A PERSONAL MOBILE FITNESS TRAINER

by

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13773

INFORMATION COMUNICATION TECHNOLOGY

Disertation is submitted in partial fulfillment
of the requirement for the Bachelor of Technology (Hons)
(Information Communication Technology)

DECEMBER 2013

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CERTIFICATION OF APPROVAL

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A project dissertation submitted to the
Information Communication Technology Programme
Universiti Teknologi PETRONAS
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Approved by,

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DECEMBER 2013

CERTIFICATION OF ORIGINALITY

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

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SAEKSARN SINNASO A/L PLA SET

ABSTRACT

Fast moving era nowadays results in huge uncertainty and changes in our daily life. It is never easy to commit a fixed routine of training with a personal trainer. On the other hand, money spent on a gym membership without proper exercise will be worthless or in the worst case counterfeit ones physical health. Smartphone with a mobile fitness application are getting into a trend and might substitute personal trainers with its multifunction to benefit users. Despite hectic daily schedule, users can still get a great workout with these mobile apps to help them exercise regularly, track goals and performance, eventually push you in the right direction you are targeting for. Personal mobile fitness application guide users with some baseline about your current health condition, targeted health goals and then help users work towards them. Customized offering motivate and encourage users along the way as users can easily switch to different apps each day to cater their own workout desire.

The personal mobile fitness application should be able to carry out 3 major functions which are giving exercise advice and food intake advice, inserting reminders and recommending training routines to users. A mobile fitness application equip with artificial intelligence that can help user to achieve their goals. It is considered as an all-in-one app to track your exercise regimen and fitness goals, food intake and reminders. It includes features such as statistics, charts, food analysis and web backup of users' training data.

Extended research on this application includes the qualitative and quantitative factors on individualized and personalized automated feedback with the goal to track training quality and success and give feedback to the user, as well as to engage and facilitate regular exercising. Qualitative feedback on the application was collected in users' perspective against manual assessments

ACKNOWLDGEMENT

First and foremost I would like to thank my supervisor Mr. Faizal bin Ahmad Fadzil for his kindness, guidance, helps during the completion of this project though he have a very hectic working hours. He even invites and treats me and my friends for a dinner at a nearby stall near my university. Without his support, I do not know whether I can pass all the obstacles.

My acknowledgement also goes to the Computer Information Science (CIS) department for giving students the opportunity to do this individual project using our skills. If CIS department did not offer the previous project management courses, for sure we will get into difficulties.

Last but not least, I would like to extend my gratitude to all my friends and family who support and encourage me to complete this dissertation.

Thank you.

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Chapter 1: Introduction

1.1 Background of study

A personal mobile fitness trainer specifically designed for Android users. It aims towards contributing to regular physical activity and a healthier lifestyle.

In recent years, fitness and sports recognition has been developed not limited for health and training in human physical activities but applicable to medical area too. However, it's is tough to achieve this practice due to insufficient knowledge on exercise regime and targeted eating habit. Maintaining an exercise routine and a proper diet over a long period of time requires high level of motivation and determination.

Ever since smartphone market has perceived a dramatic growth and has been close to our lives, the end production of this project is developing an application for detecting human physical activity which assimilated with eating behavior for Android platform. Smartphone is ideal to be an essential tool to support and contribute to regular exercising and advising a good eating habit.

Apps have transformed the phone to a multi-functional device, far beyond it classic domain which is a phone to just call and SMS only. They turned the phone to a platform which users are competent enough to enjoy a wide variety of application related to their everyday life. This trend is also seen in the sports domain. Apps role play as a personal fitness coaches for supporting individualized training, eating habit, advice and reminder.

A personal mobile fitness trainer incorporates some automated exercise skill assessment test, allowing users to record for training success as well as room for improvement by stages. Meanwhile, users are granted the opportunity to log feedback which can increase satisfaction through more efficient training. Thus, it addresses precise and often abandoned aspect of intrinsic motivation to strive further.

This project demonstrated the potential to reach training goals and well defined eating norm in a more efficient and effective way to support maintaining long-term results. It is value added features with minimal to no cost involved as compared to hire a

trainer in person. The suggested videos capture key module trainings and targeted food pattern to achieve optimum health state desired. The actual amount of physical activity required depends on individual's fitness level and the set goals.

User model that is assembled and intermittently updated through guided auto test by exploiting real-time update coming from sensors. A personal mobile fitness trainer provides knowledge prompted to users and the context from a real physiologist, dietician and a professional trainer.

To derive in optimum interaction with the user, a personal mobile fitness trainer also displays reminder agent that communicate and suggests routine exercises according to user's current condition. Users can feel the sense of belonging and engaged as the app demonstrates right method to perform exercises with 3D animations.

These projects further enhance the usability by attaching calorie counter for users to design their own menu and monitor their eating pattern for weight watching purpose. On the other hand, it calculates the calorie burned by users according to the length of time and intensity of workout held by individuals.

Overall, the app is cool and stress-free to follow. Users, who lack the self-discipline by exercising alone, can easily add fun to their routine. A mobile app would be no doubt a great way to bypass personal-trainer appointments or guarantee workout while traveling or on vacation.

1.2 Problem Statement:

Physically active individuals are healthier and they're less likely to develop generic diseases, possess better self-image and they are relatively more successful than their peers. As the mobile application market continues to grow, personal mobile fitness trainer seems to act as a catalyst to outcast traditional way of hiring a physical trainer. There are several inherent factors that lie within the limitations of physical trainer.

First of all, individuals engage with physical trainer have less time flexibility when it comes to training routine. Exercises led were often incomplete when either party fails to commit to the fixed schedule set.

In addition, risk of hiring a physical trainer can be the real competency of trainer. Trainers' qualification and experiences are vital in term influencing trainees' success. There is handful of cases reported on unqualified fitness instructors held in the market locally and internationally.

Apart from that, cost involved to appoint a physical trainer is relatively higher than deploying personal mobile fitness trainer. Physical trainer calculate the price based on distinct criteria which can range from training routine mode, frequency, time involved, goodwill of trainer and so on.

This white paper shields several approaches to Android powered mobile application development which counter these challenges in different ways. Android is ranked as top rated mobile platform in term of cost and user-friendliness. All approaches are used uniquely depending on the nature of users need.

1.3 Objectives:

This project is aimed to:

- develop a human like mobile application in giving guidance on exercise technique and proper eat habit
- to remind user to exercise and eat properly
- increase cost efficiency in achieving desired health condition or body figure
- improve accessibility towards fitness regime in 24/7 mode
- enhance flexibility of change in workout plan on users' perspective

Main Objective: "To create a mobile application that can act as a fitness trainer"

1.4 Scope of study

This project is creating an android application in smartphones to replace personal fitness coach in terms of advising and motivating individual towards healthy lifestyles. There are 4 major functionality of the fitness application which is guiding user to exercise, eating habits, and reminder and training routines. The project involved across-the-board activities throughout the application development lifecycle where developer reserves additional modifications for later stages of the development lifecycle.

In order to deliver for maximum adjustability, an iterative development methodology will be used. It enables developer to resolve one of the challenges which is time minimization to market. Project will further breakdown into several iterations to allow for frequent feedback loops between intermediary constructs. The project planning stage includes identifying an adequate scheduling approach whereby developer can reach balance between development speed optimality and workload distribution efficiency.

Chapter 2: Literature Review

2.1 Overview

We could not find any way that would turn a couch potato into a fitness buff overnight. Yet, there are some interesting and affordable tools that would give us variety of workouts that were customized and keep individuals in shape along the path.

The most crucial thing developer wish to offer is a more specific guidance. As long as users keep this app on hand whenever they are, users can hit into simply exercise routine without missing even when they are traveling. This section is about the literature review on key areas of research underpinning this research work focusing on advantages of using smartphones as a platform to implement a personal mobile fitness coach android app.

2.2 Mobile App Platform Development

According to Oliveiro-Priestnall (2011), there is multiple platforms in the market to develop applications. It will be more practical when developer focus on just one or two platforms to optimize an application for a device.

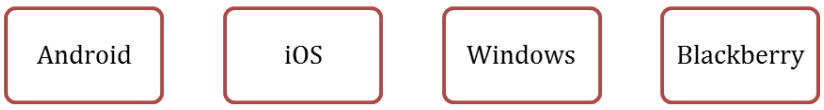


Figure 1: Operating system

When all four platforms use different languages, developer needs to select the best interest to serve its potential users. Josh (2013) state that android is open and easy to be customizable compare to iOS which is closed. He continues argues about android operating system allowed cross-app functionality and data sharing, which allowed the users to share data without boundaries between apps. Sharing one device in iOS is a

troublesome compare to Android. Android operating system can allowed the users to log in and out different apps, overlapping phone books and shared camera roll.

2.3 Cost analysis on fitness program

A Full time trainer is charging an average hourly rate of $28.27, according to the National Federation of Professional Trainers. The duration of users' training session, location of training and personal trainer's experience will determine the cost bared by users. A study of Bodenheimer (2005) exemplify the high rise of individual on fitness program have induce the development of mobile fitness applications as shown in the later part. This literature will further discuss on average price users can expect to spend on the newly developed mobile fitness applications.

2.4 Accessibility of users on fitness activities

The alternative described in the previous section is meant for fitness center or any other indoor training center. Thus, it limits user from performing the open-air physical activity, such as running in jogging tracks, recreational parks and others. This project act as an interactive role-playing player in which user can physically utilize any form of materials on hand to perform the physical activities directed by the virtual trainer via apps. The simulation can be designed for different fitness purposes according to the users need. Besides, research performed by Lee (n.d.) shows that users are allowed to explore the combination of fitness regime to motivate their physical activities and increase their score.

There are several ways to examine and monitor user's life-parameters during physical activities which will be discussed in the later section of literature.

2.5 Potential Users Demographic Factors

Putzer (2010) stated that it is important to examine the attitude of potential users toward different kinds of mobile applications. This paper will further deep dive with development of mobile application and consumer attitudes towards acceptance of mobile applications. In which this information is particularly appreciated for developers and marketers in shaping their marketing strategies to reach more potential users in the market. Moreover, this study provides the fundamental information which future works be built on to derive at specific problems.

2.6 Quality of virtual fitness trainers

Fitness training is more effective and yield greater improvement as illustrated by Davis(1998) provided the user knows whether which exercises to be performed and what level of difficulty to apply with. It backs to sustaining long-term motivation, as the user is aware of his or her training progress. Through mobile fitness apps which users can mimic the right way of doing each exercise, improve and the results effectively visible after designated modules are completed.

According to Dale (2009), detecting correct exercise execution, virtual fitness trainer on mobile eliminates the need for permanent supervision by a physical individual. It is not only supports leisure time exercising, but assimilating a valuable complement for rehabilitation purpose. Mobile fitness app supports autonomous training through comprehensive exercise descriptions details information on selected training.

