

Czech University of Life Sciences Prague

Faculty of Economics and Management

Department of Information Technologies



Diploma Thesis

Healthy Lifestyle mobile application development

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DIPLOMA THESIS ASSIGNMENT

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Systems Engineering and Informatics
Informatics

Thesis title

Mobile application development

Objectives of thesis

Diploma thesis is focused on problem of mobile application development. The main objective is to analyse, propose and develop a feeding mobile application. Partial goals of this work are:

- to create unique mobile application which combines feeding and workout areas,
- to create Simple interface for users,
- add and merge different functions(from feeding and workout areas, like calorie count, BMI).

Methodology

Methodology of the diploma thesis is based on study and analysis of specialized information sources. The practical part is focused on analyse and development of feeding mobile application. Based on a synthesis of theoretical knowledge and the results of own solution, the conclusions of the thesis will be formulated.

The proposed extent of the thesis

60 – 80 pages of text.

Keywords

Application, diet recipes, workout, java, android studio

Recommended information sources

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-

Expected date of thesis defence

2019/20 SS – FEM

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Declaration

I declare that I have worked on my diploma thesis titled "Name of the diploma thesis" by myself and I have used only the sources mentioned at the end of the thesis. As the author of the diploma thesis, I declare that the thesis does not break copyrights of any their person.

In Prague on date of submission

Acknowledgement

I would like to thank Ing. Pavel Šimek, Ph.D., for his advice and support during my work on this thesis.

Healthy lifestyle mobile application development

Abstract

The main aim of this thesis was to design mobile application which combines food recipes, diet and workout. The goal of the mobile application is to help people with cooking, diet and workout. These components are related and can have better results by following them together. It's a well-known fact that losing weight depends not only on workout, if you don't make a balance between diet and workout it can cause a worse effect.

This application has 3 main sections divided from each other: food recipes, diet and workout. Users can use one of them or all. All these tabs are connected by different functions.

Methodology of the diploma thesis is based on study and analysis of specialized information sources. The practical part is focused on analysis and development of a mobile application. Based on a synthesis of theoretical knowledge and the results of own solution, the conclusions of the thesis will be formulated.

Keywords: Application, diet, workout, recipes, reminder, feeding, body mass index, burned calories, daily calories, body fat, java, android.

Zdravý životní styl - Vývoj mobilních aplikací

Abstrakt

Hlavním cílem této práce je navrhnout mobilní aplikaci, která kombinuje recepty, stravu a cvičení. Cílem mobilní aplikace je pomáhat lidem s vařením, stravou a cvičením. Tyto komponenty jsou ve vzájemném vztahu a mohou mít lepší výsledek díky společnému sledování. Je známou skutečností, že hubnutí nezávisí pouze na tréninku, pokud zde neexistuje rovnováha mezi stravou a tréninkem, nemá to smysl. Tato aplikace má 4 hlavní oddíly, které jsou vzájemně rozděleny: recepty na jídlo, strava, připomínky a cvičení. Uživatel může použít jednu z nich nebo všechny. Všechny tyto karty jsou propojeny různými funkcemi.

Metodika diplomové práce je založena na studiu a analýze specializovaných informačních zdrojů. Praktická část je zaměřena na analýzu a vývoj mobilních aplikací zaměřené na stravování. Na základě syntézy teoretických znalostí a výsledků vlastního řešení je formulován závěr práce.

Klíčová slova: Stravování, cvičení, recepty, připomínky, potrava, index tělesné hmotnosti, spálené kalorie, denní kalorie, tělesný tuk, java, android

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1 Introduction

This thesis focuses on full development of android application for the healthy lifestyle. The development process contains analysis, design, implementation and testing.

A lot of factors make developing a mobile app difficult, such as the presence of multiple mobile app platforms, various operating systems, and multiple device types, each of them with its own unique features. With this variety, there are also many ways to design a mobile application, before I started the coding process, I must decide which of the development method is best. This decision should be guided primarily by what makes the most sense for the user.

By analyzing the market, it's become clear what is missing, what users are looking for in health care applications, what kind of design and interface they prefer.

After find out user needs, application structure should be planed. First, need to create list of functions than prototype application design.

After prototyping app start coding. Coding have few stages. Stage 1 Develop core tabs and functionality. Stage 2 Test application and fix bugs. Stage 3 adding additional features.

Stage 4 create various test cases for application test it and fix bugs.

Main goal of this thesis is to create simple and user-friendly interface, to make it easy for users to use. The goal of user-friendly interface is to make digital interaction as simple, fluid, intuitive and efficient as possible. It must assume needs and ensure easier access, comprehension, and use, maximizing the user experience. A good interface design should be imperceptible. The focus is to ensure simple and fast access to content that the user is looking for.

Another goal of the work is to create an application, that can be commercially useful in the practice. Application which has some competitive advantages on the Google play store in health care segment.

This document provides a theoretical introduction to the topic and structured with eight chapters. Chapter 2 describe concisely what the thesis is trying to achieve, and which methods are used. Chapter 3 literature review is a comprehensive summary of previous research on a topic. Chapter 4 focuses on development of application and describe functionality. Chapter 5 shows result. Chapter 6 end of thesis conclusion.

2 Objectives and Methodology

2.1 Objectives

Diploma thesis is focused on problem of mobile application development. The main objective is to analyse, propose and develop a health care mobile application. Partial goals of this work are:

- to create unique mobile application which combines feeding and workout areas. Everyone knows that eating a low-fat, low-calorie diet and getting daily exercise helps lose weight, but a new study by researchers at Fred Hutchinson Cancer Research Center has found that when it comes to losing weight and body fat, diet with exercise are more effective for weight loss than either of them alone.
- to create simple interface for users, with a user-friendly interface and easy navigation, the user decreases search time and increases satisfaction, fulfilling his needs in a fast and efficient way.
- add and merge different functions from feeding and workout areas, like calorie count, BMI, reminder, body fat calculator and so on. All these functions are related and together create health care application. To make it easier for users follow diet and workout I implement reminder and calculation functions. By setting reminder user will get notifications daily for feeding and workout time, when people do same action regularly again and again it will become a habit. Creating good habits should be main goal for users, it's also beneficial for application as well because habit will contain using "healthy lifestyle".

2.2 Methodology

Methodology of the diploma thesis is based on study and analysis of specialized information sources. Main information source is Google play store, there are more than 350000 healthcare apps available on the store. Over 60% of all users have downloaded health care applications. This number tells us that there is a huge competition on health care market, and it will be hard to create good application which will compete to existing applications.

By collecting application data from market and analysing them, it's become clear that users have few applications from health care segment. But why? The main reason is that applications are focused on one small function like body mass index calculator, reminder, body fat calculator and so on.

This small research helped to find out in which field application should be build. It should contain different functionalities form health care which are related like workout, diet, reminder and different calculators.

The practical part is focused on analyse and development of feeding mobile application. Based on a synthesis of theoretical knowledge and the results of own solution, the conclusions of the thesis will be formulated.

