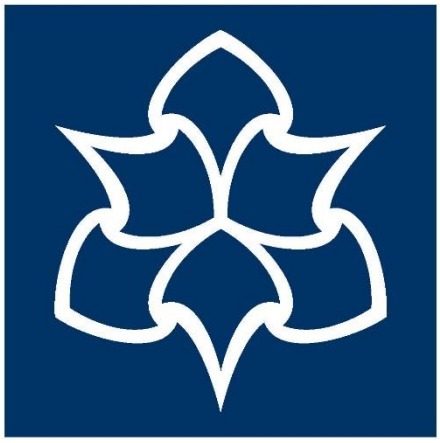
Lifestyle Tracking Mobile Application

A DISSERTATION SUBMITTED TO MANCHESTER METROPOLITAN UNIVERSITY
FOR THE DEGREE OF MASTER OF SCIENCE
IN THE FACULTY OF SCIENCE AND ENGINEERING



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Contents

List of Tables

List of Figures

Abstract

Many members of society feel the emotional impact of their unhealthy lifestyles, and the different factors of an unhealthy lifestyle all affect each other. This makes it extremely difficult for people suffering with any of these unhealthy habits to truly escape, while presence unhealthy traits such as obesity continues to climb, causing medical providers economic strain.

This Project is driven by a passion for using technology to increase quality of life, and is created with the intention of helping to find effective solutions to society-wide issues.

The aim of this project is to create a mobile application capable of tracking and graphing any lifestyle factors a user may feel burdened by, such as lack of sleep, stress, smoking habits and more. The application was made using React Native, utilising libraries for its graphical elements. The back end was created using Google Firebase.

The project successfully evaluated if an application like this can give any value to a user and found that a user could draw information about their lifestyle from simply being shown a visualisation of the data that they have tracked. The Project also successfully demonstrated the ease of use of the application, with the majority of participants successfully navigating the entire application.

Declaration

No part of this project has been submitted in support of an application for any other degree or qualification at this or any other institute of learning. Apart from those parts of the project containing citations to the work of others, this project is my own unaided work. This work has been carried out in accordance with the Manchester Metropolitan University research ethics procedures, and has received ethical approval. ethOS Reference Number: 67729

Signed: Mason Bowers

Date: 17/05/2024

Acknowledgements

I will take this opportunity to express my thanks to those who made this project possible.

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Finally, I'd like to thank my family and friends. Their support is, and always will be, my driving factor.

Abbreviations

I. Introduction

i. Project Overview

An Unhealthy Lifestyle can not only be qualified by unhealthy diet, or lack of exercise, and every unhealthy person will have their own factors affecting their lifestyle. Most Applications aimed at these groups target only one or two possible factors for being unhealthy, with diet apps not considering that their users may have reasons for their unhealthy diets other than a simple lack of trying. This paper covers the research, design, development and evaluation of Regulate, a mobile application aimed at those who are unhappy with their lifestyle and aims to give them the tools they need to track themselves and improve their overall wellbeing, be it mental or physical. The project evaluation will ask the question of whether this form of app is suitable for general use, and decide whether simple visualisation of a user's bad habits is enough to conclude upon reasons for them. The evaluation will also inadvertently show whether data visualisation could be harmful to any users who may draw incorrect conclusions from the visualisations.

ii. Aims

- Create a Mobile Application capable of tracking various custom health statistics created by the app user.
- Generate graphs for the user to make educated decisions regarding their diet and lifestyle.
- Create a server to store login details and storage of data.

iii. Report Structure

Chapter 1 – Introduction to the project
Chapter 2 – Literature review
Chapter 3 – Design
Chapter 4 – Development
Chapter 5 – Testing
Chapter 6 – Evaluation

II. **Literature Review**

Summary:

Summary of Chapter 2

Chapter 2 covers the link between socio-economic society class and unhealthy lifestyles, providing evidence that these factors are linked to each other.

Summary of Chapter 3

Chapter 2 further documents links between unhealthy lifestyles, but also gives evidence directly linking this to self-reported signs of depression.

Summary of Chapter 4

Chapter 4 explores other solutions in this space, with a breakdown of features available, and areas that are yet to be explored by these solutions.

i. Chapter 1: Introduction

A large amount of our lifestyle choices affect our quality of life, such as smoking, binge drinking, lack of exercise and unhealthy diets. These factors are often connected with increased chances of depression, shortened life expectancy and emotional problems (Savolainen et al 2014). Obesity continues to rise worldwide, and at least in the United States, affects everyone regardless of race, age, or socioeconomic position. This has led to a predicted drop in life expectancy, with obesity alone reducing life estimates of an individual by 5-20 years (Olshansky et al. 2005). It is difficult to say what the solution to this societal issue is, with healthcare systems experiencing huge costs for treatment of obesity-related conditions. Due to the rapidly rising rate of Diabetes, related medical treatments cost over $100 billion in the United States alone in 1992 (Wolf & Colditz, 1998).