2.7 Existing Mobile Fitness Applications

i. General Fitness Tracking

FitSync (Free/$4.99)

FitSync to keep track of workout progress suggest new exercises for daily basis, and give users mobile and web interface you can use to see how far they can strive.

FitSync positioned them as heart of Android gym. The app lets users log workouts on phone, set up a workout schedule, download new exercise programs, and even challenge friends to meet user's fitness goals. The premium version of FitSync which is for fees, adds some weight and body statistics and tracking list, allow real-time charts while exercising, and more.

ii. Weights and Targeted Muscle Area

Weight/Strength Training – JEFIT (Free/$4.99)

Developers promise that it's a professional-level bodybuilding and weight training app. The app syncs with the JEFIT web service, and allows users to sign up a personal workout profile, select a workout regimen, or customize from hundreds of strength training exercises readily available in the app.

JEFIT will also keep track of your activities and your progress, and lets you slowly ramp up the difficulty of your strength training so you challenge yourself with each workout. The app coordinates with user's account automatically. The advanced version removes ads, adds progress trackers and additional weight and body mass tracking, logging and reporting over time, and a challenge mode that urges users to supersede their prior performance.

iii. Exercise Programs

Circuit Training – C25K ($2.99)

Couch to 5K program was designed to take sedentary people and give them a direct training path towards being able to run a 5kilometers, and the Android app follows the plan closely. Users can listen to music while on the run, and C25K app will give them audio cues when you should switch between walking and running. It also structures an app journal to track your progress towards being ready for a full 5K run.

All in One – PocketTrainer ($5.99)

PocketTrainer doesn't have quite the same features that FitSync has, but what it lacks in features it makes up for in motivation and comfort of use. PocketTrainer comes with superior workout and motivational videos to give users a complete workout regimen

Simply select Beginner, Intermediate, or Advanced, and you'll get the kind of coaching you would normally have to go to a gym to experience from a personal trainer. Each exercise is accompanied by an instructional video and a written how-to. The overall regimen includes cardio, strength training, and endurance training.

2.8 Ideal States

A personal mobile fitness trainer is an electronic personal trainer that creates customized training plans based on science of exercise, suited to individual's body, goals, and lifestyle factors, including, duration, workout spot, duration and targeted equipment. When users enter their activity, A personal fitness trainer uses this data to report on their progress and refine personal workout plans so regular users can optimize their fitness and adapt to schedule changes.

West (2012) articulated mobile and wireless technologies usage to support the advancement of health goals has potentially transformed the face of health service delivery across the globe borderless. A powerful combination of factors is driving this change. Rise in integration of mobile health into existing health services makes training routines and well balanced diet go live any time and everywhere.

Track progress section has calculators for body mass index (BMI), hydration, heart rate, calories counter for net calories derived from training and food intake as well as space to upload photos and track your weight, BMI, waist size and other measurements**.**

2.9 Key opportunity

Goodman (n.d.) state that smartphone can make it user be fit by making them get information easily like healthy recipes. Besides that, it can help user learn new exercises, train for an upcoming goal, and monitor your progress. Paul (2013) also support the idea of smartphone help you stay fit by using the Samsung S4 newly gadgets which is called the S health gadget consist of an S Band, Body Scale and HRM which can improve one's fitness. The phone function can help the user to tell the ideal weight to aim for and how many calories per day a user should take to achieve the body physique they desire for. According to an online source, healthreviser.com, smartphone can plan your workout schedule for you to improve your fitness level

Chapter 3: Research Methodology

3.1 Overview

A prototype is constructed using a smartphone Android mobile application. A smartphone is used because nowadays everyone is carrying smartphone all the time. An android platform is chosen because the programming codes are open source which are easy available and available in the internet. Android can deploy the app created to a broad range of devices from phones to tablets and beyond. Google play can be used to market the android app product worldwide and making a business out of it. In Google play growing customer base, the app created can be easily rise in popularity with it weekly "top" chart and ranking for promotional purposes.

Using the mobility of smartphone it can act as a tool and platform to replace the guidance and advice from a personal coach. The application will be able to categorize user into beginner, intermediate and advanced. These 3 categories have different trainings, eating habits, advices and steps for user to follow during exercising. The app has 4 major functions which are giving guidance of exercise and nutrition plan, reminder and training routines.

There are a few similar competitor fitness mobile app in the market such as JEFIT, C25K, PocketTrainer and etc. They provide a large range of workouts trainings and some other interesting functionality. However, the apps do not provide useful advices to novices and new users that just starting to step into healthy lifestyles. Furthermore, these apps does not combine training workout with a proper eating diet. These competitors only focus solely on work out routines, they have forgotten about the importance of consuming a proper meal rich in protein, carbohydrates, vitamins and minerals. Many people tend to overlook this matter, limiting the results of their training. Hence, with these app a proper workout routine and food planning for the user is created for the user to maximize their muscle growth and body physique they wanted.

The progress of developing the prototype of the application is being recorded in a Gant Chart and Key Milestone to ensure the project smooth progress. The Gant chart and Key Milestone are listed at the appendix section.

3.2 System Development Life Cycle

The methodology used in developing this mobile fitness trainer application is using an Agile Software Development Model. The lifecycle is based on iterative and incremental development, where requirements and solutions evolve through collaboration between self-organizing and cross-functional teams. Where the application is developed on an iterative manner, which changes through several stages and each stage of lifecycles consist of different functionalities and requirement to be meet. Hence, instead of developing the project based on a step by step basis, planning, testing, implementation and feedback are being done at the same time when the system is being developed.

Figure 2: Agile Software Development Model

The author chooses this development because the mobile fitness trainer needs to be completed in a short period of time of 8 months, which is limited time is only given to finish these project. The term ‘agile development’ is used for the flexibility and the adaptive planning phase as time is crucial for this project development, the author would like to develop this project as flexible as he can to ensure that any weakness and problem for the project can be identified immediately and change it.

3.3 Research Framework

This chapter highlights the research framework, explaining how this project would be done as an effort to present a solution to overcome the problem statements. A well-planned the project activities from the early phase of the project development until the completion of the project system. All the activities were putting into different time slot accordingly like a schedule in order for me to have a systematic process of the system development and at the same time.

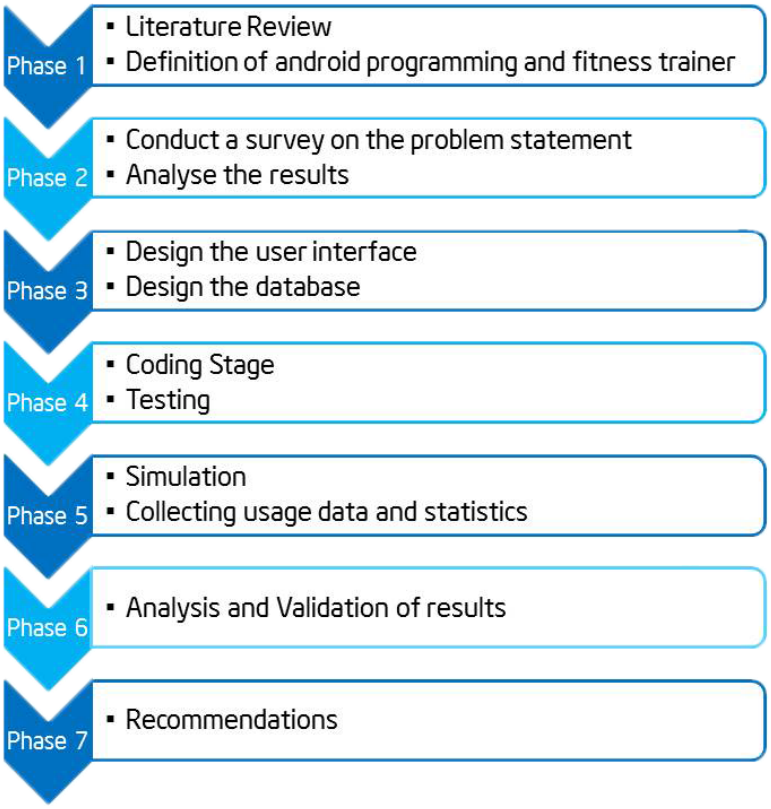


Figure 3: Research Framework

During FYP1, the processes are divided into 2 stages, namely FYP1 and FYP2 with each covering with different tasks. In the stage of FYP1, it comprises of phase 1, which is about information gathering on the literature part of the research. In phase, the author will gather the necessary information from the students and lecturers by conducting a survey research and analyze the data collected. During phase 3, the author will be designing the interface and the necessary database to hold the data from both the application.

During FYP2, the author will proceed with the coding stage in constructing the whole application. A testing stage will be run by asking some users to test the application and find the room for improvement. Simulations of the entire systems will be done in phase 5 and the author will collect on the usage data and statistics to gain the information for improving the application. The results from the usage data will then be recorded and analyzed during phase 6. The final phase will be the recommendations.

3.4 System Architecture

Figure 4: System Architecture

The system architecture of this mobile app will be develop in an android based smartphone and focusing on 3 major function which are the advice function, reminder function and training function. All the data are been save in the phone memory or SD card.

The advice function will focus on advising the user in terms of their nutrition and exercise routines through relating the workout history of the users and giving them advice based on their performance and history of exercise. Advice like on how many number of repetition and set the user should do. This acts like a personal trainer advice their disciple of what correct workout they should follow.

For following function is the reminder function. It will notify the user by using the android alarm function of the phone. It will notify the user to exercise. It acts like a personal trainer which reminds them to exercise.

The final function which is the training function it will monitor and check the user progress and give the right recommendation to them into achieving their fitness goals. By using the smartphone powerful processing, it allows the smartphone to find the best routine for the user to perform based on their fitness level. Like a personal trainer giving the right exercise for their disciple to improve.

3.5 Functionalities

Mobile fitness trainers are able to perform a few functions in order to help to achieve the objectives of the project. Below are the functionalities.