3 Literature Review

Dute, et al have studied on the health of the students and European youngsters that take unhealthy food and never stands on the better level of the physical activity and getting overweight, which increasing obesity rate day by day possessing public health problems in Europe. They predicted the use of mobile phone applications that are playing a vital role to enhance the strategies for health promotion of the students. From the January of 2009 to November of 2013 some databases such as MEDLINE, Scopus, PsycINFO and Scopus were observed for publications of English-language. These studies have involved some features such as an application is included in the primary component of intervention, this intervention targets physical activity or overweight prevention or healthy nutrition, and the students or adolescents of aged from 12 – 25 years are included in the targeted group. Twelve unique applications were described by all these 15 studies from which 10 apps performed the role of monitoring tools to promote the level of physical activities and dietary intake. The Web-based programs were utilized by the other apps that challenge their users to do exercise and to take photographs and make a list of their problematic foods. The behavioral theory gives ideas for the development of five apps that was specified clearly. These applied techniques of behavioral change, frequently promoting the self monitoring of behavior and providing feedback upon performance. Self-contained functions can be performed by the apps, but mostly people used them to build up school programs or for therapy.

Ten year old children can be used, the apps and for adolescents only four apps were developed. For a time being these apps was examined at a lower level. The young people use them abundantly and, potentially only limited research on health promotion is available on the apps for adolescents. By using these apps one can set target, improve self-monitoring and enhance awareness. Three applications have some social features so these can be taken as “social media”, but roughly their potential found to be seems (Dute, 2016).

Higgins, J. P. has revealed that the healthcare providers want some ways to improve and monitor the fitness and health of their patients, particularly during their visiting session. These apps are also used as incentives by some insurance companies to promote health and lower premiums. As the use of smartphones increasing day by day so they can provide a monitoring tool for the patients to improve their fitness and health. Particularly, the fitness apps are programs on smartphones that collected data from inbuilt tools of smart-phones like GPS (Global Positioning System), microphone, accelerometer, camera, and speaker, to measure fitness and health parameters. After analyzing the data these apps summarize it, also the devise individualized plans that based upon the goals of users to providing the personalized coaching, frequently obtain feedback and motivation by sharing milestones on the social media. This research also proved that such applications help patients to achieve their fitness and health goals. It also discussed the features to be seen in an application by studied the famous fitness and health applications. At the last it discussed the patient scenarios with recommendations of apps, future research and limitations (Higgins, 2019).

Mikyung, L. et al., investigated the importance and features of mobile apps based upon improving health programs for the public. A brief bibliographic research studies on health promoting programs by using mobile applications in peer reviewed journals that published in English near to November of 2017 by was conducted using Embase, CINAHL and PubMed databases.

The inclusion standards were as, the random control of the trial design and evaluate interventions based upon mobile apps to improve health of the adults in which twelve studies were involved. Physical activities, diet plans and improvement of the healthy lifestyles were most seen topics and these apps were designed to give feedback on the

health status of the young ones and also to test the health status of individuals or behavioral changing.

Across all studies, health outcomes were shown to be better for mobile app users compared to non-users. Mobile app-based health interventions may be an effective strategy for improving health promotion behaviors in the general population without diseases. This study suggests that mobile app use is becoming commonplace for a variety of health-promoting behaviors in addition to physical activity and weight control. Future research should address the feasibility and effectiveness of using mobile apps for health promotion in developing countries (Mikyung, 2018).

Anderson, K., et al., defined the Health apps as commercially available fitness apps having self-monitoring capacity. They revealed that English speaking users of health app for monitoring their self, aged from 18 to older were selected for an interview from Perth's metropolitan area, Australia. This structured interview was consisting of questions based upon Health Information Technology Acceptance Model, the Mobile Application Rating Scale and the Technology Acceptance Model, that is the only research to do so. All these models facilitated the Deductive Thematic Analysis of transcripts of interviews. Explicit and Implicit responses are not arranging these models that were examined inductively. There were 22 users (7-males and 15-females) participants, thirteen of which were 26 to 35 years old. In which 18 participants reported about the applications operated on iPhones. These applications were operated to examine the diseases such asthma, celiac disease, diabetes, blood pressure, pain management, chronic migraine, fitness, menstrual cycle irregularity, and depression. Initially, these applications were used weekly for some minutes per session to meet consumer's starting milestones than there was a significant decreased in their usage. Inductive and deductive thematic analysis has reduced to the four prominent themes: engagement in app usage; technical app functionality; design features and easy use; users' data management. This interview provided awareness of the challenges, usage and benefits of the health monitoring apps. Through understating the consumer's expectations and experiences range can inform health application design to enhance the persistence in self monitoring. (Anderson, 2016).

The aim of this study is to exhibit the contribution of the mobile phone applications to promote the healthy lifestyle, good nutrition, physical activities, and avoid obesity in

students and adolescents. These apps are developed to describe the content upon the theoretical mechanisms applied and the lessons teach about good health (Dute, 2016).

There are purposes of use of the mobile applications such as health monitoring, provision of feedback and health information. Mobile applications were utilized to monitor behavioral changes or health status of individuals (75%; 9 of 12), give feedback on an individual's health status (75%; 9 of 12), and give information about health (66.7%; 8 of 12). Mostly the mobile applications were developed by the study teams to use and study purposes, and other's use pre-developed application programs. Two studies can never be used the same application. After the intervention of mobile applications, the primary results of study remarkably improved. Mobile app provided by the Intervention groups and any more interventions such as phone calls, SMS, pedometer and group education. In eight out of twelve researches (66.7%) control groups never be provided an intervention, but the 33.3% remaining studies had control group that provided with a pedometer, a website or a mobile app and diary (Mikyung, 2018).

By putting more stress upon the health systems consumers are enhancing their needs for health- care of chronic conditions and living longer as well. Besides this quickly increasing number of health mobile applications for the self-care of the consumer, but there is the lack of research in user's participation with electronic self monitoring. This research explores the health of consumers that use applications to monitor their health; they got benefits by using the health applications, and suggestions to improve the health applications (Anderson, 2016).

The aim of this research was the systematic design theory that has driven and targets the groups to adapt the dietary mobile application concepts for the promotion of healthy-eating and drinking habits also the vegetables and fruit consumption in young adults and adolescents (Rohde, 2019).

The features are described in applications that also changed with the objectives of the apps or programs according to requirement. In programs the apps used to generally support the improvement of nutrition or the weight loss that commonly utilized the dietary tracking and logging features, such features were not used in apps aimed to support food access and grocery shopping. Ideally, all the apps supporting, food access, parenting practices and grocery shopping, although some features such as weight-loss apps and nutritional

improvement were lacking commonly. The apps that supporting food access and grocery shopping had least variety due to their specific aims feature domains inclusion, while the apps that supporting the nutrition improvement and parenting typically inclusion greatest domains variety (Rabbi, 2015).