ii. Chapter 2: Social Class links to Unhealthy Lifestyles

Although an unhealthy lifestyle is not uncommon in any social class, it is shown that there are particular members of society who are more prone to having one. One of these groups is those with a low level of education (Danaei et al. 2017). People with a low level of education are less likely to attempt to increase their level of physical activity. This is important for the creation of this application, as it demands that the app be as accessible as possible to all users, as this group is a primary target audience. It was found that in regard to smoking cessation, people with low levels of education are more likely to relapse due to weight gain, and it is also more likely that they didn't exercise during their attempt at quitting (Pisinger et al. 2011). It is also found that smokers with lower Social-Economic Status are much more likely to think that their previous attempts at quitting were bad experiences, and a large reason for relapsing is their nervousness. This shows the benefit of educational methods regarding smoking cessation, and anxiety and stress management being vital in helping smokers quit. Weight gain being a significant suggestion of relapse also clearly illustrates how diet tracking during an attempt to quit is vital to avoid this trigger to relapse.

iii. Chapter 3: Unhealthy Lifestyles and Mental Health

It has been found that unhealthy lifestyle factors such as a poorly balanced diet and lack of exercise are intertwined with the prevalence of depressive symptoms (Furihata et al. 2018). Although it is likely that depressive symptoms' many relationships with unhealthy habits are bi-directional, it is still made clear that people looking to make changes to their lifestyle must be made aware of the possibility of a link between their depressive symptoms and their unhealthy habits, and so can make changes that benefit them in both senses. This is further amplified due to research suggesting that regular exercise may physically help to prevent depression. Research found that mild exercise can reduce depressive symptoms and may be beneficial in the care of these persons (Nabkasorn et al. 2014). This once again supports the idea that most traits of an unhealthy diet are interconnected and affect one another, and that to work on one's health they should be attentive to all unhealthy traits instead of just one.

iv. Chapter 4: Marketed Solutions

This chapter will cover two popular apps in the self-improvement space, namely NutraCheck Calorie Tracker (Nutracheck) and How We Feel (How We Feel).

NutraCheck is a calorie tracker mobile application, with a large database of nutrition information, making it easy for users to input their food and drink for the day and track all of their different nutritional intakes. While this app offers a suitable solution to diet tracking, it being a pay-to-use app will reduce its accessibility to potential users. NutraCheck also lacks any tracking information besides food, water, alcohol, and 5 a day tracking. This results in the app mainly catering towards those attempting to lose weight, with their website displaying this by populating their 'successes' page with weight loss journeys. While NutraCheck is an extremely effective solution to diet tracking, it makes no attempt whatsoever to assist users in curbing their other unhealthy tendencies.

How We Feel is a mood tracker app used for documenting the user's emotions, with the capacity to add location, potential reason, activity, weather and more. The emotion tracking is done using a word association for the user's feelings, giving them a large dictionary of words to choose how they feel from, making the time between app opening and data being saved extremely quick and easy. This is a very good feature, stopping a user tracking their emotions from becoming a 'chore' and is also very discrete, meaning that users who may not want to disclose their attempt at self-betterment for fear of a lack of support from friends and family (Pisinger et al. 2011), need not. Another huge benefit to this solution is the additional tracking of other factors such as sleep and exercise which can be imported from other health apps, resulting in users being able to clearly see any causality between their lifestyle and emotions. The app also contains a library of lessons, coping strategies and quotes. This fully-equips users to handle their emotions, with all information being created by a team led by the Yale University Center for Emotional Intelligence.

How We Feel is completely free to use, with it being funded by donations, drastically reducing the bar for entry and making the app very welcoming, with the team stating their passion is to 'create a more emotionally healthy world'.

To conclude, the self-improvement space already contains strong solutions for users' needs, but, at least in the case of these two examples, still lacks a true solution for the relationships between all of the factors contributing to an unhealthy lifestyle.

v. Chapter 5: Conclusion

Many pieces of evidence in this section demonstrates the need for self-improvement to work in more than one regard at a time to be successful, from the links between weight gain and relapse in Chapter 1 to the link between unhealthy diets and depression in Chapter 2. It is made clear throughout this section that our physical and mental selves are dependent on one another, and one cannot flourish without the other. This realisation makes it clear that apps within this space must soon learn to cover both bases; self-improvement apps must learn to nurture their user's entire self, instead of exclusively catering towards certain demographics. This is imperative if society is to truly work towards a general rise in quality of life.

III. Design

i. Introduction

This Chapter will detail the design decisions made throughout the project and will walk through the design documents for the application and server. The design of the was done with great consideration for the User Experience, with screens being as simple to navigate as possible, and maintaining an uncluttered layout throughout. The intention of this design philosophy is to lower the technical aptitude required to use the app, as the app is intended to be inclusive to users from all backgrounds.