Functionalities list:

a) Guide to exercise
b) Nutrition plan
c) Reminder
d) Training routines

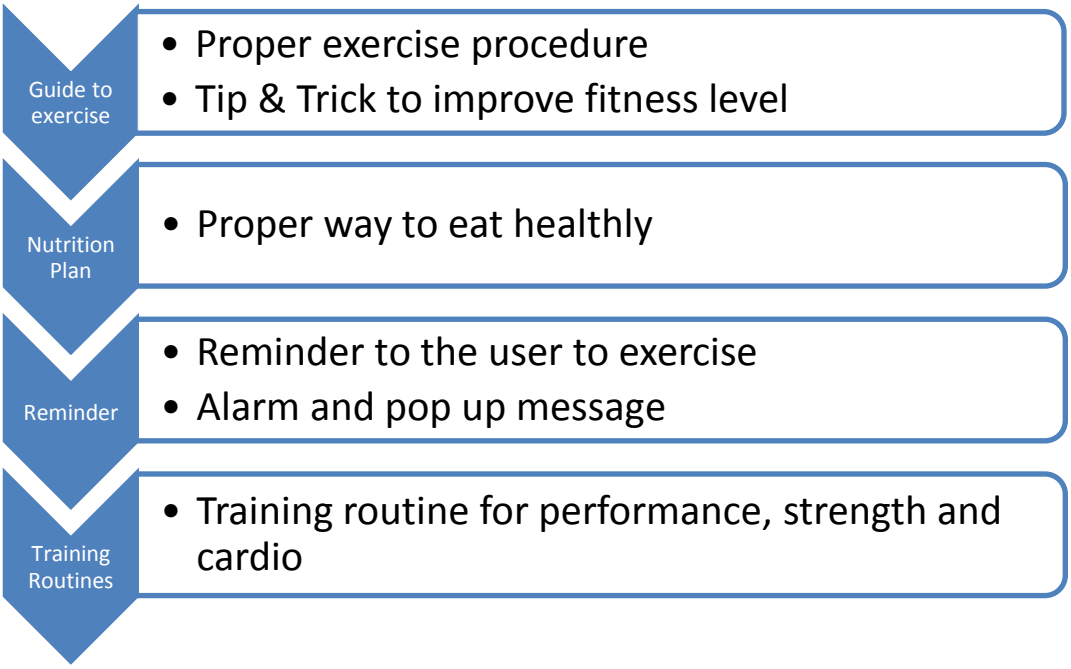


Figure 5: List of functionalities of mobile fitness trainer

3.5.1 Guide to exercise

Figure 6: Pictures of major body muscles

The project is to create a mobile app which can teach and guide user to perform exercise correctly. The application will guide in training the chest, arms, back, abs, legs and shoulders. A series of pictures and video will be shown to the user to guide them in performing the exercise correctly. Step by step information is also provided for a detail understanding of the exercise and workout routine. A list of various ways to train the same body part is also provided. So that, the user can chooses on which way to exercise that suit them the most. A set of workout exercise routine combine together are called training routines. These training routines are a series of combination of exercise to give user better workout routine is also provided and will be explain in the training routines section.

3.5.2 Nutrition Plan

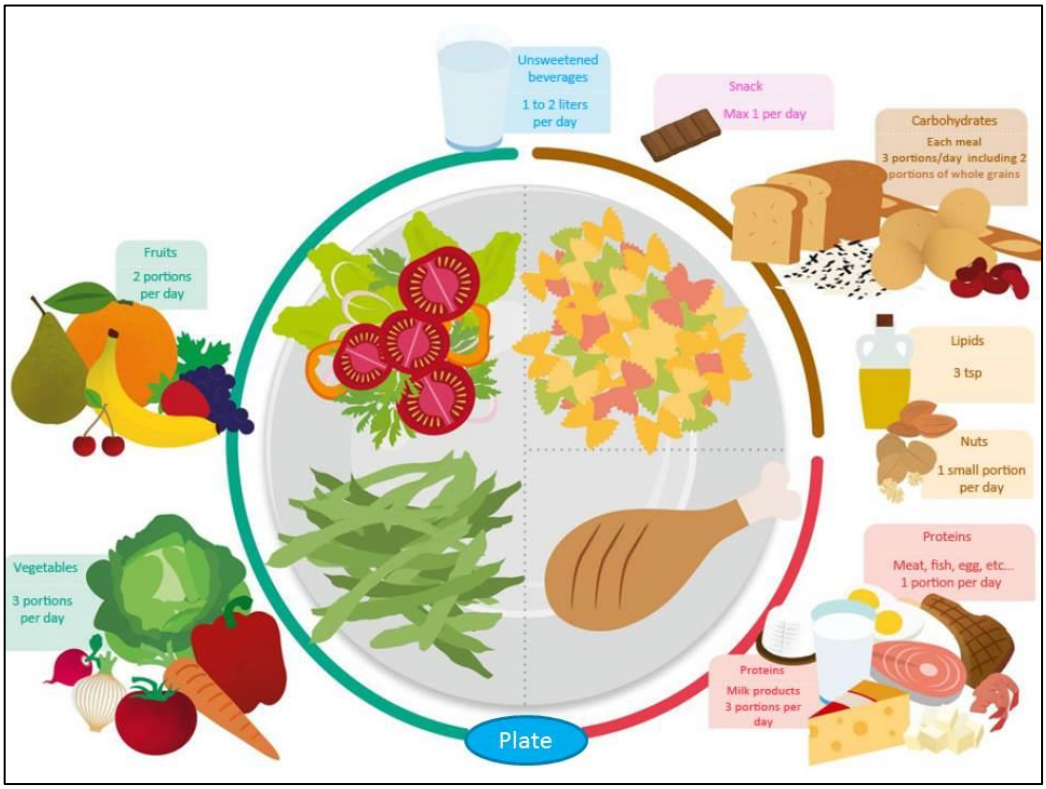


Figure 7: Meal plan

Besides guiding the user into how to exercise, the mobile application will also teach and guide the user on how to eat properly and how to be on a diet to lose weight or gain weight. A nutrition plan is important because exercise only helps 20% in achieving a good fitness lifestyle. The other 80% goes to eating proper and healthy meals to achieve the user fitness goals. Information on what to eat during what time will be shown to the users. A list of various diets will be available for the user to choose according to their liking and fitness preferences. Advice will also be given to the user on which diet to follow according to their exercise history.

3.5.3 Reminder

Figure 8: Reminder

Without a reminder to the user to exercise and eat properly the mobile application will fail it purpose. Due to user will eventually forget about their exercise goal if they are not constantly reminded of it. With this reminder function it plays the roles of a physical trainer which constantly remind his or her disciple to keep on working out to achieve results. With a smartphone mobile application, an alarm can help in reminding the user on when to go to exercise or to remind user to take their meals during they are busy doing things. Beside an alarm, a push notification can also help in notifying the user on which pending workout they should do or meals which they have skipped and they

should take. Hence, with this reminder function it acts to constantly remind the user to exercise and eat healthy meals for them to achieve their fitness goals.

3.5.4 Training Routines

Figure 9: Training Routines

Besides reminding user to exercise, this project mobile app will also provide well-planned and effective training routines for the user to follow. This is the core function in aiding the user to reach their desire fitness level. The training routines a compromise of training workout that focuses on performance, strength and cardio workout.

For performance workout is a workout to improve the agility of the user muscle. The training routine is for the user that wants to prepare for a sports competition such as swimming, running, marathons and etc. The workout routines will be more towards high repetitions and lesser weights. The workout be intense and have less break between exercises.

However for strength workout, it will focus on improving the strength of the user. This training routine is design to make user to be stronger and be able to lift even heavy weights then before. Indirectly, the user muscle will grow bigger and stronger which will shape the user body into a better and good looking. The workout routines will be more towards taking heavier weights and lesser repetitions. The workout will be powerlifting and have more breaks between exercises.

For the last workout which is the cardio workout. The workout will focus on burning the fats away, making the user look slimmer. This training routine is design to make user to be able to cut down their body fat to bring out their abdominal muscle and also slim down their tummy area. The workout routines will tell the user in how the right way to maximize the After-Burn effects to burn away those body fat while running on a treadmill.

3.6 Data Collection

I. Interview

Conduct an interview is one of effective approach to gain further information related to this project. The interview is conducted to a few candidates who are:

a) Fitness GYM Instructors
b) People that workout at the gym
c) People that having a busy lifestyle that exercise at irregular times

II. Online Survey

Depending on the results of interview is not enough. Therefore in this project online survey is created and distributed to the public through Facebook to get their evaluations by using. In the survey form the people were asked several questions that related to this project in order to get their feedback and comments. Based on the result the project developer will review and evaluate to enhance the product quality. The results for this online survey will be showed in the results section later.

III. User testing

After the completion of the mobile fitness trainer application, the applications are given to user to be tested. Below are the phases of the user testing process.

Objective of user testing:

I. To check whether the system run smoothly
II. To check whether the system meet the requirement of a fitness application
III. To check whether the system act as a personal trainer
IV. To check whether the system is able to guide in exercising technique and meal consumption
V. To check whether the alarm suit the individuals

User testing phases:

i. **Phase 1 –** Testing on normal people.
ii. **Phase 2 –** Testing on fitness individual in the gym.
iii. **Phase 3 –** Interview a fitness trainer on how effective the application.

Chapter 4: System Development process

4.1 Tools for development

4.1.1 Software

The tools that are available for the author to use include:

1. ***Eclipse IDE***

   Use for hard coding in Object-oriented Java in developing Android Application.

2. ***Adobe Photoshop Portable CS5***

   Use to design the template, buttons, and images for the application.

3. ***Android Starter Development Kit***

   Use to code the android application according to the template.

4.1.2 Hardware

1. ***An Android Smartphone***

   Use for testing and development purpose.

2. **A computer**

   Use for testing and development purpose.

4.2 Initial User Interface Prototype

Before the mobile trainer application project is started. An initial user interfaces was design. The initial user interface was also been presented in the author proposal defense. The interface will act as a guideline during the coding and design of the mobile fitness application.

3 Major Tab

a) The Exercise tab
b) The Meals tab
c) The Log tab

The Exercise Tab

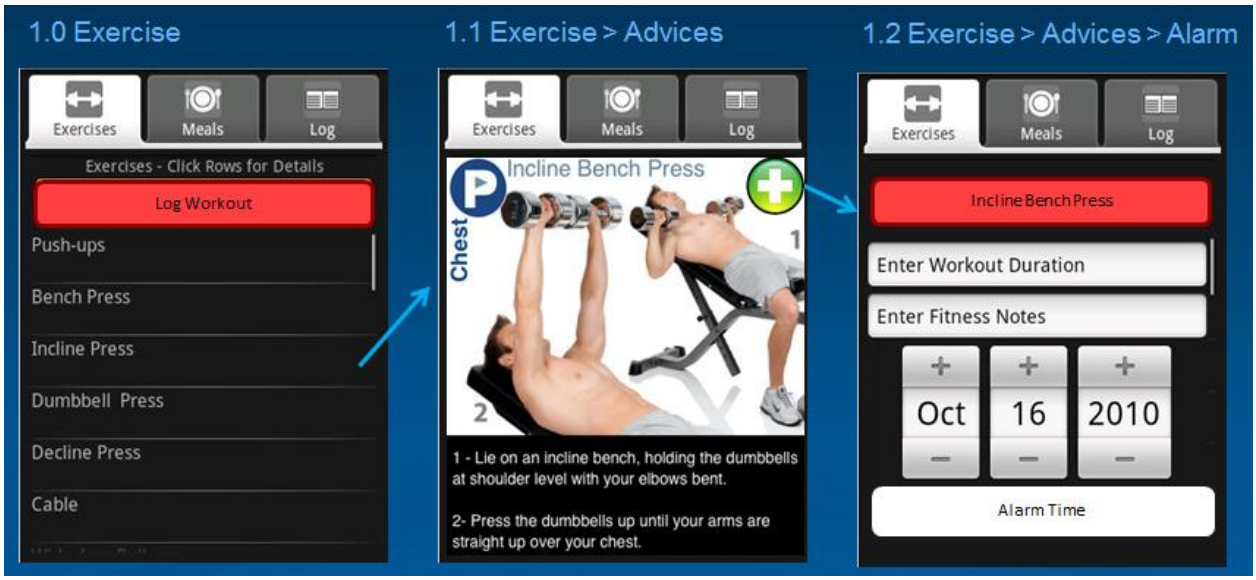


Figure 10: User Interface of exercise tab

Above is the interface for the exercise tab. When the user click onto the exercise tab, a list of workout exercises, training routines and exercise for certain body parts will appear like the 1.0 Exercise. The user will be able to scroll over the list of workout. When they click on a certain workout such as the Incline Chest press, then a new page will be display like the 1.1 Exercise > Advices. On these page user can see step to step

guide on how to perform the work out, advices, and a picture on how to carry out these work out. If the user wish to add the workout exercise into the log (summary of workout history), they need to click on the green add button which will lead to the next page 1.2 Exercise>Advice>Alarm. On this page the user will be able to set an alarm to notify them to perform this workout at their desire time. When the user click saves, the workout will be save into the log (summary of workout & meals history) which is the history page.