The aim of this application was to examine and contrast the uses of hypertension-management applications; to consider the common situations, problems, characteristics, and trends of hypertension-management, m-health applications; and to recognize the mainland China and non-mainland China products to provide recommendations for the developers in firms and to assist hypertensive patients in choosing such suitable applications (Jun L., 2018).

The aim of this application was to analyze and compare the usefulness of hypertension management APPs released in the Chinese market; to understand the general situations, characteristics, problems, and trends in hypertension management, mHealth APPs; and to identify the gaps between mainland China products and non-mainland China products with the aim to provide recommendations for developers in industry and assist hypertensive patients in selecting suitable APPs (Jun L., 2018).

3.1.1 Fitness application popularity

Schoeppe, et al., have explained that fitness and Health apps have earned much popularity in the interventions to promote diet, sedentary behaviors and physical activities but their effectiveness is not clear. These systematic studies clear the intervention efficacy that the applications utilized to promote physical activities, sedentary behavior and diet in adults and children.

Systematic literature researches were preceded in five different databases for identifying research papers that published among 2006 to 2016. These studies were based upon if one is used smart-phone app in intervention to promote diet, physical activities or sedentary behavior for the prevention. Interventions can stand alone, interventions usage an

application only, or multiple-component interventions, including an application as one of many intervention components. The results obtained were altering the health behaviors and related to health results such as body weight, fitness, blood pressure, cholesterol, glucose, and quality of life. Study methodological standard and inclusion, assessed independently by the two reviewers.

27 researches were involved the most randomized controlled trials (e.i. $n = 19$; 70%). 23 researches involved adults out of which seventeen exhibits the health promotion. 4 researches involved children out of which two exhibit better health promotion. 21 researches involved physical activities out of which fourteen exhibit better health promotion 13 researches involved diet out of which seven exhibited better health promotion. Most of the researches showed detected the significant or better effects of between-group promotion or improvements in the health behavior while few research works showed the better within-group promotion or improvements.

A large number of multiple-component interventions that is (eight out of thirteen; 62%) exhibit beneficial between-group promotions as compared to stand-alone application interventions (five out of fourteen; 36%). 11 researches exhibited application using statistics, and 3 of them reported that higher application usage was linked with promoting health results. This review presented the modest verification that application based interventions to promote physical activities, diet and the sedentary behaviors could be effective. Multiple-component interventions shown to be much effective than stand alone application interventions, besides, this will be committed in controlled trials. Future studies are required on the combinations of application features and optimal numbers, behavioral changing techniques, and participant contact level required to maximize the consumer intervention efficacy and engagement (Schoeppe S. A., 2016).

Rohde, et al., has explained that because the mobile phones are used widely, dietary mobile applications are the promising tools to prevent the diet related non-communicable diseases early in the life. However, much of the current nutritional applications lacking user acceptance and scientific evaluation. The process of design was constructed according to the behavioral change wheel (BCW). The process of development consisted of three stages. In the first stage, the targeted behavior was specific, and barriers and facilitators were recognized. Moreover, insights into the target group needs, values and interests in

nutrition field and applications were exhibited. For this conclusion, two empirical researches were proceeding with the target-group. In the second stage, the outcomes of the first stage translated into behavioral change techniques (BCTs), and finally to the functional applications and the features. As a result, in the third stage, this concept was optimized and evaluated through the skilled interviews.

For achieving the target behavior barriers and facilitators were psychological abilities (e.g., self efficacy), automatic motivation, reflective motivation (e.g., fitness), physical opportunities (e.g., time) and social support. Target groups needs, values and interests in nutrition field that were translated into target groups prior to application use, e.g. low effort usage, recipes or visual feedback. Education, incentives, persuasion, capability and training were recognized as related functions of intervention. Incorporation with priority target groups, they were translated through 14 BCTs, like graded tasks, rewards or self monitoring into the application concept that is Challenge to go (C2go). The skilled judgment suggested change in some features of applications to improve adherence, technical feasibility and positive health effects. This concept C2go consists of three worlds: the (1) vegetable, (2) fruit, and (2) drinking worlds. The consumers have faced many challenges in all the worlds, including a quiz and feedback. Many tips are developed that are based upon health action approach and helps the consumers to gain challenges and through this they can achieve the targeted behavior. These challenges can be faced alone or against anyone in a community. Due to unusual activities, one can collect points and can achieve levels. After point collection it access to information section, where consumers choose the content of their interest. C2go is a goal at young adults and adolescents to promote their vegetable and fruit consumption along with drinking routine. The theory driven, and the target group that adapted the concept of dietary mobile intervention that utilizes gamification and systematically developed usage of BCW (Rohde, 2019).

3.1.2 Health-related applications improve community the health

Kantorski et al., revealed that Backward design is the well developed strategy of design that was used to produce educational curriculums for decades. While traditionally it is utilized for planning and creating the classroom based curriculums, in this study, we will explore the usage of backward design as the design strategies to develop an educational-mobile apps, *BiblioTech*TM “CityHacks: in Sleep search”. They also discussed the whole

process from starting concept to launch it and get updated along with plans for the future studies (Kantorski, 2019).

Sarah, et al., provides an understanding about the consumers of mobile health and observes that whether the use of a health application can be contributed to recently developed digital inequalities. It focused upon the features linked with the usage of mobile health application and recognized which features present the usage of different kind of health applications. The data obtained from the most typical Dutch population sample revealed that mostly younger and higher educated persons are using the mobile health applications and they had higher level of e-health literacy skills than the non-users. Moreover, different patterns of usage were discovered to specific kind of health applications. Policy and theory implications were discussed (Sarah, 2019).

Emma, et al., has researched that the uses of smartphone apps are rapidly increasing to improve the health and nutrition levels in the community. However, lack of practical literature of supporting the practitioners and researchers in developing and or choosing health apps. This study maps the key content, features, theoretical approaches, and consumer testing method utilized to improve nutrition in the community settings. The systematic and scoping methodology utilized to publish the peer reviewed literature that report on apps with certain improvement of nutrition focus deliberately to use in the setting of community. After studying, these articles were categorized into four groups: nutrition-improvement trial, dietary self-monitoring trial, app description article, and qualitative app development study. To mapping, the studies were divided into different categories depend upon the target populations and objective of the program or app. Out of 4818 titles that recognized by the search of databases, sixty-four articles were involved. Wider categories of features are involved on apps commonly corresponded to the different behavioral changes that supporting the strategy which is common in many classic behavior changing models. The key contents of the apps commonly concentrated on the composition of food, with better feedback that generally utilized to deliver the educational contents. Before the deployment of app user testing was explained in just up to half of the researches. A collaboration among app developers and the practitioners improve a proper balance of evidence based functionality and content. This study gives a unique resource for the development teams of the programs and practitioners searching to utilize an app for the improvement of nutrition in the settings community (Emma, 2017).