ii. Development Environment

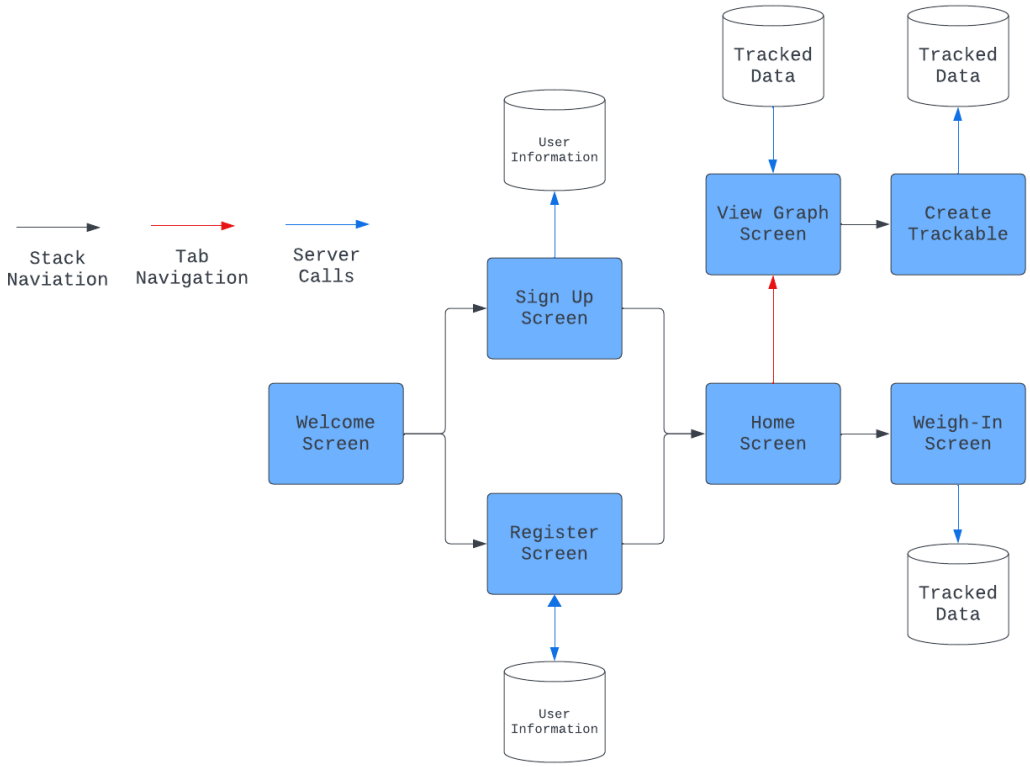
The client-side application will be built in React Native. React Native is a JavaScript library which allows for mobile development for both iOS and Android devices. React Native also has a wide range of libraries, which allows the use of a library for the main function of the app, being the graph generation.

It was originally intended that Node.js would be used to create the server for the application, but it was found that a simpler and faster resource to make use of would be Google Firebase. Google Firebase is an online service for creating back-end servers, whilst also providing email and password verification. Not only does this save a large amount of time for the project, but it also more clearly demonstrates what the app would feel like post-release, as the server is not being hosted on the development PC. This leads to more attention being given to the usability of the app, as the developer is more aware of wait-times for server responses and will have to write more robust code that considers this longer response time. Using Google Firebase also increases the security of the app, as the data is not being secured on the developer's own PC. A final advantage of using Google Firebase would be the decrease in downtime should an issue occur, since the server is being hosted by such a large provider, it is less likely to be taken down by environmental factors such as power-cuts and internet connectivity issues, as well as any potential malicious attacks from other people.

The chosen development environment for the entire application was Visual Studio Code. This is due to both familiarity with this environment, and its ability to be used for the full-stack development of this application. Being able to use just one development environment for the entire application allows for much less time to be spent familiarising with the features and navigation of the environment.

iii. Screen Navigation

Planning the Screen Navigation of the client-side of the application involved creating a wireframe and deciding on the navigation method to be used for each screen. A tab navigator was decided on for the main two pages of the app to allow quick switching between these two important screens, with all other screens being navigated to using a stack navigator.



iv. Database Layout

Database Layout Diagrams were also created, with a user ID being used as the primary key for the User Information table, and tracker ID being used for the primary key of the trackable data table. User ID was also included as a foreign key for the trackable data table.

v. Screen Layouts

Simple design layouts were created for each screen to prevent an over-complication of the UI later in development. This allows the app to be as inclusive as possible, as it is intended to be used by people with all levels of technical literacy.

vi. Evaluation Method

The evaluation will be measured by an online questionnaire. This was decided to evaluate the effectiveness of the graphs, and to identify whether users would be able to

make accurate observations about their lifestyle based on these graphs. The generated graphs will use data created in order to illustrate clear patterns and lead to specific observations. This allows for a multiple-choice examination method. A multiple-choice examination results in completely anonymous data, meaning that no precautions must be taken to anonymise this data. It could be argued that a multiple-choice styled exam is not enough proof to confirm the effectiveness of the app, but due to time restraints, it is more important to confirm that users don't often reach wrong conclusions, to prevent any potential harm to user's diets and lifestyles. The basic functionality of the app will also be evaluated, with a new user profile being created, data being added to the app and ensuring all endpoints can be reached by a new user profile.

