, it will have an additional back button on the top left corner. Luckily our app's function works well that we will be able to connect between different interfaces. We also designed a "Goal page" that our user can enter their goal for today. Then we design the Goal Interface We have moved the progress bar to the goal interface where users can check the percentage they have completed by today. Also, users can set their goals by using the button set on-screen. Design Record Interface We have built connections between health data and user records. Now, our user can check their record that is read from health data to view their run distance and data.

Allowing users to upload the photo is one of our features, while it is a little bit challenging to develop the feature that allows users to select photos from photo libraries or cameras to use on their profile. Another challenging development is setting up notifications for users. This feature has been introduced in detail in Accomplished Goals. In the process of developing those features, we feel our self-learning ability was fully improved, and during online searching, I found a lot of excellent videos for teaching SwiftUI development. I believe these resources will be very helpful for my future study at SwiftUI.

Xiao helped the team members to solve the problem of connecting the Welcome Page with the Main Functional Interface. The NavigationView we used at the beginning did not connect our views properly. Eventually, we realized that using a toggle may help us solve this problem very well.

Eventually, we fully implemented the GPS function in the activity view so that the user can visualize their movement on the map. The app asks for user permission when accessing their location information. If the user grants permission, then the map is loaded on the activity page. On the map, there is a small twinkling blue circle indicating the user's current location. The locationManger file has updated the user's current location coordinate along with the array that stores the previous user's location. In such a way, when the user starts to run, they click the run button, the app will put annotations on the map and many annotations connect each other to show the user their traveled route. The user will also be able to see the working minute since we enable the stopwatch function, which is located near the button. Besides, the user can watch moving speed below the stopwatch.

If a user wants to finish the run, simply click the end button. At this moment, all data such as running duration, speed parameter, the timestamp will be sent to the Record backend. That is saying that users can track their information on the record page.

In general, since our app has many functions, and our common view is to make our app as perfect as possible, we have to admit that the time we spent on this project exceeded our expectations. We have basically completed our initial design, completed most of the stretch goals, and added a lot of user-friendly details to our app during the development process. We are very satisfied with the final submission of our app, and we feel that all our efforts for this are worthwhile.

## Future Directions

Apple Watch is becoming more and more popular. Many people wear it when running. We can connect a Bluetooth headset to the Apple Watch so that we can listen to music or answer import calls. Wearing it makes us no longer need to carry a mobile phone when running. Another powerful function of the Apple Watch is that it can detect our heartbeat data and location data in real-time and provides us with more detailed exercise statistics reports through a series of calculations. In the next step, we will implement our App in the Apple Watch so that users can know and record their exercise status in real-time while running without an iPhone.