Naomi, et al., explained the objective of this literature review to recognize the characteristics of mobile apps in health related conditions and to observe their health effects relevant to the chronic illness management. The researchers also explain the suggestion for the use of applications in the patient centered care and data interpretation by the health workers. The English language Peer reviewed research papers that were published from 2008 to current time are involved in the synthesis. This study exhibits better results when health promoted mobile apps were utilized practices and support clinician, mobile apps use as a monitoring tool for communication with individuals and the symptoms analyzer. From literature, it can be revealed that the nurses play a vital role in giving feedback, which strengthens the self care strategy and the adherence for promoting results. Additional study is required to exhibit the long lasting effects of applications on nurses, patient outcomes, patient outcomes, and the implementation feasibility into practices (Naomi, 2016).

Saba, et al., had searched the bibliographic databases such as Web of Science, PubMed, Cochrane libraries and Scopus from the January of 2013 to the May of 2019 for research articles about the health applications. Detailed information about the safety consequences and concerns were drawn out and classify into the natural categories. The analysis was proceeding according to the PRISMA-ScR (preferred reporting items for systematic reviews and meta-analyses extension for scoping reviews) statements. Out of the seventy-four researches recognized, the most of the reviews of one or a group of related applications, almost half linked to the management of disease. Total 80 safety features were recognized, sixty-seven were related to the information quality involved incomplete and incorrect information, content variation, and inappropriate or incorrect responses to the needs of consumers. The remaining thirteen relevant to the functionality of the application involved lacking validation for input of users, gaps in the features, fail to respond to the health dangers, delayed processing, and faulty alarm. Out of the 52 actual reports or potential consequences, five had potentially harmed the patient. They also recognized the sixty-six reports upon the gaps in the development of application, lacking expert's involvement, poor validation and bad evidence base.

App safety is a rising public-health problem. The present evidence exhibits that applications cause the clinical risk to users. Consumer involvement, professional of health

care, regulators in testing and development can improve the quality. Moreover the mandatory report of safety features is required to promote results (Saba, 2020).

Venkata, et al., has explained in this research that from a few years ago astronomist give attention to the mobile apps due to the increasing mobile app downloading and the withal because of revenue being engendered. With increasing number of applications, the lamentable applications or failing applications have been increasing. Fascinating mobile applications involve in this research which can be availed the developers to understand the merits and concerns of mobile applications. The researchers made an effort to merge all critical factors that cause the application failure that involve the developers' negligence, technical issues, and inadequate efforts of marketing and high users' prospects. This research gives the proposals to application failure. The failing applications growing in number rapidly, because of the developers of mobile phone application, are not developing a standard application of development life cycle. In this paper, they have developed a mobile app with the help of traditional Software Development life cycle phases such as Requirements, Develop, Test, Design, & Maintenance) and they have used M-UML, UML, and mobile app development technology (Venkata, 2014).

Mathews, et al., has given the Digital-health solutions that are increasing in both capabilities and numbers. Other then this advantage, the confidence of many stakeholders from clinicians and patients to payers, regulators and industry, in medicine will be remains quite low. Consequently, there is a requirement for transparent, objective, and the standards based digital health product evaluation that can bring great clarity to marketplace of digital health. They believed an idea that can be guided the end user requirements and formal assessments across clinical, technical, cost domains and usability is one of the possible solutions. Digital-health solution has greater quality, value and impact will be easy to differentiate. At the end they search existing gaps and landscape, evaluate the developmental approaches and responses, and the detail of pragmatic framework that explained the current shortcomings in marketplace with a way to implement (Mathews, 2014).

Vanderboom et al., has found a pain-diary app which can be easy, useful and valuable for the patients with fibromyalgia. They concluded that nurse provided feedback and the

interactions that had the capability to affect outcomes positively, but didn't analyze the improvement in the level of pain (Vanderboom, 2013).

Kristjánsdóttir et al., wrote in an article that smartphone based pain diaries and receiving a personalized feedbacks from the authors of the research (Kristjánsdóttir, 2013).

Stinson et al., found an increasing assent between young participants who feels the pain at game based application. They concluded mobile applications had much ability to improve pain and the life quality, while the participants noted that this app is easily usable, consist of enjoyment and don't find it interrupting daily (Stinson, 2013).

Jun L., et al., wrote that an app for the management of hypertension was available from the October of 2016 examined from the usefulness of function and data perspective. PRISMA was used to determine the sample settings. An item set was based upon the usability of TURF and the Chinese Guideline for the Hypertension Management and used to examine the functionality quantitatively and the collected the data item from the sample applications, designers' perspective, activity model and consumers.

From the seventy-three supported hypertension management applications no one can completely cover the useful item set. Only the positioning sensors and cameras are generally used in the collection of information regarding to the usefulness of mobile hardware. According to the provision services and data items the most general data collection are vital signs and the demographic information, but the applications which are developed in the non-mainland China and mainland China provide different services and patterns of making profit. According to the privacy protections and security of data the applications from the mainland China provided the lowest usefulness. Mobile health application can efficiently and promptly acquire sign related data through promoting scientific and professional data regarding to healthy habits for life.

Applications also promote the preventive usage of collected data and bringing new opportunities to control and manage hypertension (Jun L., 2018).

Kratzke, et al., has explained the aim of the literature review to analyze the present research regarding health related mobile application and understand how to applications implement in chronic disease management to maintain, prevent or improve the health of an

individual. They introduce health applications as monitoring tools for individual interventions to promote chronic illnesses, management and behaviors of health. Moreover, through this study one can find the nursing-practice and identify the area for further studies (Kratzke, 2012).

Balk-Moller et al., used an app named as SoSu-life that was developed for the reduction of weight loss within a workplace in certain groups of employees. This application also helps the participants to achieve their private goals and also provide weekly challenges and colleague challenges to compete and interact with several groups.

Carter et al., has introduced an application to dietary control based upon behavioral evidence and used this data for the adults having overweight; the application was developed for the settings of goal, self monitoring of physical activities and dietary control and provided feedback through text messages on the weekend. One more intervention study regarding to weight loss for obese adolescents utilized application for the communication of interventions via settings of goal, social support and challenge games through the buddy system which help for self monitoring from the participants (Carter, 2013, Svetkey,2015).

3.2 Application integration

3.2.1 Basics of Health and Fitness Applications

Health & Fitness applications include a large range of weight goals, promoting fitness activities, nutrition and sleep, diet, relaxation, pregnancy, alternative medicine and General Healthcare Information. Most of the fitness applications have free lite or trial version that permit individuals to use basic features of the application and test is it relevant. The charges of pro-version, one time fee or a subscription fee.

Once the application has downloaded by the user, basic data are needed such as the gender, weight, height and date of birth. These applications are useable through the device combination such as accelerometer, camera, global positioning system, diary, speaker and microphone to collect data on the consumer during her or his activities. Some applications also synchronize through wireless with some wearable devices like a wristband, heart rate

sensor, sensor, shoe sensor, belt sensor or more recent are smart clothing with wearable sensor technologies (Zheng, 2014).

Few applications involve a storyline's adventure in which consumers get involved in them and they distract them in this way they follow a moderate Aerobic-workout. Many applications have visual coaches that can inspire the user by talking them and they feel like someone giving training them more personally.