The Meals Tab

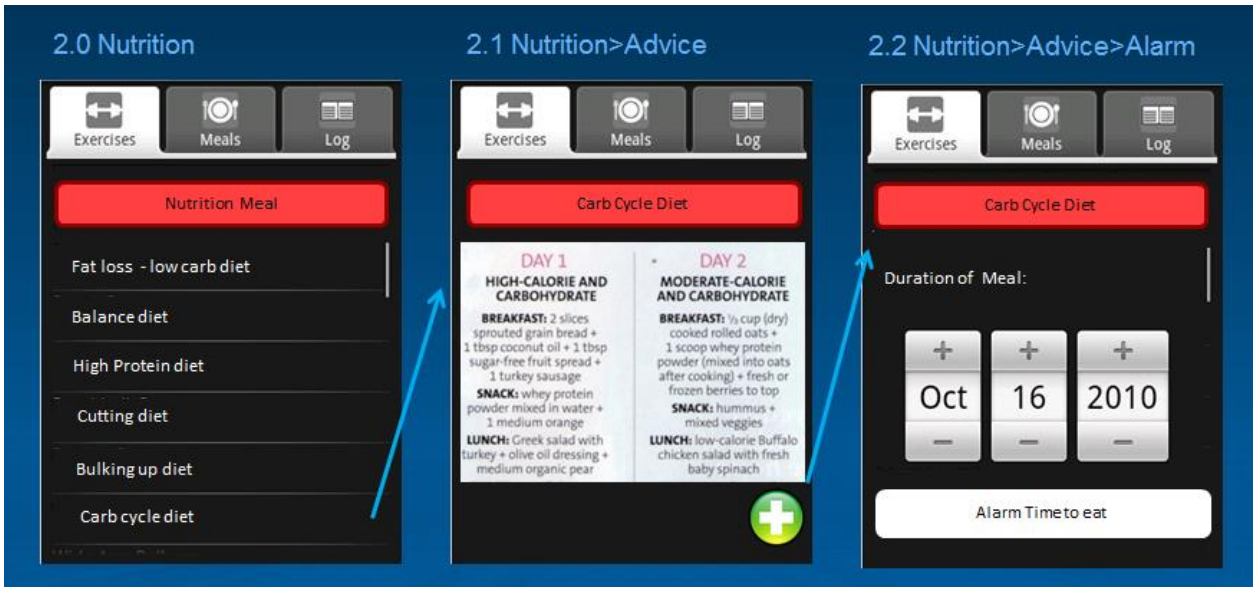


Figure 11: User Interface of meal tab

Above is the interface for the Meals tab. When the user click onto the meals tab, a list of diet and eating plans will be appear like the 2.0 Nutrition. The user will be able to scroll over the list of nutrition, meals and diet plan. When they click a certain nutrition diet such as Carb Cycle Diet, a new page be shown just like 2.1 Nutrition > Advices. On this page information on step to step guide in how to eat according to the diet plan will be shown to the user. If the user wish to follow or perform the diet they need to click on the green add button which will lead to the next page 2.2 Nutrition>Advice>Alarm. On this page the user are able to set alarm to notify them to when to eat their meals or when the

duration of this diet plan. When the user click save the diet plan will be save into the log (summary of workout & meals history) which is the history page.

The Log Tab

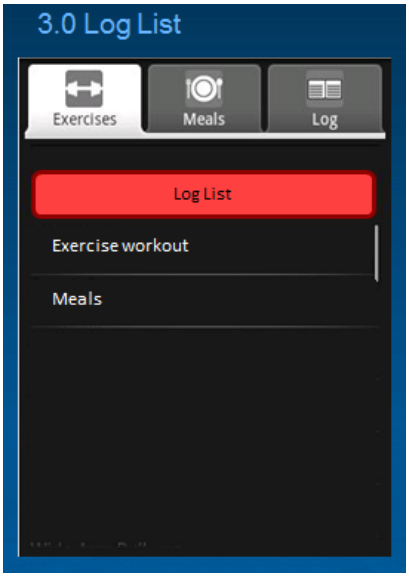


Figure 11: User Interface of log tab

Above is the interface for the Log tab (summary of workout & meals history). When the choose these tab by clicking, a page will appear showing the whole history of the exercise workout the user is following and also the eating diet the user is currently following. Here the user can edit and delete the current workout routines, eating diet and the alarm notification which they save previously.

4.3 System Development process

A suitable Android Smartphone was bought at the price of RM499.00. This smartphone can support all of the required function of these projects. The smartphone is working one Android Jelly Bean and can application configure in Eclipse Android Development Tool (ADT) can be used in the phone. Below is the image of the phone.

Based on figure below, the mobile application is currently being developed using Eclipse Android Development Tool (ADT). The interfaces have been compiled in the developer tool, but some of the features cannot fully function yet because the coding part is not completed up till now. The coding of the mobile application is shown below. The basic function of the buttons has been set, and the next phase of the coding is to make the application can perform some required tasks that have been plan previously in the user design phase.

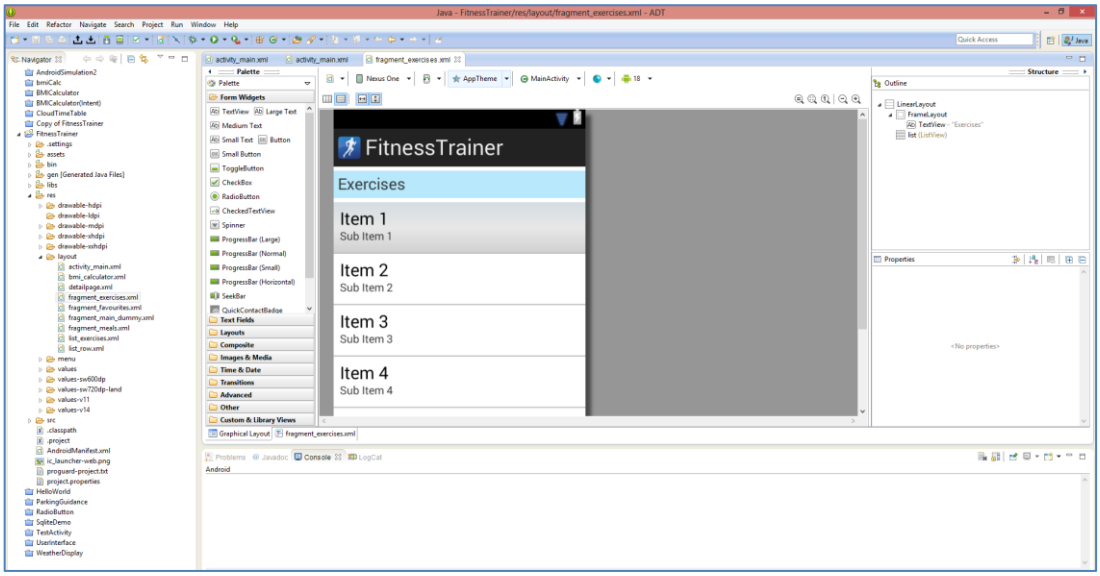


Figure 13: System Development using Eclipse ADT

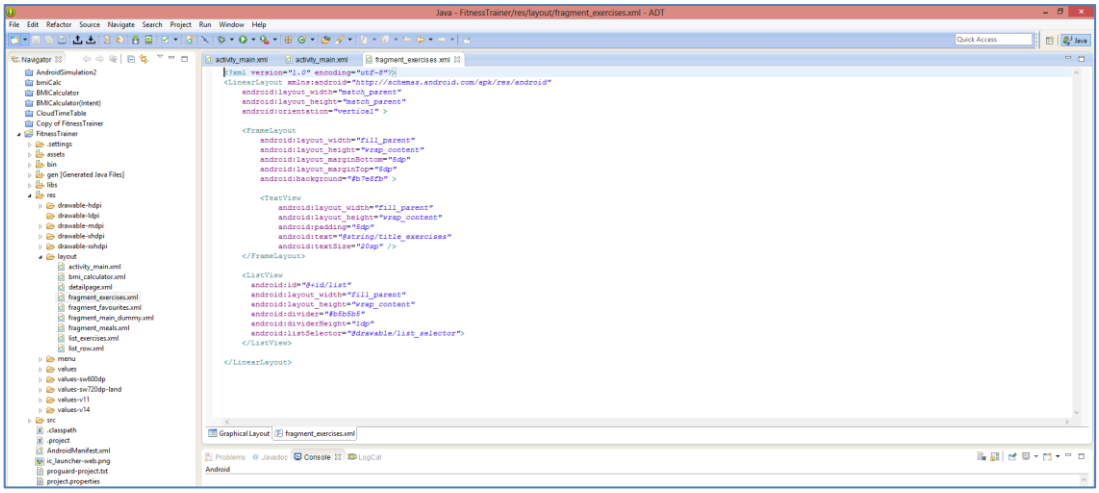


Figure 14: Java Coding of the application

Chapter 5: Result and Discussion

5.1 Discussion of findings

5.1.1 Online Survey Result

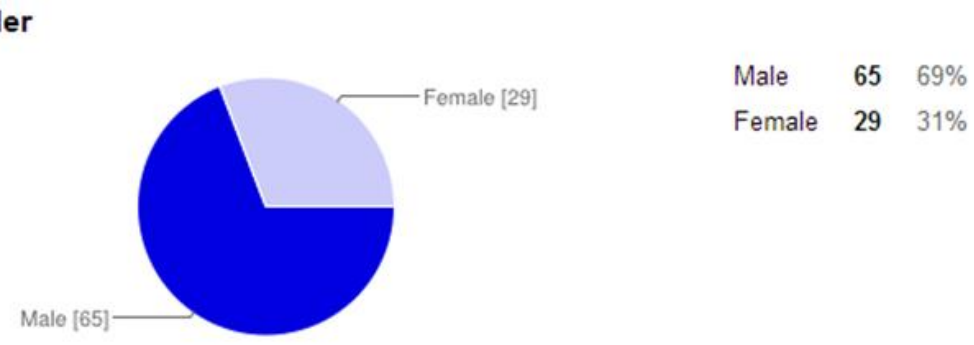
An online survey questionnaire was conducted to study about the project research problem statement and research objective.

