Edinburgh Napier UNIVERSITY

Coursework Report

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Abstract

This report will detail the life cycle of my app for Mobile Applications Development project and will include a detailed breakdown for my prototype android application named 'BodyBulker'.

1 Introduction

The assignment at hand was to design, implement and evaluate a prototype for a mobile application for the Android platform using the Android SDK. I choose to write an app for people who wish to grow muscle. After careful consideration, I decided that focusing on an app that would track lean mass and body fat percentage was the best way to begin writing my app to achieve my main goal.

Another part of growing muscle is protein. Therefore, the app would have to implement a way of tracking a user's protein intake and working out how much daily protein a user should be consuming for the best muscle growth results. I decided that the best way to work this out was to use the lean mass/protein ratio which is normally 1g of protein for every 1lb of lean body mass as advised as a rule of thumb, Bill Geiger (2018).

1.1 App Description

BodyBulker is an app designed for users that wish to bulk up and increase muscle size, this app allow users to work out their daily protein intake based around their lean mass weight. The app will work out a users lean body mass based on the input of a user or their actual weight and body fat content. Based on these calculations, the app will then work out a user daily protein intake which will allow the user to follow to increase muscle mass with appropriate weight training exercises. This allows users to monitor their body fat, lean mass and protein intake which are the three main components of bodybuilding.

Other features of the app will be to allow the user to work out their BMI as a healthy guideline. A user will also be able to take progress pictures from within the app so that they can track and compare their progress with pictures.

1.2 Inspiration

The inspiration for my app came from my own ideas of what I would like from an app to help my efforts at the gym. There are many other apps out there that do similar, if not the same thing, but I wanted something simple to use and free that isn't full of advertisements.

The other issue was that I couldn't find an app that would combine the functions into one application. To gain the functions that I wanted, I would normally have to use around three different apps. One for calculating lean mass, another for tracking protein intake and again another for tracking food types. I felt that an app targeting specifically body builder to help with combining these functions would be best.

2 Design

2.1 Navigation

BodyBulker has seven screens to navigate as you can see in appendix 2.1.a. Navigation for this app should be as easy as any other and the app should only work in portrait mode and if the mobile device is rotated the app should not move.

The Splash screen will load for 2 seconds using the following code handler.

```
1  //Handler for splash screen delay
2      Handler splashHandler = new Handler();
3      splashHandler.postDelayed(new Runnable() {
4          @Override
5          public void run(){
6              startActivity(new Intent(SplashScreenActivity.this,↩
       MainActivity.class));
7              finish();
8          }
9      },2000);
```

The user will then be presented with the Main Activity screen as you can see in appendix 2.1.b Upon loading the main activity, the app with load the shared preferences files and any data pulled down will be displayed within the data fields as shown again within appendix 2.1.c. However, if this is the first time the app has been used then the shared preferences will load default data which will be zeros in each data field.

From the main activity, the user can work out his/her body lean mass by clicking the 'lean mass' button. The body fat activity, shown here in appendix 1.2.b, will then start. From here the user can enter their weight in pounds and their body fat percentage. To note, the user will have to know their accurate body fat percentage before using this part of the app. This can be achieved by using any type of body fat machine found in fitness centers, chemists etc or certain types of home bathroom scales.

Once the user's weight and body fat details are entered, they can then press the calculate button which will calculate their lean mass and save these details to shared preferences which will be called again from the main activity and the user will be taken straight back to the home screen. From the home screen the user will no be able to see their individual stats which include body fat percentage, lean mass and weight.

When the user has worked our their lean mass, the app will automatically tell the user how much their daily protein intake should be so that they can build muscle. This is a well known formula of 1gram of protein for every 1lb of lean mass.

To work out how much protein the user is taking every day, the user can use the protein tracker activity, shown in appendix 1.2.c, part of this app by clicking the protein tracker button. From here the user can select different food types with preset average protein that is in each of these food types. With each click of a button, the protein average will be calculated and stored in to saved preferences. This will allow the user to track what protein they are consuming throughout the day. Once the user has reached their target they can then clear the total by pressing the clear button and start again the next day. This daily protein total will also be shown on the main screen of the app alongside the user's weight, body fat percentage etc.

As a healthy guideline, a user should always try and stick to their healthy BMI range. We have included a BMI calculator that can be accessed from the BMI button on the home screen, appendix 2.1.d. From here a user can enter their weight in pounds and their height in inches to calculate their BMI range. Alternatively the user can use our BMI scale that can be accessed from the View BMI Scale button within the BMI activity.

A good way of keeping track of progress with body changed is by taking progress pictures, we have enabled the camera function from within this app so that the user can take regular progress pictures of their body. This can be access by using the progress pictures button from the main activity. The user can also access the gallery from within there also.

To navigate back from any page, the user can simply use the mobile device back button or simply click the home button when one is provided.

3 Software Modeling

High level UML supplied to show in which way our user will interact with the app, see appendix 3.a This UML diagram shows what the user would input into the app and what the app would then calculate by using includes and extends options.

4 Implementation

For the implementation of this application,the latest version of Android Studio V3.0.1 at the time of writing this report was used. For testing during the design stage, I used a virtual device within Android Studio, this virtual device was based on the Nexus 5X, API 24. This allowed me to write and app that would push out to over 90 percent of android devices.

The following screenshots show the different app screens and their actual prototype layout.