The online questionnaire service will be provided by 'Gorilla Experiment Builder', an online service designed to facilitate scientific research involving human participants. Gorilla Experiment Builder allows for the creation of anything from complex tasks to simple questionnaires, and everything is made using a simple and easy to use GUI. This is suitable for use due to the high speed at which data is accessible from the questionnaire, and the ease of questionnaire creation, allowing more time to be spent making the application.

vii. App Icons

All icons from the app will be sourced from an open source, free to use icon set from Ming Cute (MingCute Icon). The icons are basic and clearly convey their meaning, while also being customisable to fit the colour scheme of the application.

viii. Conclusion

The Design section laid out the basic building blocks of the application, while also planning the evaluation style. The screen designs should ensure consistent UI elements throughout the application, while the development environment being prepared and the Navigation Layout being wireframed should ease development. Having the Evaluation planned beforehand is important to create an application that is appropriate for the questions being answered by the project.

IV. **Development**

i. Introduction

The following chapter will be a thorough documentation of the development process. It will include decisions made during development, along with any issues and how they were resolved.

ii. Preparation of the Environment

As this was a Mobile Application, an emulator was used to test the application during development. The emulator used was from Android Studio and was a Google Pixel 7 Pro running Android 13.0. Visual Studio Code was used for the frontend development, and NPM-Expo was used for library management.
Once Android Studio is installed, a device can be created under ‘device manager’. The developer is then prompted to select a phone to emulate and an Android OS.

iii. Welcome & Home Screen

A simple Welcome Screen was created, with a login and sign-up option.

The second step to implement and test the graphing library is to implement a simple home screen. The layout was created using view elements following the design layout created earlier in the project, leaving space for a graph to be generated at the top of the screen.

Figure 1:
Welcome Screen

iv. Graph Generation

Graphs in the App will be generated using the react-native-chart-kit. A temporary graph was created to test and style, with it being placed at the top of the home screen. The temporary graph was styled to match the colour palette created during the design of the application, and this style sheet will be used for the other graphs later on.

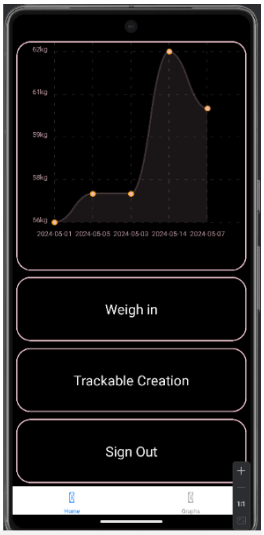


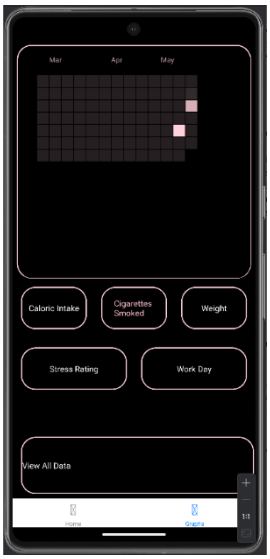
Figure 2:
Home Screen

v. Trackable Creation

This feature allows a user to set the name and data type of one of their tracked variables. A new screen branching from the Graph View Screen was created (As seen in the wireframe earlier). This new screen simply accepts a name and data type from the user and saves it into the local storage of the device in preparation for the server being developed.

vi. Graph Viewing

This section covers the algorithm to allow for graph creation independent of the data types selected to be shown. The graph view page simply generates a button for each variable being tracked by the user, and when selected, a graph corresponding to the data type of the variable is generated. In some cases where the data types are appropriate, two variables can be viewed together to look for patterns between them.



This screen features a grid of buttons, each corresponding to a created Trackable variable, with the ones seen in the image being sample choices.
The algorithm used to generate the graphs based on the Trackable selected makes use of the ‘Datatype’ variable within each entry of the ‘Trackables’ table in the server.

Figure 3:
View Graph

Different Data Types are given a different graph to ensure each graph is suitable for the data type it is attempting to represent.

```
if (["Measurement"].includes(Value.DataType)){
  return(
    <LineChart
          data={{labels: Value1Data.map(item => item.Date),datasets: [{data: Value1Data.map(item => item.Data)}]}}
```

vii. Server Development

As the front-end of the application is now functional, the server can be created to store the login details and data tracked by the user. Setting up the server using Google Firebase is quick and easy, with only a config file needing to be added to the project. This is also the point at which all saves to the storage of the device will be replaced with server calls instead.

The Navigation Stacks for the Home Screen and Welcome Screen were split into areas accessible by logged in/logged out users, using the authentication feature of Google Firebase to switch between when a user logs in (Appendix 2: Root Navigator)