The most famous applications have best animations and illustrations of the proper way of exercise, such as free weights or gym-workouts on resistance weight machines along with running, bicycling, jogging, rowing, X-training postures, and step aerobics. Apps commonly tabulate the data such as total energy output for workouts, energy in diet apps (pictures of food, estimates by consumer, scanning barcodes), complete data of workout (speed, reps, and miles), sleep quality data, and body weight data.

Lacking encouragement, companionship or support from the friends and family has been recognized by the United State centers for the Prevention and Control of Disease as the greatest hurdle to physical activities (Centers, 2014). The applications which encourage social networks and sharing of work out achievements like RunKeeper (23 Million consumers; RunKeeper, Boston, MA) and Fitocracy (1 Million consumers; Fitocracy, New York, NY) cause of these hurdles (Nakhasi, 2014). Recently, most of the fitness and health applications permit the consumers for sharing their accomplishments with the social media friends (Twitter, Facebook, Instagram Pinterest).the involvement of good social support from the social media can improve friendly competition and feedback and enhance the persuasive strength of smartphone apps (Al Ayubi, 2014). Most of the applications send statistical summary for the consumer to incorporate and review her or his health & fitness Data Management Program and may involve weekly summary and suggestions on the modern workout and goal for the incoming weeks.

3.2.2 Things to Look for in Good Health & Fitness Applications

A better Health & Fitness application have the following important features: has a consumer's friendly involvement; a free trial version's offer; during activity easy to start and reliable, permit for setting of goal; provided real time personal feedbacks; be customized to consumer fitness levels and skills; availability of expert consultation; incorporates evidence based behavioral changing techniques; association with other Fitness and Health applications, devices (for example, Fitbit Inc, Calif, Fitbit devices for

monitoring activity, San Francisco) and computer systems to provide easy statistical sharing and reviews; provides the periodic summary and supports social networks (Middelweerd, 2014 and Khan, 2014)

Recommended Health and Fitness Applications

The applications recommended in the journals are based upon both the sales data from the smartphone application stores such as Google Play and iTunes and the reviews the rank applications on the criteria basis, involve highly rated by the consumers, consumer friendly, unique, reliable, able to innovate and grow, downloads and application cost

3.2.3 How to Best Integrate Applications into Practice

Once the Peter Drucker said: “what gets measured gets managed” (Willcocks, 1996). In this way, the Health care workers can use applications initially to obtain the idea related to many aspects of health of patient and fitness, such as dietary intake, activity, medication compliance and patterns of sleep. Applications along with wearable devices and the clothing can be the best way to collect data, so the patient and the provider both of know that what is happening actually. The provide can be implemented the behavioral changing by having such data and noted the outcomes by using the applications. However, an application may provide the warning system for when the health and fitness are going well. By passing the time, as the Communication and Technology promote, there will be more personal or precision medical approach by which the patient can be take advice from his or her provider through the application and query the provider will be answer on question regarding to the wellness and health issue that arose by the patients.

A research of the English language based scientific literature was conducted through some databases such as PubMed, Google Scholar and MEDLINE for the time being in 1976. The Keyword that was used in this research was “goals,” “smartphone,” “trainer,” “apps,” “motivation,” “aerobic training,” “support,” “healthy lifestyle,” “resistance training,” “coach,” “fitness,” “weight,” “obesity,” “overweight,” “physical activities,” “management” and “exercise.” The bibliographies of the articles from where the data searched and the other relevant studies were also provided. Moreover, the links from websites having published research articles were studied for patent information. Many website sources were used to obtain the authentic studies along with references to put the authentic data in this research. A list of apps was gathered by using the Power-search function of iTunes version 11.1.5.5 and the Version of Google Play Store 4.9.13.

2.2.2. Eligibility, Identification, and Selection

The preferred applications were selected through an approach by getting information from the main application stores of the smartphone stores such as Google Play and from the independent reviews. “Health and Fitness” applications were also reviewed through Google Play stores. In data selection, thirty applications were searched and selected from the iTunes store, 10 from each of the different categories such as Top Free Apps, Top Grossing and Top Paid Apps. Just like iTunes thirty applications were selected by Google Play store for data selection and extraction, 10 from each of the different categories such as Top Free, Top All Prices and Top Paid. In second step; for independent reviews the data was select from the top ranking results of the Google search through following sources; (1) “The sixty-five best Health and Fitness Applications of 2014; 65 app (Team TG, 2014); (2) PC Magazine's “The hundred best iPhone Applications of 2014 Health & Fitness”: 7 apps (Duffy J., 2014); and “The hundred best Android Applications of 2014 Health & Fitness”: 7 apps (Eddy M., 2014); (3) [Active.com](#) “15 best iPhone Fitness Applications for 2014”: 15 apps (Rosenzweig F. 2014); (4) Men's Fitness “The top ten Fitness Applications for 2014”: 10 apps (Barroso M, 2014); and (5) Business Insider “RANKED: The thirteen best Health & Fitness Applications”: 13 apps (Borison R, 2014). The key- criteria that used by the searcher were top or best application list involved the high rated by users, user friendly, unique, reliable, cost of application, ability to innovate and grow, and a number of consumers logging into the application through Facebook. 131 applications were being recognized through the sum of the applications, from all the listed independent sources.

The Applications were only eligible through the following conditions (1) apps were available for the Android OS and iOS systems; (2) apps could be utilized by most of the adults (adolescents, children, pregnancy-specific or gender applications were ineligible); and (3) includes a certain intervention designed and measures to promote some health and fitness aspects (Passive Information only Apps were ineligible).

Through Excel Pivot-Table, the Redmond, Wash, and Microsoft Corp applications were chosen resulting in the nineteen applications that appeared in two or more independent lists. This strategy of search is specifically subjected to the market response and may not reflective or provide the quality and efficacy evidence. There are also some medical research journals in the application areas because of this new field.

The smartphone Technology that including the GPS (Global Positioning System), microphone, accelerometer, camera, and speaker has average to excellent measuring

accuracy of physical activities, different static activities, cycling, stair use, running and walking (Bort-Roig, 2014). This technology makes it possible for the smartphone applications to examine the biological parameters cardiac rehabilitation, physical activities, falls in elderly and diabetes (Recio-Rodriguez, 2014)

The applications of the smartphones have ability to facilitate the behavioral change (Fanning, 2012., Glynn, 2014., Carter, 2013., Boulos, 2013). The adolescents have adopting and using successfully to promote the physical activities and eating habits (Wohlers, 2009., Ashrafian, 2014). Studies are also there at the applications for the elders (older adults.) ((Recio-Rodriguez, 2014)

Some app interventions have involved features such as rapid intention formation, goal setting, performance measurement, individually tailored feedback; self monitoring, progression and goal reviewing have been reflect more effectiveness (Middelweerd, 2014., Abraham, 2008., Conn, V. 2011., Foster, 2013., Direito, A., 2014).