Appendix 4.a Main Activity (See appendices)
Appendix 4.b BodyFat Activity (See appendices)
Appendix 4.c BMI Activity (See appendices)
Appendix 4.d BMI Scale Activity (See appendices)
Appendix 4.e Protein Tracker Activity (See appendices)
Appendix 4.f Progress Picture Activity (See appendices)

The implementation includes the use of buttons and text inputs and text boxes to display information to the user. To keep the app simple and extremely easy to use, I felt that this approach of simplicity was best and easy to use. I did think of using image buttons so that I could use icons instead of buttons, but for the prototype I felt that buttons were the easier option at this early stage. Normal buttons also allow me to provide more information to the user as for example the button do in the protein tracker activity. Here they are used to give the user information on protein content within certain food types.

5 Evaluation

I set out to create an app that would allow users who wish to increase muscle mass to be able to track their body fat percentage, lean mass, protein intake and work out their intake totals. This was the main goal and this is what I ended up with.

I also included a BMI calculator and a BMI scale so that users can work BMI out with this also. I am not too sure that this part is needed as BMI scales do not take into account muscle mass and as muscle weighs more than fat, BMI can end up being way off which would indicate a user may be obese or overweight when in fact they are not. For these reasons I may take the BMI part of the app out. On the other hand, a BMI scale can be useful at the beginning so that a user can find out what their healthy range is before they set off on their muscle mass increase.

The aesthetics of the app still need to be designed such as the colour scheme and if buttons should be icons but since this is an early prototype, the initial layout will do for now. I may have to hire a graphical designer to help with this stage of the app as aesthetics aren't my forte.

With regards to the layout of the screens and the location of buttons etc, I wanted something that would be easy to look at and not overload the user with too many options and too much data, though the main bulk of the data such

as the user body statistics had to be displayed on the main screen.

Overall I think that I stuck to my main goals and created enough content in the short space of time that I had to write this app, considering that I had to learn the use of Android Studio from scratch. There are a few modifications to the app that I would like to make and other functions that I would like to add that I will details further into this report.

5.1 App Comparison

I compared my app to other similar apps with he same goal of being aimed at body builders or people who want to increase muscle mass. One of the first apps that I looked at was called 'Lean Body Mass Calculator" which is a free app by 'GeniusNine Info Systems LLP' and is available through the android play app store. This an app that calculates a persons lean body mass but that is all it really does. It also provides some information on nutritional foods but isn't really much use for the goal my app is intended for although it does have one of the same functions.

The second app that I reviewed was 'Protein Tracker' by 'Moustapha Al'. This app allows the user to set protein goals and track their protein intake using graphs and totals. It also has a similar function as my app that allows users to select certain food types and gives that food type protein average amount. Again though, this app doesn't combine the functions of my app and wouldn't be of any use on its own for a user looking to gain muscle mass. Further apps would be required to achieve the same end goal of the multiple functions of my app.

Most of the other apps that I looked at only offered functions of tracking weight and tracking food consumption and their calories. No app that I have currently found offers the combined functions of my app that allows the user to track body fat, protein and records protein intake all in a single app, though im sure through the hundreds of apps available that there must be one somewhere.

5.2 Possible Improvements

After evaluating and testing my app there are some changes that I would like to implement that should make the app more functional and work better to achieve the end goal. These changes would be the following:-

1. Add food diary to track what food a user has eaten per day. This would be entered into the diary along with the date and food types consumed along with their nutritional value with emphasis being on protein. I feel that this would allow the user to keep track of their overall diet with allowing them to track sugar, salt and other ingredient intakes.

2. Create a new section of the app that would allow the user to record muscle size. Weight trainers often measure the size of biceps, triceps and other muscle groups as this allows the user to get a detailed picture of their gains over time. Again, the user would be able to enter these details into a sort of diary within the app and look back at their history. The progress pictures can also be tied into this too.

3. Possibly remove the BMI Calculator as I feel that this is insignificant to my app with regards to BMI scales not being efficient for body builders.

4. Add a weight training schedule into the app for every day of the week to allow the user to follow certain exercises that would target muscle mass.

5. Add an option to the protein calculator so that the user can change the protein calculation formula so that the user can go from 1g of protein per 1lb of lean mass to whatever formula they wish. Some body builders prefer to use 1.5g per 1b of lean mass.

6. Add a store into the app where users can order protein shake mixes and other gym related items.

7. Allow user to add protein from other food types into the protein calculator. That way if a user consumes a food type that isn't on our app then they can still add that protein amount in to the calculation.

8. Change the save feature on the camera function so that it saves to the phone and not the external storage device.

6 Personal Evaluation

Learning Android Studio has been an extremely good challenge for me. Before starting this module, I really though that I was going to hate it as I didn't enjoy this module in College at all. I was therefore pleasantly surprised when using Android Studio for the first time and I have actually really enjoyed it.

Two of the main challenged that I faced when writing the code for my app was saving to shared preferences and initiating the camera for use within the app itself. The shared preferences took me the best part of a day to get working, for some reason I was trying to pass over the data form variables to other screen and save them and call them again at the same time which was confusing the app. I finally learned that all I needed to do was to save the data to shared preferences then call it form wherever i wanted to inside the app. To help learn this I used Jorgesys (2014).

With the camera problem it was a lot more difficult, the way in which the camera is accessed has changed in the latest version of Android Studio. I therefore had to use YouTube tutorials that would help me with this function. Combining things that I learned from multiple videos eventually allowed me to get the camera working and allow the user to save photos to an external memory device. The videos that I used were EDMT Dev (2016) and a series by Mobile Application Tutorials (2015).

Overall I feel that I have achieved a goal of learning how to build a mobile device application using a main stream

language such as Android Studio instead of MIT App inventor which we used at College last year. If I stick with learning this further, I actually believe that I may go on to wish to seek a career in this field of application design for mobile devices etc.

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