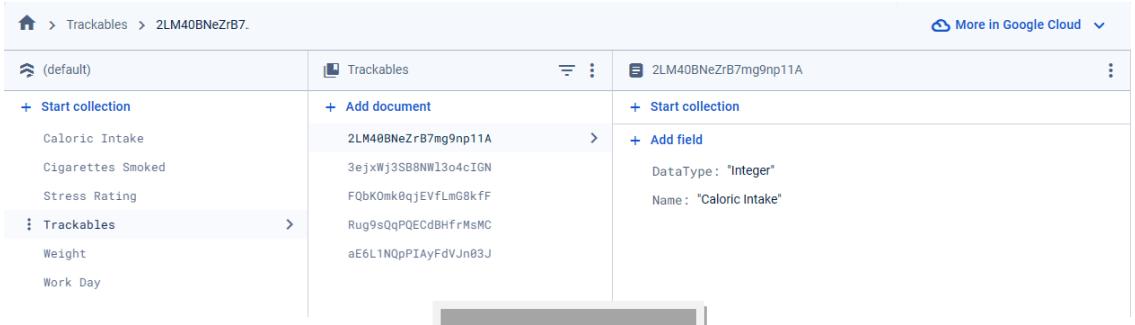


Figure 4: Database

viii. Data Viewing Screen

Another of the fundamental requirements for the application to function is for users to be able to view and delete past readings. The page will be kept as simple as possible, with readings being displayed in a list down the screen. Each element of this list is selectable, in which case the user is given the option to delete the reading. This style of page is also implemented for the separate Trackable Data types, in order for a user to delete one of the data types they previously chose to track. The button for this feature has replaced the ‘Create Trackable’ button on the View Graphs screen, with the ‘Create Trackable’ button being moved to the home screen.

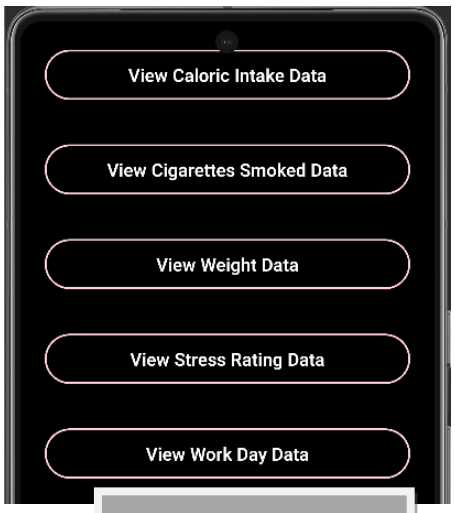


Figure 5:
Select Trackable to view data

ix. Final Navigation Layout

The final layout of the navigation objects are shown below:

```
const Stack = createNativeStackNavigator();
const Tab = createBottomTabNavigator();

function HomeTab() {
  return (
    <Tab.Navigator>
      <Tab.Screen name="Home" component={HomeStack} options={{headerShown: false}} />
      <Tab.Screen name="Graphs" component={GraphStack} options={{headerShown: false}} />
    </Tab.Navigator>
  );
}

function HomeStack() {
  return (
    <Stack.Navigator defaultScreenOptions={HomeScreen}>
      <Stack.Screen name="HomeStack" component={HomeScreen} options={{headerShown: false}} />
      <Stack.Screen name="WeighIn" component={WeighInScreen} options={{headerShown: false}} />
      <Stack.Screen name="TrackableCreation" component={CreateTrackScreen} options={{headerShown: false}}/>
      <Stack.Screen name="GraphTest" component={GraphTestScreen} options={{headerShown: false}}/>
    </Stack.Navigator>
  );
}

function GraphStack() {
  return (
    <Stack.Navigator defaultScreenOptions={GraphViewScreen}>
      <Stack.Screen name="GraphStack" component={GraphViewScreen} options={{headerShown: false}} />
      <Stack.Screen name="ChooseToView" component={ChooseToViewScreen} options={{headerShown: false}} />
      <Stack.Screen name="ViewAllData" component={ViewAllDataScreen} options={{headerShown: false}}/>
    </Stack.Navigator>
  );
}

function AuthStack() {
  return (
    <Stack.Navigator defaultScreenOptions={WelcomeScreen}>
      <Stack.Screen name="Welcome" component={WelcomeScreen} options={{headerShown: false}} />
      <Stack.Screen name="Login" component={LoginScreen} options={{headerShown: false}} />
      <Stack.Screen name="Register" component={RegisterScreen} options={{headerShown: false}} />
    </Stack.Navigator>
  );
}
```

The HomeTab object is what gives the app it's tab navigator between the home screen and the graph view screen. Two nested Stack navigators allow each of these tabs to then go to other screens, such as the Weigh In and View All Data screens. The AuthStack contains screens that a logged out user can view, such as the Welcome and Login Screen. This is what allows the user to 'log in' as when authentication is detected, a root navigator switches the app from the AuthStack to HomeTab.

x. Development Testing

Feature To Test	Test Description	Expected Outcome	Result
Create Account	Testing whether new users can create an account	New Email address for account seen in server	PASS
Sign In	Can the user sign in?	User redirected to Home Page once authentication is complete	PASS
Create Trackable	Can The user create a new Trackable Variable?	New Table shows in the server for that user	PASS
View Graph	Can the User View a graph	Graph shows on home screen	FAIL- Application crashed due to attempting to draw a graph with no data. RESOLVED
Add Data	Can the user Input Their daily data?	Data appears in server	PASS
Delete Trackable	Can the User delete an entry?	Data removed from server	PASS
View Different Graph Types	Can the app generate different graphs based on data type?	Different graphs generated for 'measurement' 'boolean' and 'count' datatypes	PASS

Validation was added to ensure that data has been retrieved before attempting to draw the graph, as both retrieving data from the server is not an immediate function. This was done by adding a new condition, Draw = true/false, to every graph generation. Draw is switched to True once the variable being plotted contains data.

```
//calls before render to get weights from server
  useEffect(() => {

    getDocz().then(() => {
      if (Weights) { //check if weights has a value
        setDraw(true);
      } else {
        console.warn("Weights data not available yet.");
      }
    });
    }, []);
```

xi. Development Conclusion

This section has covered specific notable moments during the development of the application. The testing uncovered an error in methodology, and so was successful in increasing the quality of the application in preparation for the Evaluation.