The survey was designed using Google drive. The survey form was distributed to the public by using Gmail and Facebook. 95 respondents from various walks of life completed and submitted the survey form online. The sample questionnaire is display at the appendix section.

Question 1

The online survey was done by the respondent from the age range from 30 years old to 13 year old.

Question 2

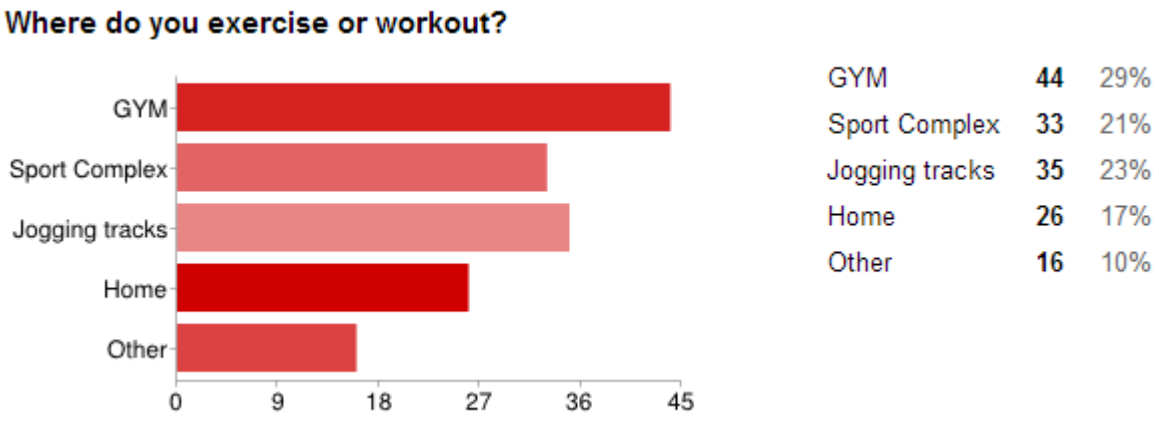


In the questionnaire results there were 65 males and 30 females respondent to the online survey.

Question 3

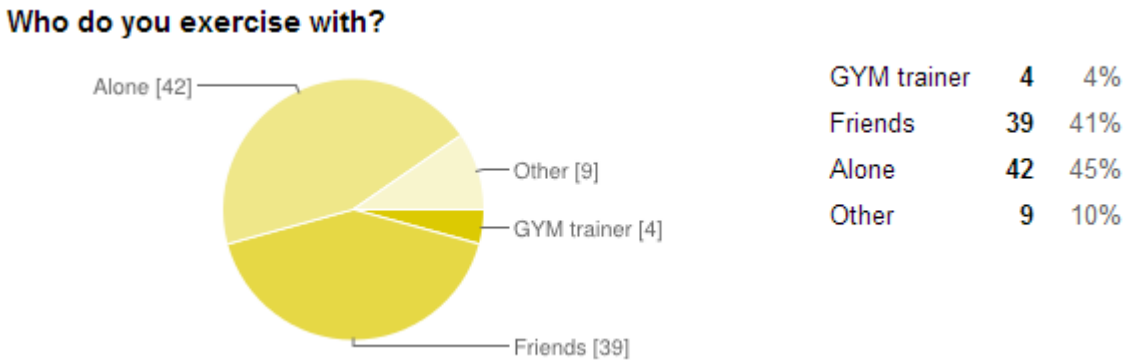
In question 3 the respondents were ask on how frequent they exercise. Most of the respondent was on the moderate scale which exercises 4-2 times per week which consists of 35 out of 95 respondents. Only 7 respondents said they never perform any exercise at all. 20 out of 95 respondents choose the option that they exercise regularly which is 7 to 5 times a week.

Question 4



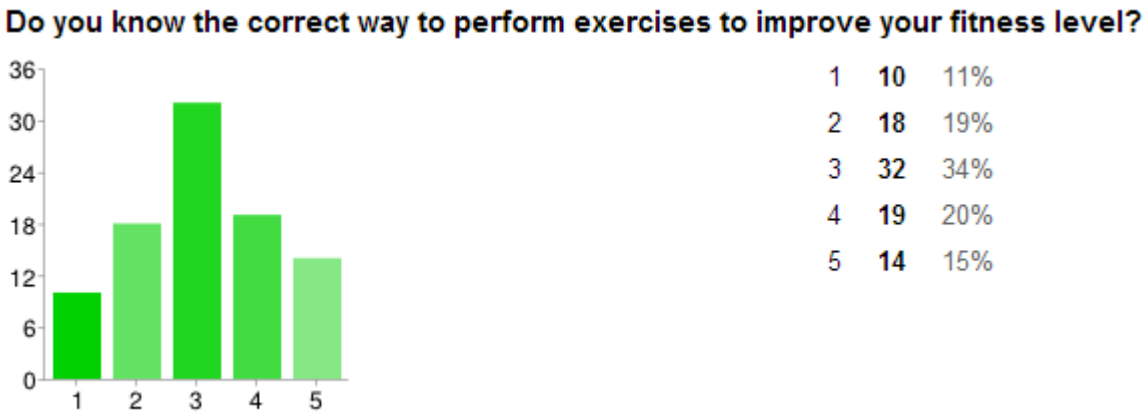
In the online survey the respondent were ask about where do they exercise or workout. A majority of people chooses GYM as their best workout place compare to others which consist of 44 out of 95 respondents. Another favorite spot to workout chosen was the jogging tracks which been choose by 35 respondent. The home as the respondent workout place came in the fourth place which is chosen by 26 respondents.

Question 5



In question 5 the respondents were ask about whom they normally exercise with. 42 out of 95 respondents said they have nobody to exercise with so they exercise alone. Only a few respondents have guidance from a GYM trainer which is only 4 respondents.

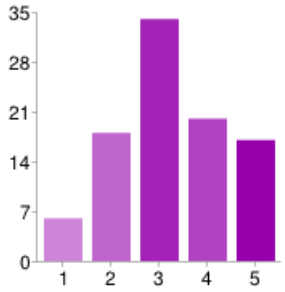
Question 6



The respondents were asked to rate on how they think they perform the right exercise to improve their fitness level from the scale of 1-5 (bad to good). Majority of them are uncertain of their exercise 64% fall below the 1 – 3 scale which are uncertain. Only 35% respondent chooses that they perform a good exercise routine.

Question 7

Do you know how to eat a healthy in terms of a balance of carbohydrate, protein, minerals, and vitamins?

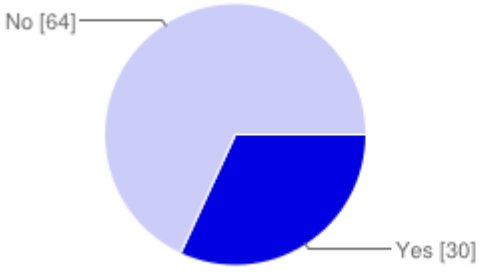


1	**6**	6%
2	**18**	19%
3	**34**	36%
4	**20**	21%
5	**17**	18%

The respondents were also asked to rate on how they think their eating habit from the scale of 1-5 (bad to good). Majority of them are uncertain of their exercise 61% fall below the 1 – 3 scale which are uncertain. Only 39% respondent chooses that they have a healthy eating habit.

Question 8

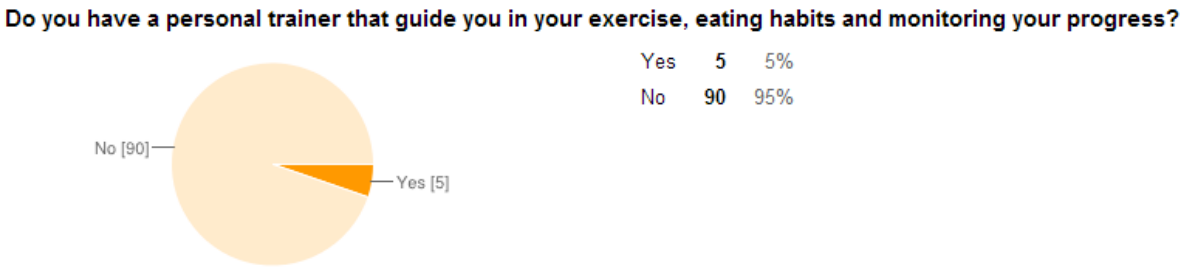
Do you monitor your exercise progress?



Yes	**30**	32%
No	**64**	68%

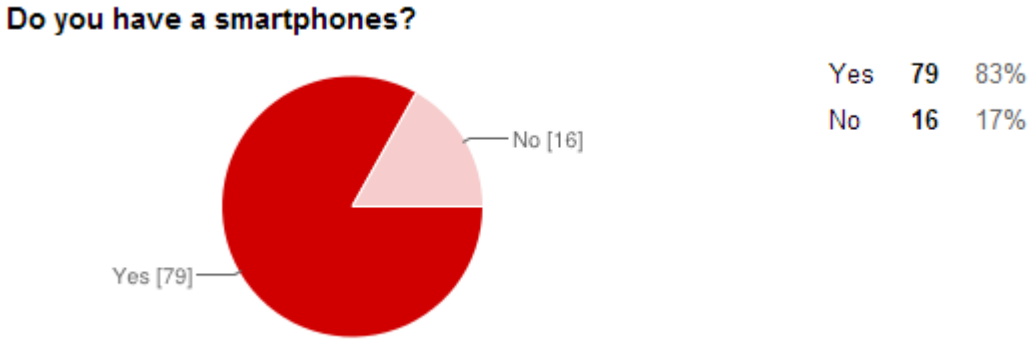
In question 8 only 30 respondents monitor their exercise progress and 65 of them does not even bother to monitor their exercise progress

Question 9



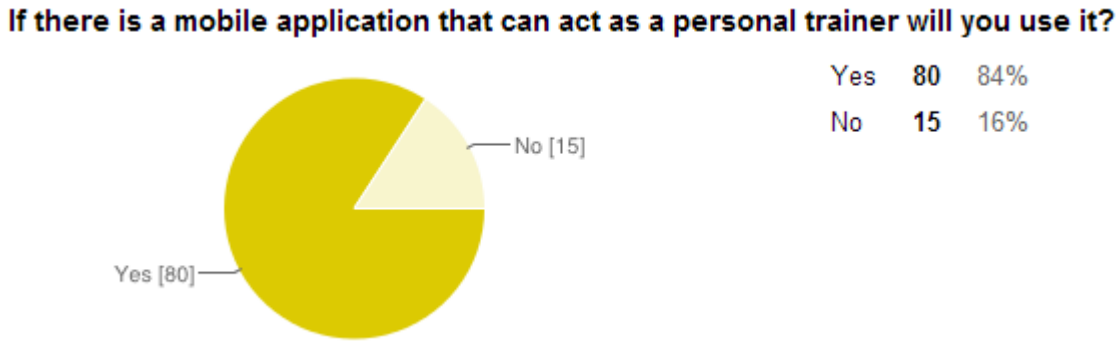
In question 9 the respondents were ask whether they have a personal trainer to guide them in their exercise, eating habit and monitor their progress. Only 5 out of 95 respondents have a personal trainer to guide them

Question 10



In question 10 the respondents were ask whether they have a smartphones at their disposal. Majority of them have a smartphone which is 79 respondents.