The applications that monitor the activities of the individuals involved the goal setting, self monitoring, and the feedback that more related to the recommendations from the Social Cognitive Theory (Lyons, 2014). Fifty-seven famous applications of physical activities were reviewed ant noted that they involved the five behavioral changing interventions to which there is no difference between paid and free applications (Middelweerd, 2014). While others have more behavioral changing interventions found in paid apps (Direito, A., 2014).

These applications are new monitoring tools, and there are very few medical researches that have conducted to date. However, there are several researches have been conducted on the smartphone applications that are used to maintain fitness and health, and these are reviewed in the present article.

An analysis included 1350 studies that use mobile interventions, having text messaging, self reports and smartphone applications, revealed that the effective means to affect the physical activities was technology (Fanning, J). One search from all of the analysis noted that in the underactive adults initially, having age 50 or more, those received the feedback daily, by setting the goals and mobile devices significantly support the increasing moderate vigorous physical activities by 178 minutes/week, contrast with 80 minutes/week for the control group (King, 2008).

An eight week, open label, taken a controlled trial randomly in Ireland listed ninety patients of 16 or more than 16 years old that use smartphone and assess the efficacy of

application use of physical activities (Glynn, 2014). Similar goals of physical activities were provided to the participants and information about exercise benefits. The smartphones were given to the group of intervention and also the detailed instructions that how to achieve such goals by using this application. The initial outcomes were change in physical activities, as measured through step-count among base-line and follow up. The improvement in the daily step-count from one to eight weeks was 1029 (95% confidence intervals, 214 – 1843) steps/day, recommend the interventions.

In a research by contrasting self monitoring intervention of weight management provided by a smartphone application with a paper diary and Website in volunteers of 128 overweight, the application group attachment was remarkably higher (92 days, mean) contrast with the Website (35 days, mean) or dairy group (29 days, mean) ($P < .001$) (Carter, 2013). Mean weight that reduced at six months was 4.6 Kg, 2.9 Kg, 1.3 Kg in the application, Website and diary group, respectively.

One more trial of weight loss contrast the mobile application for dietary self monitoring and weight loss, “Lose It” with diet counseling traditionally and the entry method in forty-seven subjects of overweight (Wharton, 2014). They distinguished that the traditional group and the app group both of them lost the equal weight in the 8 week intervals of time during trials.

Another research describes the feasibility of an application which is called “Persuasive social network for physical activity,” that was designed on evidence based behavioral changing theories of health and strategies, along with delivery of innovative and effective interventions (Al Ayubi, 2014). The research contains the thirteen subjects, participants of 24 – 45 years old, with mass index of their bodies are from 18.5 – 42.9 kg/m², with increasing step-count goal/day. Half of them have the experience of the smartphones, and they all users of the social networking systems. After proper training, everyone will be able to use these applications. By passing one week they unlocked all the social networking features that will allow the users to compare and share with other people during the trial. The positive support from the social networking shown the significant increase of the step-count: at base-line without social support after the one week, means-steps were exactly 4202/day that when distinguished after involving social features, mean-steps were 6352/day.

3.2.4 Future Directions in Health and Fitness Applications

The following are the recommendations:

- Most of the research on health and fitness has contain that interventions are much effective if they are depended upon the behavioral change Theory Models and specially involves the features such as rapid intention formation, goal settings, performance, individual feedback, progression, self monitoring, and goal reviewing (Middelweerd, 2014., Abraham, 2008., Conn, V. 2011., Foster, 2013). Fitness and Health applications must be contained few or all the features and need to be tested at different times with rigorous evidence based research trail whose results are peer-reviewed by experts to examine the safety and effectiveness of the application. Besides, all the application should have all the standardized grade features that are in listed so the consumer can rapidly attain the suitability.
- Long lasting and great sample sized random control trail in the outpatient settings are required to attain the efficacy and safety of the fitness and health applications and should be involved the different participants in terms of gender, age, personality type, socioeconomic status, social networking and smartphone experience.
- In present, the applications have been lacking the emphasis or evidence based and medicinal and professional involvement (Mobasheri, 2014). So the application should be effective and the consumer friendly and their features must be incorporated.
- The applications need to be more developments of a smartphone and the Wireless Sensor Technology to give more correct data. Sensors are developing that will be woven or integrated into the accessories, clothing and into the living environment, such that the fitness and health information that can be acquired pervasively and seamlessly in our daily life (Zheng, 2014). Such sensors will be provide more accurate information and reliable data on the fitness and health to the smartphones, in this way, applications will be able to the more prescribe activities that can improve the consumer's fitness and health.
- The ability of an application to be compete with the multi-features applications and the sharing of data will like to be the feature of newer generation smartphones will give a complete fitness and health summaries for the consumer.

- The development of the Health applications and informatics that deal with transmission, acquisition, processing, retrieval, storage, and use of health data is required. This promotes the best transparency among the fitness and health application consumers and their medicine provider (Zheng, 2014).
- New Medical Mobile device that is m-Health apps are developing that will be revolutionize that how the industry of healthcare deal with patients and made the virtual-health record that can be found all over the world (Becker, 2014).
- The privacy and security Development for application consumers and healthcare provider: mostly applications do not have privacy policies and those are not transparent (Sunyaev, 2015).

3.2.5 Usefulness of Mobile Health App

Generally, the term usability is taken as a concept about the user experience and the product quality. Since 1990, Usability is an assessment criteria which are broadly adopted in the world of software inspection (Nielsen, 1994), and today it is predominating developed delivery target for the mobile applications (Zhang, 2005). The mobile applications are not able to hold on the users by ignoring the usability. The tracking data explore that the users allocate less than thirty seconds to learn the use of mobile application before leaving it for other apps, or before giving up the use of mobile applications for this reason altogether.

The usability scope was described early in the International Organization for Standardization standards as “to which extent, we can use a product can be determined by some specific users to attain the specific goals with efficiency, satisfaction and effectiveness in the specific context of use,” outlining Efficiency, Satisfaction and Effectiveness as the measurable features (Fox, 2012).

In contrast, to estimate the mobile health applications the Nielsen model (Nielsen, 1994) is usually used due to its feature’s suitability to assess the software products; features such as Learnability, Satisfaction, Efficiency, Errors and Memorability can be measure through this model. Zhang and Adipat (Zhang, 2005) also explored some particular issues related to mobile devices such as the challenges of data entry as auxiliary considerations, limitations of hardware, and the mobile context not be tackled by these models.

Totally eight studies are described and implemented application interventions that are measured to promote physical activity and healthy diet. Basically, the app functionality involves the practical tips, provision of personal feedback, tricks based upon the participant's exercise status and self reported diet (Balk-Møller; 2017, Naimark, 2015).

Balk-Moller et al., (Balk-Møller, 2017) used an app named as SoSu-life which was developed for reducing body-weight between the particular groups of employees in a workplace. This application (SoSu-life) was further utilized by the participants to achieve their personal goals and provide weekly challenges and colleague challenges to compete and interact with the other groups.