V. Evaluation

i. Questionnaire Structure

The Questionnaire begins with a consent form, educating volunteers on what the questionnaire will contain and requiring consent to the recording of their answers to proceed. They are then asked to give a unique identifier to be used in the case of them wanting to revoke permission after submitting. The questionnaire then begins.
The questionnaire begins with questions about an unmarked graph, asking volunteers to identify any correlation between the two variables. Options for answers to these questions are simple, such as 'positive correlation' and 'no correlation'. The second section of the questionnaire uses labelled graphs, and answers include real-world observations of the patterns shown in the graph, such as 'the user smokes more on workdays' and 'the variables are not related in any way'. This format of questionnaire allows, in the event of the evaluation failing, for another project to have data on which knowledge areas were lacking in volunteers. This allows for another project to implement assistance in understanding the graphs, or assistance in drawing conclusions from the graphs.

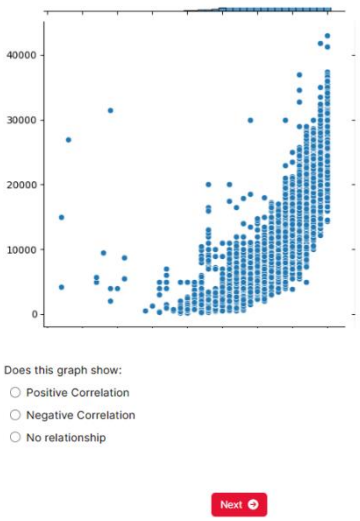


Figure 6:
Section 1 Sample Question

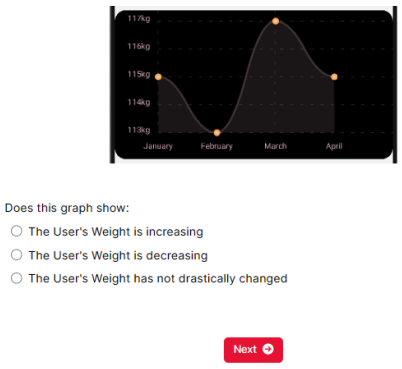


Figure 7:
Section 2 Sample Question

ii. Questionnaire Results

There were 20 participants in the questionnaire, with it being limited due to Gorilla Experiment Builder being a paid service provider, and the minimum being 20 participants. Average Scores for each section are listed below.

Section	Average Score
Section 1: Sample Graphs	80%
Section 2: In-App Graphs	91.25%

The first section of the questionnaire seems to have been more difficult than the second section with participants scoring lower. This likely stems from the language used; participants may simply have been aware of the meaning of ‘correlation’. This is an imperfect, but not unfavourable result, since lack of knowledge of maths-specific language does not have any effect on the accuracy of participants conclusions as seen in section 2.

The success in section 2 suggests that the graphs were in fact clear enough to read, and participants were able to draw the meaning from them once the question and options for answers were given in plain language.

One notable result of the questionnaire is that the graph shown in Figure 7 was particularly troubling to users. This is likely due to the style of Line Graph, and a straight-line graph should be tested to see if it is clearer to users.

iii. Application Test Structure

The Application was also tested by volunteers from the questionnaire. There were 9 participants for this test. They were asked to create an account, input some weight data (it was not required to be their own actual data), view a weight graph, delete one value, and then create a trackable variable. This test was designed to make sure that all endpoints are accessible to users, and that they can navigate through the UI unguided.

iv. Application Test Results

The Table below documents results of the Application Test:

Task:	Percentage of Users Successful:
Create Account with Email and Password	100%
Input Weight Data	100%
View a Graph of Weight	100%
Create a Trackable Variable	78%
Add Data to Trackable	78%
View Graph of Trackable	78%
Delete Trackable	67%

Overall, this demonstrates that the app is clear and easy to navigate, with most endpoints being accessible to the vast majority of users. Given that participants were not given any guidance whatsoever, this is a resounding success for the design and implementation of the application. In the case of the poor performance for 'Delete Trackable' endpoint, it is likely that users did not find the screen to edit data due to it being labelled 'View All Data'. This is an error in the UI and should be changed to be more appropriate.

v. Possible Biases

This area of the report will cover possible biases in the evaluation methodology, with the intention of influencing any future developments to use a more balanced approach.
The most noticeable bias was created by the process of volunteer recruitment. All volunteers were found by the Lead Researcher using social media and are therefore likely to be people who reside in the same country. This means that the understanding of the graphs cannot be evaluated for global use and is more illustrative of those in the UK.
Another bias of the Evaluation is that the data used for the questionnaire was artificially created in order to give clear illustration of the correct answer. This was done due to the time restrictions, and in a future project, collecting and using real data would be much more indicative of a user's true ability to recognise patterns in the graphs.