Question 11



In question 11 the respondents were ask whether will there used a mobile application which can act as a personal trainer. Majority of them have agrees that they would like to try and used the mobile application.

5.1.2 Interview Result

Interviews have been conducted with the aim to:

- To obtain people opinions about how crucial a personal fitness trainer in helping them to achieve their goals.
- To investigate whether a mobile application can act or substitutes a personal fitness trainer.

Interview 1: Mr. Ong Wei Shen, 22 years old

Figure 15: Interview 1 candidate

The first interview was conducted with Mr. Ong Wei Shen who was my secondary school friend. He had been working out in the gym for 2 years. Despite of working out in the gym, he does not see much result he told me.

The main reason of not improving in his fitness level was because of does not have anyone to notify and push him during his exercise routine. He also stated that sometimes he will skip his routine if he is lazy. Plus he will forget of going to the gym if no one reminded him. It's been tough for him to exercise when most of his friends are not having the same semester break as him since his study abroad at United Kingdom.

He understands the importance of having a personal trainer to guide him in term of his exercise routine, eating habit and monitor his progress. However, he have an irregular working out time which is normally the night which is during this time no personal trainer is available to guide him. Besides that, his semester break is only for 2 months. He needs to go back to UK after that. Hence, it is inconvenient for him to get a personal trainer.

After hearing my idea of creating a mobile app that can act as a personal trainer, he seems delightful about the idea and said he would like to try it after finished I develop it. He stated that the mobile application would be very beneficial for him in guiding in his how to exercise, eating lifestyle and monitoring his progress.

Interview 2: Mr. Soon Chia Aun, 22 years old

Figure 16: Interview 2 candidate

The second interview was conducted with Mr. Soon Chia Aun who is my GYM colleague under the same Personal Trainer Mr. Tan Chee Foo. He had been working out in the gym since secondary school. Despite of starting to go to the gym early to work out, he does not see significant result and improvement during his days without a personal trainer. He thanked me personally due to introducing him a personal trainer which helps him improve his fitness level. He has cut down his weight from 92kg (overweight) to 75kg (ideal weight).

He stated that he was once inconsistent in terms of training time, training method and eating habit. The personal trainer managed to advice and changed his habit into achieving his fitness goals. During difficult time when he is feeling lazy the personal trainer would motivate and push him to not be lazy and exercise. The personal trainer also will change his training routine based on what he feel suitable for him. His confidence level also improves greatly with the changes happen to him. He also gave me his before and after picture of his transformation from a big stomach to having 6 pack abs with the guidance of a personal trainer.

After knowing about my project, he said that the project is a very good one to help people that do not have the opportunity to have personal trainer like he does. He also shows interest in the mobile app would like to download to try it. He further agrees that this project is good for the public because a lot of people need guidance in exercising and eating properly.

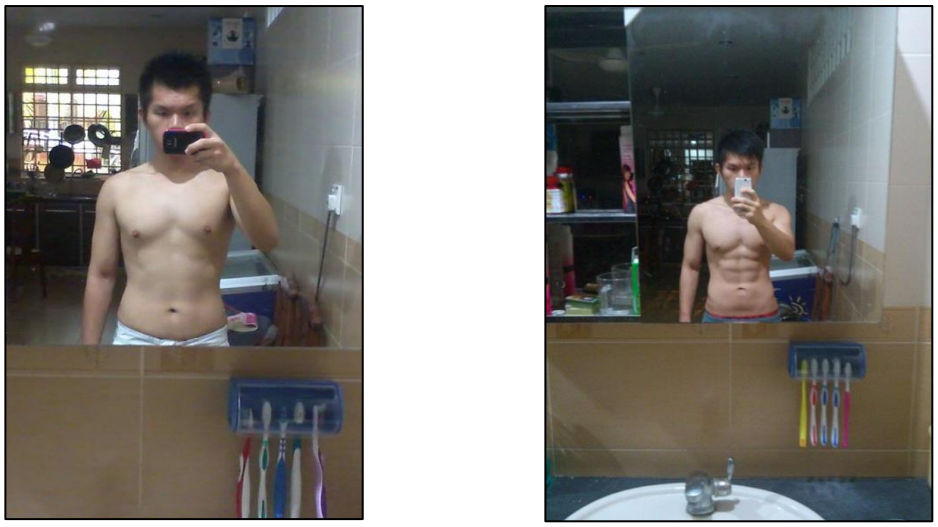


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Figure 17: Interview 2 candidate transformation

Interview 3: Mr. Tan Chee Foo, 57 years old (Personal Trainer)

Figure 18: Interview 3 fitness trainer

The last interview was conducted with Mr. Tan Chee Foo, who is my GYM Personal Fitness Trainer. He is currently 57 years old but is looking fit as ever. He started his profession as a personal fitness trainer since his early 30's. He has plenty of people under his guidance ranging from secondary school to 60 years old disciple, male and female. He been exercising since his early 20s and felt in love with it. He stated that a GYM is like his second home and he spend more time in the gym rather than at his home.

He said nowadays exercising is becoming a trend to younger generation nowadays than past few years. The new generations which are my generation have more tendencies to exercise in the GYM. However, many of them exercise the wrong way, eating the wrong things and does not monitor their progress which lead them to failure in improving their fitness level. Some of them also do not know to use the GYM equipment properly which may cause accidents or damaging the GYM equipment. As a personal trainer people hire him to show them the right way to exercise correctly, educate them in terms of what to eat and monitor their progress from time to time with proper training.

After listening on what project I'm doing he stands a neutral side about the idea. He stated that he is not very knowledgeable in term of technology so he cannot decide. Besides that, he said that a mobile app may not replace fully a personal trainer because a physical trainer with experience will be better. However he agrees that this project can helps in aiding people that are lacking the guidance of a personal trainer because are too busy, having irregular working times and does not have the money to afford one.

5.2 Final Prototype

The Logo & Splash Screen

Figure 19: A mobile fitness trainer logo and splash screen

Above is the Mobile Fitness Trainer logo and splash screen. The blue running logo will appear in the smartphone list of application. When the logo is clicked, the application will start running. Before going into the 4 main tabs of the application a white splash screen is shown on the background to tell user what is the name of the mobile fitness application.

The 4 Main Tabs

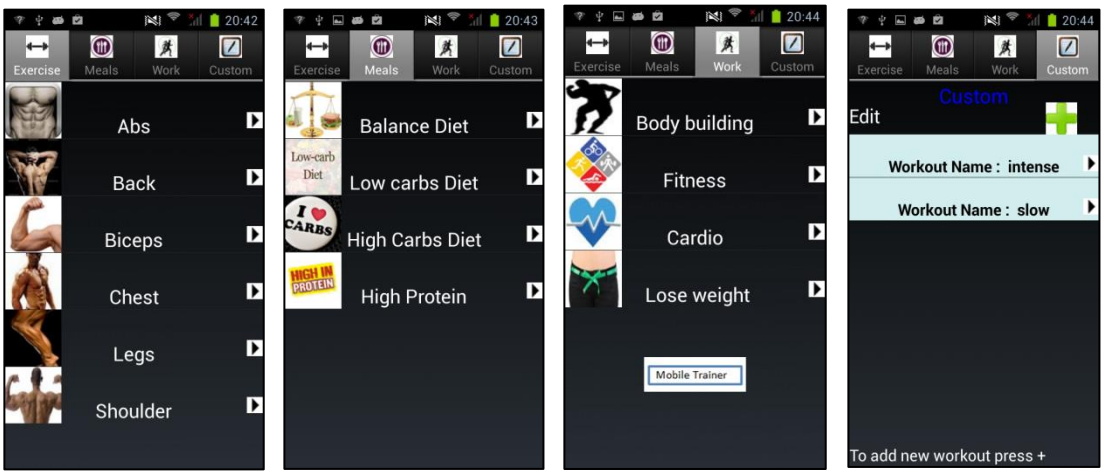


Figure 20: The 4 main tab of a mobile fitness trainer

Above are the 4 Main tabs of the Mobile Fitness Trainer. The exercise tab will show out all the list of major muscles. The meals tab will show the list of diet available in the fitness application. The next tab which is the workout tab which show all the list of training available in the application and a Mobile Trainer button which will advise user on which training and meals plan to follow. Lastly is the custom tab which allows the user to add, edit and delete exercise as they please.

The Exercise Tab

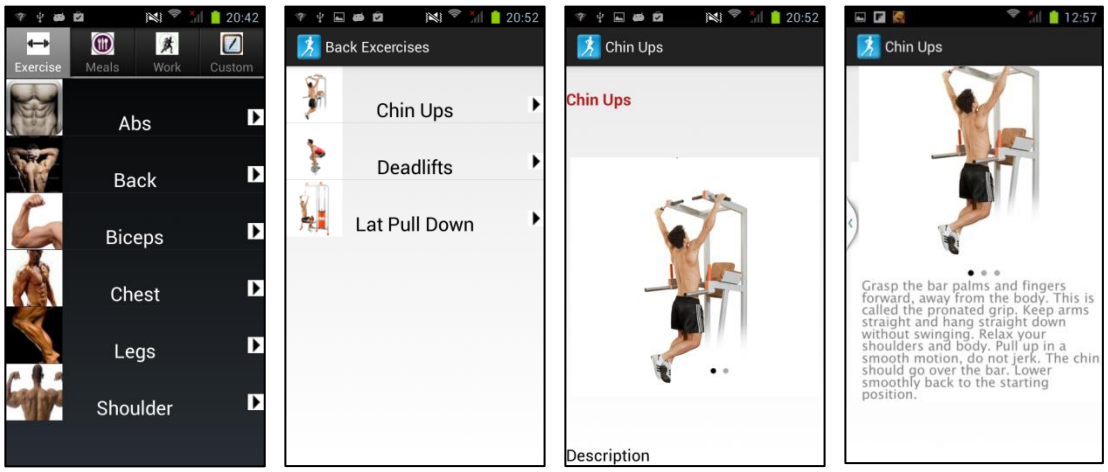


Figure 21: Exercise tab of a mobile fitness trainer

In the exercise tab when the users click into a major muscle for example the back muscle, a list of back exercises will be display for the user to choose. When the user pick Chin ups, a couple of pictures are shown to the users about how to perform chin up exercise. This will show users on the techniques to exercise properly. Plus, detail description on the tips and tricks are display below for further explanation on how to perform the exercise correctly.