Carter et al., (Carter, 2013) introduced an application to dietary control via evidence based behavioral approaches and used this data for obese adults; consumers used this application to set their goals, self-monitoring of physical and dietary activity, and for feedback through text messages every week. Another study determined the weight loss for overweight adults utilized an application to communicate interventions via challenge games, goal setting and social support through a buddy system, in which self-monitoring is allowed from the participants (Svetkey, 2015).

Another program provided Electronic diaries are used to facilitate the automatic weight and activity monitoring, and the caloric intake to avoid diabetes by weight loss among obese adults (Fukuoka, 2015). Moreover, the application utilized gives a reminder to the participants to enter the information daily and to provide interactive intervention content, involving quizzes, daily messages and video clips. This study is designed to promote eating behaviors by utilized an application of food record to allow participants to enter dietary food data comfortably through capturing the pictures of the drinks and the food after and before eating by a camera (Kerr, 2016).

In an intervention research, we are using an application to improve automatic feedback, physical activity, calories burned and step count tracking was provided (Glynn, 2014). Another study (King, 2016), reveals the usability of mobile application to improve the physical activities by applying 3 different applications depends upon the motivational-frames taken from the theories of behavioral science and evidences. First one is known as Analytic application, concentrate upon the quantitative and personal goal setting, provided information to help changing of behavior and behavioral feedback. The goal achieved by a consumer is highlighted through colored meters. The second application is named as Social app that is established from a social perspective to make stronger social support for

changing behavior, provided social feedback and highlight the behavioral models by similar and group based competition and collaboration. Third application named as Affect application that used principles like a bird avatar and schedule reinforcement to check the consumer's physical activities.

Total, four studies described an applied application interventions measured to develop health related behavioral changes such as intake of vitamin D, sun protection, bone health-promotion and preventions of the coronary heart disease. Buller et al., established an application for the protection from the sun. This application provided the present dangerous level of the such as the medium, low, high and extremely high. So to warn the consumers from the sunburn damage, time intervals to reapply the sunscreen, level of generating vitamin D in the skin, and any other precautions for sun protection (Buller, 2015).

Another application was developed to promote intake of vitamin D in the youths. This application gives the feedback immediate that the consumers can contrast the recommended levels with their calcium and vitamin D intake levels, after take their drink, food and the supplements consisting calcium and vitamin D that had been intake. The time spends by a consumer into the sunlight also considered for. Moreover, the significant information was given automatically by linking consumers to the daily Ultra Violet forecast once one will be entered the postal code (Goodman, 2016).

A research utilizing an application to promote the bone health in adult women with low-bone mass provided the achieved feedback and scores depend upon the consumer's recording activity hours, exercise and nutrition (Park, 2017). A research to avoid coronary-heart diseases provided 4 learning models such as heart's physiology, CHD prevalence/Cardiac Risk Factors, information about healthy heart lifestyle, and management of stress, that permits the workers to learn within twenty minutes and get information depends upon 3 calculations (daily caloric-intake, ten years CHD risk, body mass index) (Zhang, 2017).

Health results involved the enhanced physical activities, improving weight control and preventing the risk of chronic disease. A research employed an application for the office employees to achieve their weight-loss goals through the team competitions and individual benchmarks. The results explored that after the use of thirty eight weeks the consumers revealed a beneficial body weight loss, fat %age of the body, and waist circumference contrast to the control group (Balk-Møller, 2017).

The consumers who utilized an application for self monitoring of their caloric intake every day depends upon the certain goals of body weight loss reveal significantly more adherence to the intervention contrast to the group who consume diaries or websites; the application consumer group also had a highly beneficial reduction of body fat and weight loss (Carter, 2013).

From another research it is highlighted that an intervention group shown a beneficial weight reduction and an increase in physical activities, when differentiate with a control group who utilized only pedometer. Additionally, the blood pressure, saturated fat, hip circumference, and the intake of sweet beverage decrease (Fukuoka, 2015). It is also reported that the dietary evaluation and feedback adjustment by utilizing a mobile food record, declined the energy-dense intake and nutrition through poor foods, along with beverages sweetened with sugar, which help to reduce the weight loss (Kerr, 2016).

A research (King, 2016) that evaluated the improvement of physical activity between young people by contrasting three different applications such as the Affect, Social, and Analytic applications explored the beneficial increase in MVPA (Moderate-to-Vigorous-Intensity Physical Activity) among consumers of the social applications as compared to the consumers of the other applications.

An intervention research developed to improve the healthy lifestyle shown an increase in the timing of physical activity, beneficially reduced the weight, promotions in scores of diet quality, and enhanced nutritional knowledge within consumers utilizing a Web-site-based application contrasted with the control group (Naimark, 2015). Another research revealed increasing knowledge of coronary-heart disease and behavioral management for blood cholesterol between the intervention groups (Zhang, 2017).

4 Practical Part

Healthy Lifestyle has four main tabs: calculate, workout, diet, reminder. These sections have subfunctions. Calculate contains 16 different calculators (functions): BMI, blood pressure, lean body mass, blood alcohol, daily calories, smoking cost, energy expenditure, water requirement, weight loss, ideal weight, calories burned, fate intake, body water, blood donation, blood volume, body fat.

Workout section has 8 kind of workouts: beginner, abs, 6 pack, push ups, plank, cardio, crunches, squat.

Diet section has tabs where user can choose diet type, after choosing one of diets application will generate recipe list for selected request.

In reminder tab user can create, select, edit or delete reminder. Creating process has 3 steps: first user should name reminder, second set date and last step set time.