vi. Summary

To conclude, this section has attempted to effectively measure both the efficacy and inclusivity of the mobile app. Although there were some notable drawbacks in the region of volunteer recruitment, this evaluation has conclusively demonstrated that the app is accessible to a majority of users, and has also resulted in an improvement to the clarity of the UI elements.
The Questionnaire showed that mathematical knowledge of users does not necessarily draw away from their ability to accurately gather information from the styles of graph in the application, and demonstrated that the graphs generated are clear enough for users to notice patterns in their lifestyles. The most important realisation though is that no danger of participants making unhealthy changes to their lifestyle could be noticed, with users making accurate conclusions during section 2 of the questionnaire.

VI. Conclusion

Project Aims

The project delivers on its fundamental aim of giving users a simple to use, accessible and effective way of tracking and plotting their lifestyle habits, with all tracked variables being decided by the user. The server effectively stores login information and tracked data, and all server calls are quick and responsive.

Weaknesses of the Project

One overwhelmingly clear weakness of the application is the complete lack of any advice or teachings on how a user can pursue a healthier lifestyle. This advice could further prevent any users from reaching incorrect conclusions from the visualisations. This is because of the lack of a healthcare professional in order to add this advice, as it would be unethical to add any advice without it being approved beforehand. Anyhow, this is still a major shortfall of the application, and would need to be remedied should the application ever see public release.

Future of the Project

As mentioned in the ‘Weaknesses of the Project’ section above, a major downfall of the app is its complete lack of educational materials for users to have at their disposal. This would be the project’s first aim, should work continue, and so a team of researchers and medical experts would need to be brought into the project to resolve this.

Another future aim of the project would be to integrate a database of nutritional values for sample foods, such as seen in other marketed solutions mentioned earlier. This would allow users to easily add their daily nutritional values, and save users the effort of manually calculating their daily intake.

A public forum could also be added to share advice and document one’s journey with others, although this would require more research to determine the effectiveness of such a solution.

As mentioned earlier, there are many ways in which this Project could have been more suitably evaluated. One example is the extremely small sample size for the questionnaire, and the increased likelihood that most participants originate from similar socio-economic backgrounds due to all participants being recruited by the Lead Researcher, using a Social Media account. This results in the app’s effectiveness still being extremely uncertain when considering a worldwide or society-wide audience, as users from other countries, cultures and socio-economic backgrounds than the Lead Researcher will have been underrepresented within this study, and due to the anonymity of all participants, no attempt was made to account for this. Another suitable evaluation method for the Project would be a wide-scale test-run of the app, with participants using the app over a period of time and documenting both their results, and their feeling on the app. Not only would this result in a clear answer as to the efficacy of the application, but it would likely also result in a large amount of feedback to further improve the application.

Future of the Self-Improvement Space

It is clear, with so much research on the reasons for unhealthy lifestyles, that society’s views on self-improvement will soon change to be more in-line with the views illustrated throughout this report; someone looking to improve their emotional wellbeing must also improve themself physically, with the same being said for the reverse. If the ‘Self-Improvement App’ space is to continue appealing to users, they

must also take this into account and realise that they should be nurturing ever sense of their users, instead of picking one particular habit to capitalise on.

Personal Conclusion

This Project was an amazing opportunity to attempt to make a mobile application that could really help people, while also doing research into what features 'Self-Improvement' apps really need to improve their services. The project has equipped me with the skills to build effective solutions based on research and design, whilst also being my first time building a full-stack application. Building another React Native Application was an opportunity to develop my skills in UI design and problem solving, and the work with data has significantly improved my JavaScript capabilities.