The Meal Tab

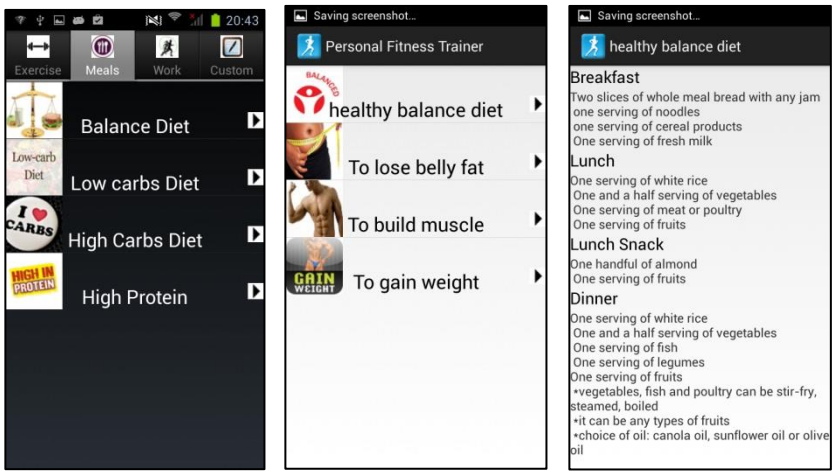


Figure 22: Meal tab of a mobile fitness trainer

The next tab is the meals tab. It will show a few recommended diet plans to follow for different user fitness ideal. The diet will show on what to eat from the first meal which is the breakfast till the final meal of the day which is the dinner. The quantity and the proportion of the meal to be taken are also stated in the diet plan.

The Workout Tab

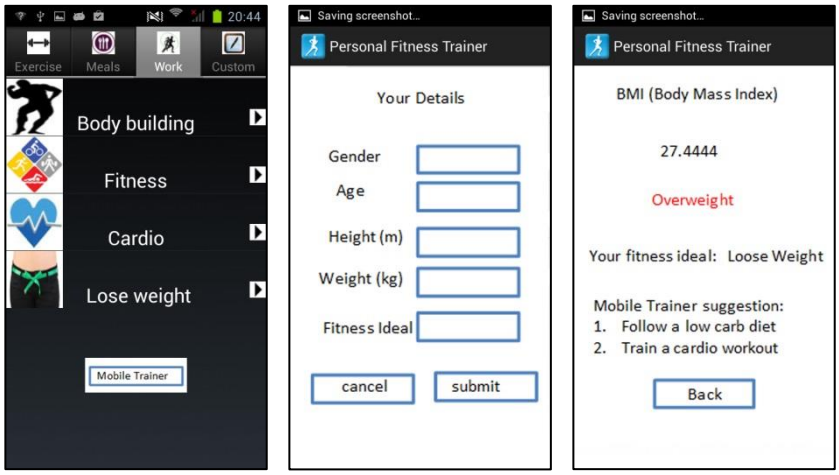


Figure 23: Workout tab of a mobile fitness trainer

The workout tab is the third tab of the application. It shows all the list of trainings available in the application. The bodybuilding training is the strength training program, fitness training is the performance training program, cardio training to increase in the stamina of individual and the lose weight training is to let user cut down their weights. The mobile trainer button is a function of the application to recommend user on which training and meal plan that a user should follow based on their BMI, age, gender and fitness ideal. The application will be able to recommend a proper training and meal plan for the users.

Custom Tab

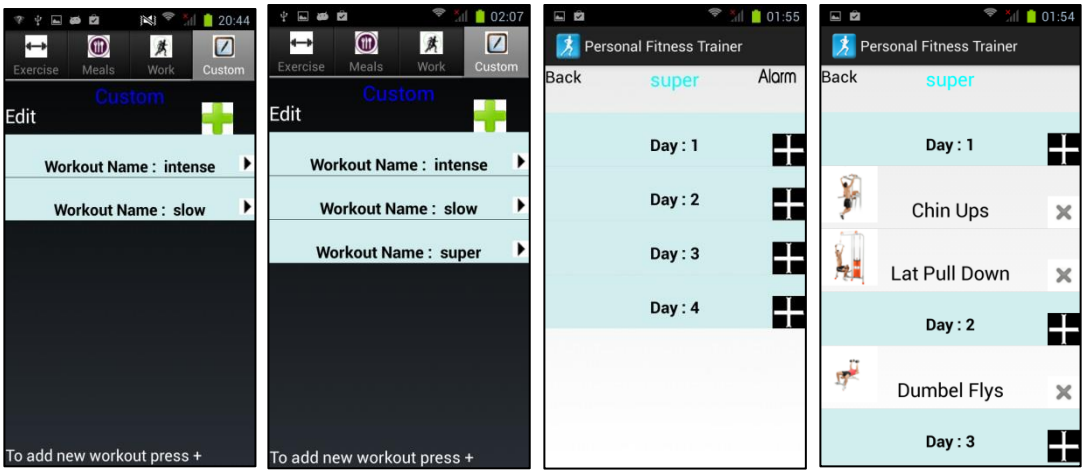


Figure 24: Custom tab of a mobile fitness trainer

The last tab of the application is the custom tab. This tab allows the user to create their own workout plan based on the numbers of day they wanted. Users can add in exercise to the respective day they wanted. Besides that user can set alarm to each workout plan to remind and notify them on the time to exercise.

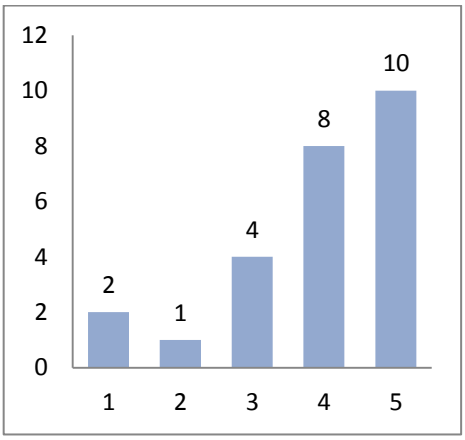
5.3 User testing on Final prototype

5.3.1 User testing results

After completion of the mobile fitness trainer application, the application is given to a group of fitness individuals from UTP. A survey form was design and is given to the individuals to fill up after testing the application. The survey form is at the Appendix section. The survey was conducted on 25 individuals.

Question 1

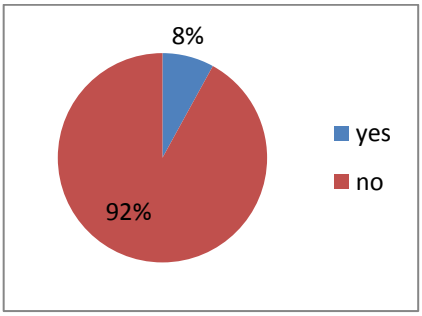
How smooth is the application? Scale from 1 to 5



In the User Testing survey form the respondent were asked to scale from 1 to 5 regarding the smoothness of the application. A majority of participant chooses the scale of 5 which is the application is very smooth which is 10 people. And only a few agree that the application have is not smooth.

Question 2

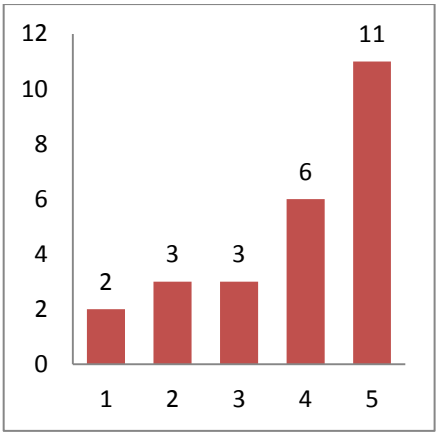
Did you experience any bug? If yes please comment below



In Question 2 the respondents where ask whether they experience any bug on the application they tried. A majority of them said they do not experience any problem. Only 2 of the individual said yes that they experience bug. Their comments were the application crash after multiple error input at the custom tab.

Question 3

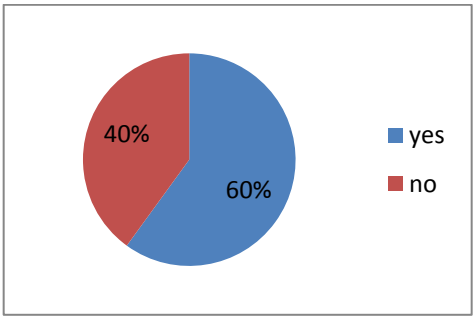
If this mobile application is launched, how helpful do you think it would be? Scale from 1 to 5



In Question 3 the participants of the survey are ask on a scale of 1 to 5 whether this application is helpful to them. Only a few respondents give a low scale. The majority of respondent agrees that it will be helpful for them which is 11 people agrees.

Question 4

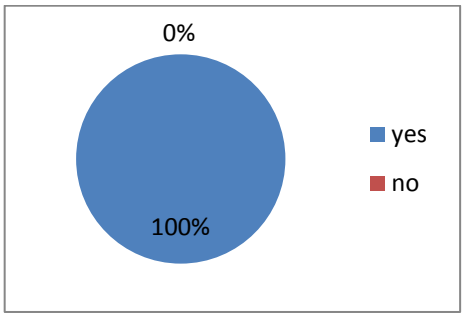
Will you download the application?



The participants were asked whether they will download the application into the mobile phone or not. Out of 25 people, 60% would download and 40% would not download.

Question 5

Does this application act as a personal trainer in guiding, reminding and motivating people?



In Question 5 the participants were ask whether the idea of the application can act as a personal trainer in guiding, reminding and motivating people. All 25 participants agree that the application can act as a personal trainer.

5.3.2 User testing Interview results

Interview: Mr. Hamid bin Ahmad, 41 years old (UTP GYM instructor)

Figure 25: User testing interview fitness trainer

The interview was conducted on Mr. Hamid bin Ahmad. He is a GYM instructor of the University Teknologi PETRONAS, UTP. Besides that, he is also a part time personal trainer which coaches the university students on techniques to exercise properly and proper meal consumption.