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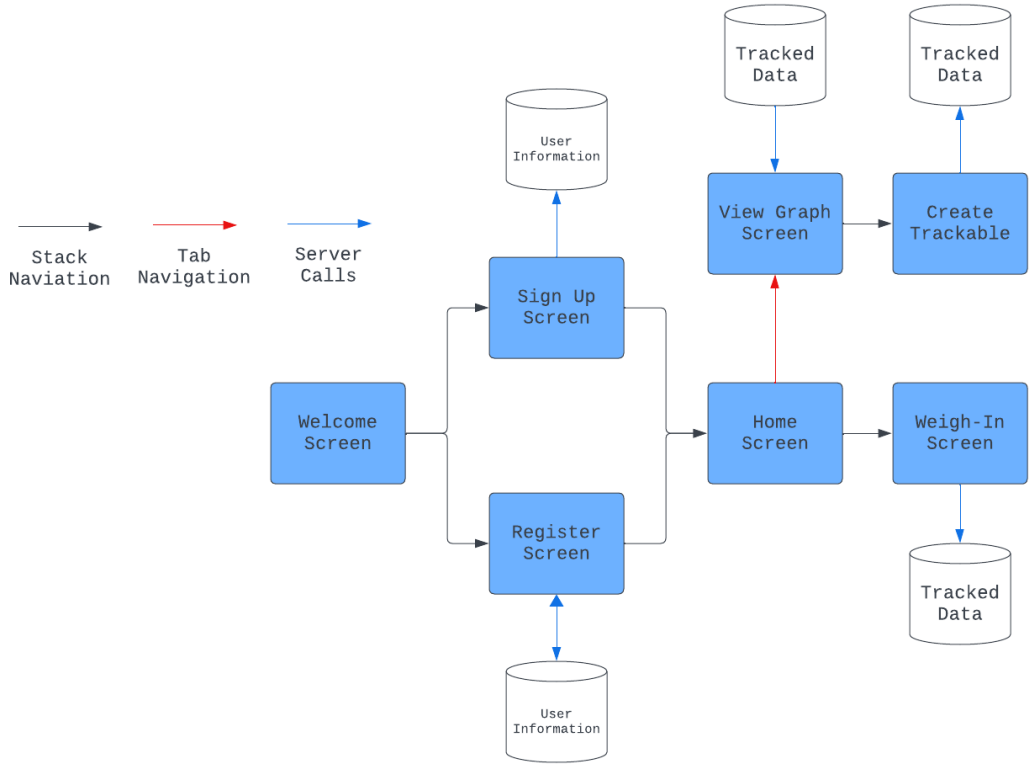
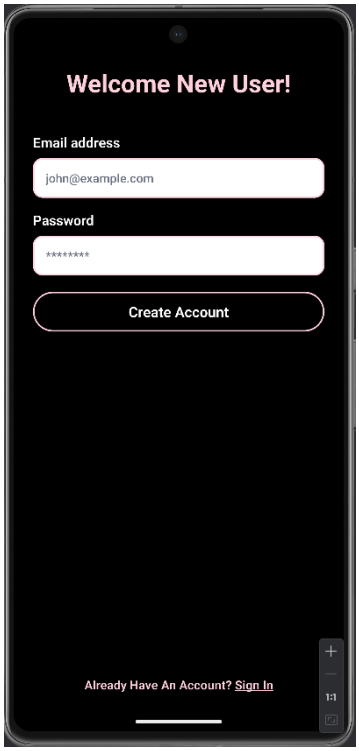
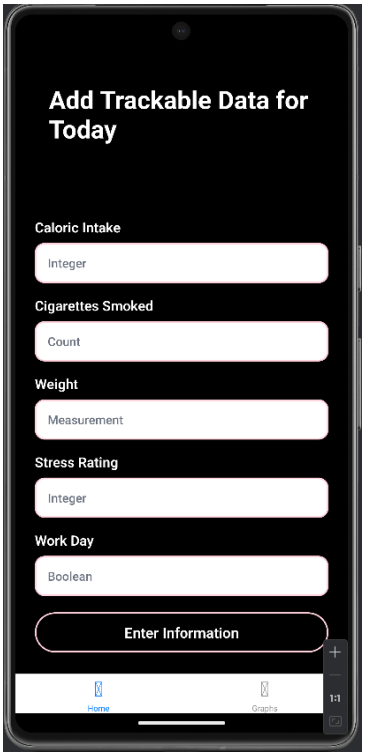
Appendices

Appendix A





Register Screen



Weigh-In Screen

Appendix B

```
function RootNavigator () {
  const {user, setUser} = React.useContext(AuthenticatedUserContext);
  const [loading,setLoading] = React.useState(true);
  React.useEffect(() => {
    const unsubscribe = onAuthStateChanged(auth,
      async authenticatedUser => {
        authenticatedUser ? setUser(authenticatedUser) : setUser(null);
        setLoading(false);
      }
    );
    return () => unsubscribe();
  }, [user]);

  if(loading) {
    return(
      <View style={{flex:1, justifyContent:'center', alignItems:'center'}}>
        <ActivityIndicator size="large"/>
      </View>
    )
  }
  return(
    <NavigationContainer>
      {user ? <HomeTab/> : <AuthStack/>}
    </NavigationContainer>
  )
}
```

Root Navigator

```
<SafeAreaView style={{ flex: 1, backgroundColor: '#000000' }}>


<View style={styles.container}>
    <KeyboardAwareScrollView>
    {TrackNames.map((Trackable, index) => (
     <View style={styles.form}>



       <View style={styles.formAction}>
         <TouchableOpacity
           onPress={() => {
             navigation.navigate('ViewAllData', {Trackable})
           }}>
           <View style={styles.btn}>
             <Text style={styles.btnText}>View {Trackable.Name} Data</Text>
           </View>
         </TouchableOpacity>
       </View>


     </View>
    ))}
```

View Data screen- List of Trackables Generation (see Figure 5)

```
const [form, setForm] = useState({
  email: '',
  password: '',
});

const onHandleLogin = () => {

  if (form.email !== "" && form.password !== ""){

    signInWithEmailAndPassword(auth, form.email, form.password)
    .then (() => console.log('login successful'))
    .catch((err) => Alert.alert("login error", err.message));
  }
}
```

Login Function