He was amazed with the mobile fitness application pictures which are in the exercise list. He says that the pictures shown in the application are very easy to understand and says that nowadays generations are very lucky of the technology nowadays. He state that during old times he need to learnt and pay a fitness trainer to teach him the basic of exercising. He also agrees that food consumption is very important in a fitness regime which nowadays peoples failed to understand, they only focus on the exercise training only. So, he said that the meal tab is also a good part of the mobile application. The ability of the application to remind user to exercise is also very helpful he said. The functionality of advising the user to pick suitable exercise training and a meal diet which is based on the user age, gender, Body Mass Index (BMI) and fitness preference is similar to what he normally do to his clients.

However he also agrees with Mr. Tan Chee Foo which is that a mobile app may not replace fully a personal trainer because a physical trainer but can as a medium to teach the basic of exercising and meal consumption to increase the fitness level of individual. He also said I need to consider on some advance training for intensive individuals because the application I develop now is for beginners and intermediate individuals only.

Chapter 6: Conclusion

In conclusion, with the result from the online survey and interview this project is heading to a right direction. The problem statement can be solved by the development of this mobile fitness application. The project objectives are also met with this mobile application. These projects are also in the scope of study of the author which relating to the author field of study. With the proper planning from the Gantt chart and key milestone the time frame of accomplishing the project can be achieved in just two UTP semesters.

Besides that, smartphone nowadays have the power of computing and multitasking which allowed it to perform a wide variety of function. Hence smartphone nowadays have the Artificial Intelligence nearly the same as a human. It can decide on what best for the user. A mobile fitness app of giving advice prompts it users to exercise or follow a workout and diet routine can be achieved. Even though the mobile application might not be as effective as a good personal fitness coach, but it have the right amount of function to help the user achieve their fitness goals.

From the user testing result and interview the mobile fitness trainer are able to guide user in the right techniques to exercise and eating the meals properly. The alarm notification is able to remind the user to go to exercise. Furthermore, users are also satisfied with the ability to customize their out training plan in the application.

In conclusion the mobile fitness trainer cannot fully replace a fitness trainer but it can act as a medium for individual to learn the basic techniques to improve fitness level. The mobile application shows promising result that it will help individuals that does not have fitness trainer. Hence, the society will be aware of a healthy habit which promotes a good fitness level in individual, avoiding unnecessary health problem. By doing the right things, right result can be achieved.

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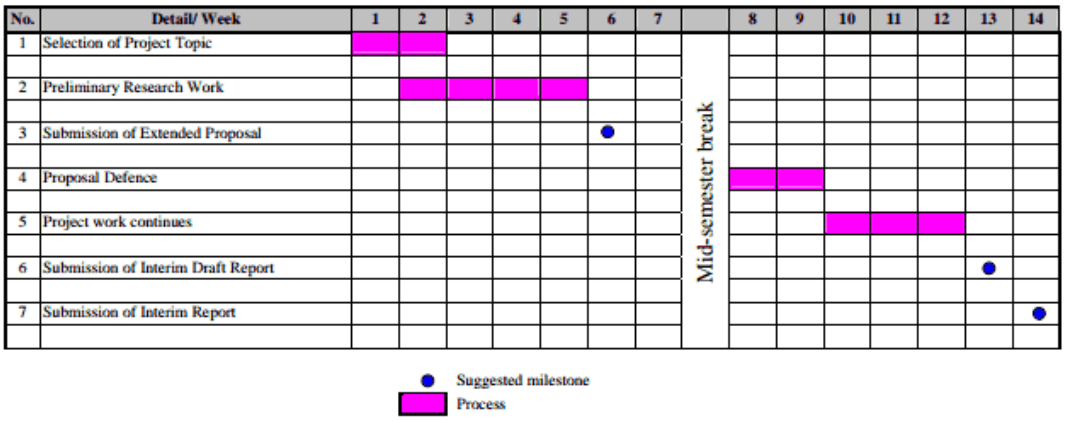
Appendix

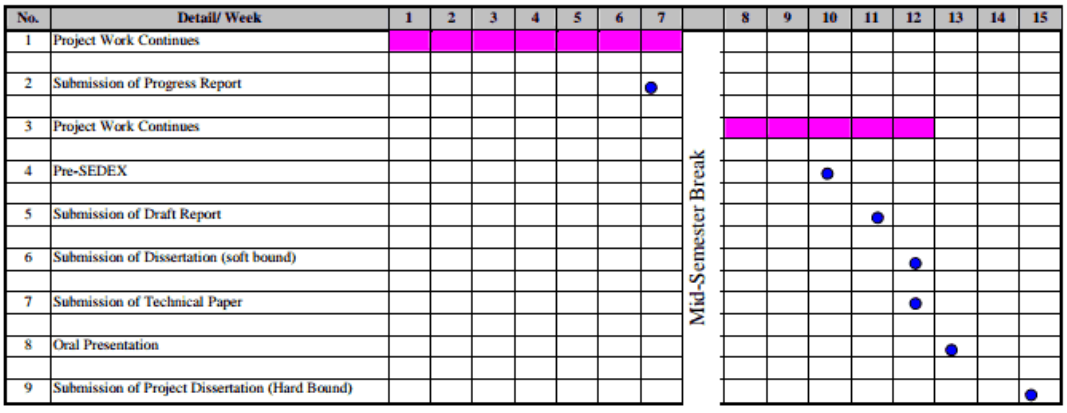
Appendix 1: Gant Chart and Key milestone for FYP 1.

Timelines for FYP 1

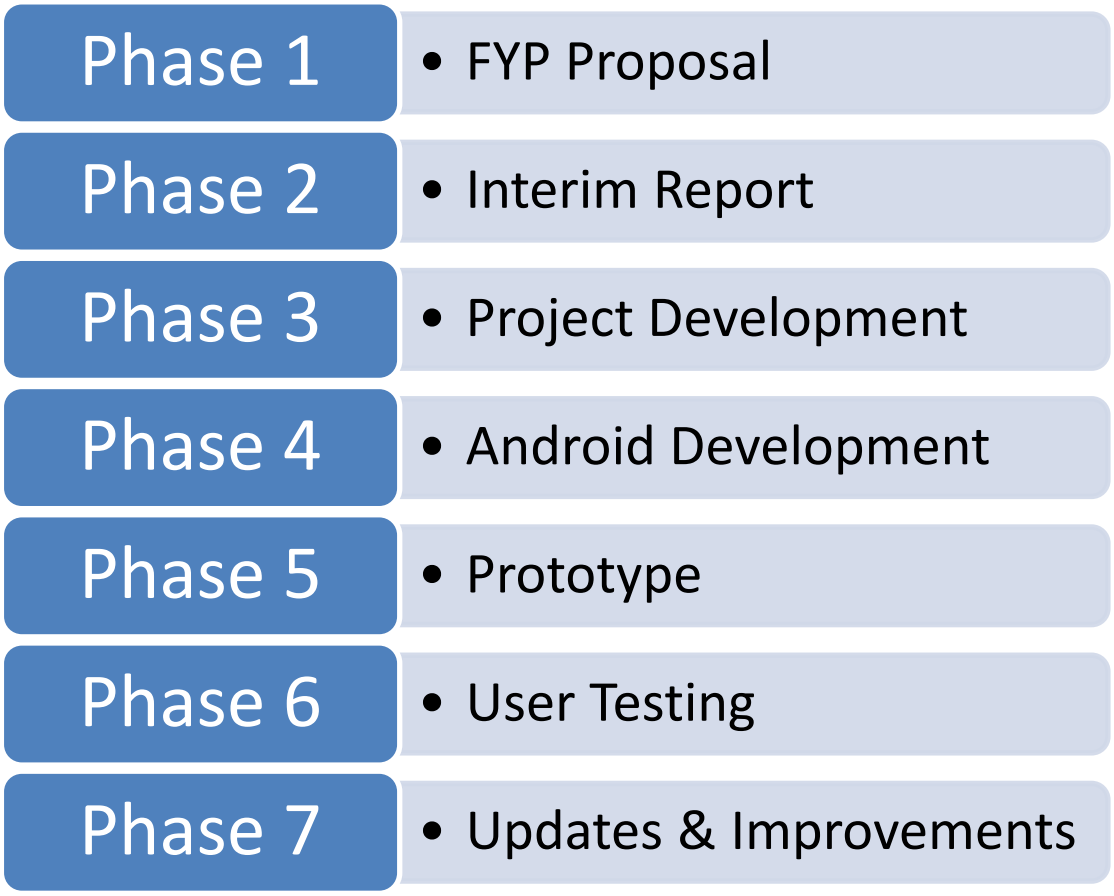


Appendix 2: Gant Chart and Key milestone for FYP 2

Timelines for FYP 2



Appendix 3: Project Development Flow Chart.



Appendix 4: Online Survey Questionnaire.

A Personal Mobile Fitness Trainer

Form Description

Age

Gender

- ○ Male
- ○ Female

How frequently do you exercise?

- ○ Regularly (7-5 times/week)
- ○ Moderate (4-2 times/week)
- ○ Less (2-1 times/week)
- ○ No excercise

Where do you exercise or workout?

- ☐ GYM
- ☐ Sport Complex
- ☐ Jogging tracks
- ☐ Home
- ☐ Other:

Who do you exercise with?

- ○ GYM trainer
- ○ Friends
- ○ Alone
- ○ Other:

Do you know the correct way to perform exercises to improve your fitness level?

	1	2	3	4	5	
Bad	○	○	○	○	○	Good

Do you know how to eat a healthy in terms of a balance of carbohydrate, protein, minerals, and vitamins?

	1	2	3	4	5	
Bad	○	○	○	○	○	Good

Do you monitor your exercise progress?

- ○ Yes
- ○ No

Do you have a personal trainer that guide you in your exercise, eating habits and monitoring your progress?

- ○ Yes
- ○ No

Do you have a smartphones?

- ○ Yes
- ○ No

If there is a mobile application that can act as a personal trainer will you use it?

- ○ Yes
- ○ No

Appendix 5:User testing survey form.

A Mobile Fitness Trainer Survey (User Testing)

1. **How smooth is the application?**

   1 2 3 4 5

   Bad ○ ○ ○ ○ ○ Good

2. **Did you experience any bug? If yes please comment below**

   ○ Yes
   ○ No

   _____

   _____

3. **If this mobile application is launched, how helpful do you think it would be?**

   1 2 3 4 5

   Bad ○ ○ ○ ○ ○ Good

4. **Will you download the application?**

   ○ Yes
   ○ No

5. **Does this application act as a personal trainer in guiding, reminding and motivating people?**

   ○ Yes
   ○ No

Appendix 6:Poster of A Mobile Fitness Trainer