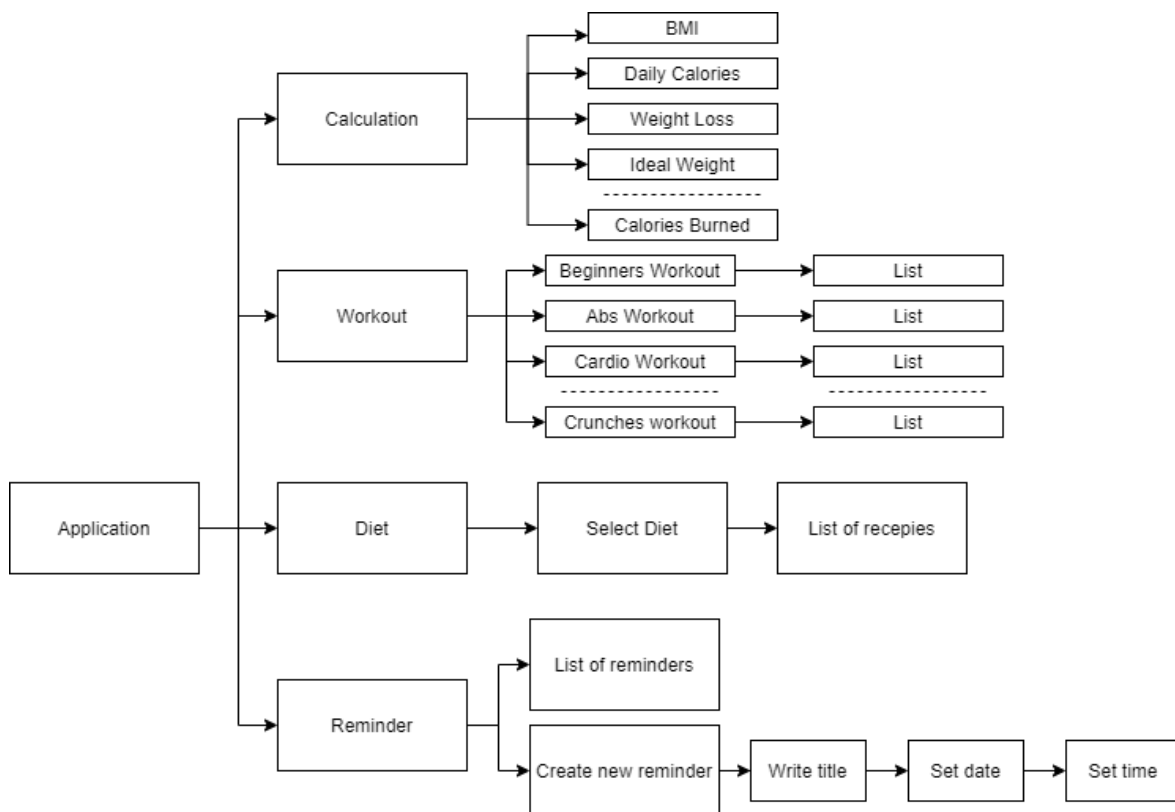


Figure 1 Application diagram

4.1 FUNCTIONALITY

As a fitness freak, we always seek different mobile health and fitness applications and download some of them with the best features and functionality. We always attract toward the best crafted fitness applications that have several features and which work as a personal trainer for us. One always tries to find the application which gives frequent and rapid result to the consumer. Here also we will discuss about the features of functionality of a health and fitness application which are highlighted with different colors to attract consumers towards it.

This application includes all the features which a consumer tries to find in a single app which work as a fitness trainer for her/him. Application is divided for four section: Diet, Workout, Calculate, Reminder.

```
public boolean onNavigationItemSelectedListener(@NonNull MenuItem menuItem) {  
    switch (menuItem.getItemId()){  
        case R.id.calculate:  
            startActivity(new Intent(getApplicationContext(),Calculate.class));  
            overridePendingTransition(0,0);  
            return true;  
        case R.id.workouts:  
            startActivity(new Intent(getApplicationContext(),Workouts.class));  
            overridePendingTransition(0,0);  
            return true;  
        case R.id.diet:  
            return true;  
        case R.id.reminders:  
            startActivity(new Intent(getApplicationContext(),Reminders.class));  
            overridePendingTransition(0,0);  
            return true;  
    }  
    return false;  
}
```

Table 1 navigation bar code

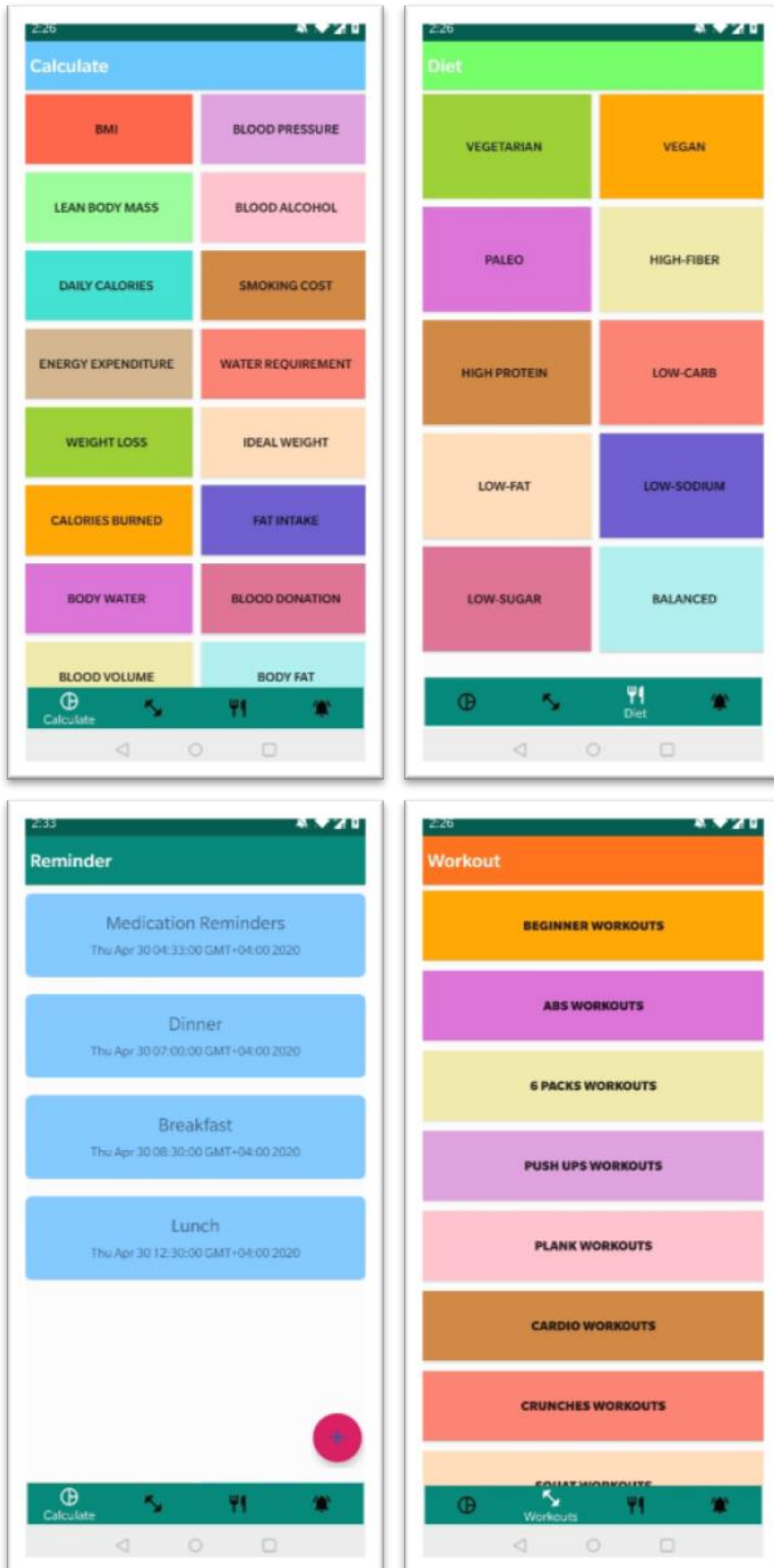


Figure 1 4 Main section

It's a function of an application in which consumer finds a perfect diet plan according to its body requirements. It provides an option to select the food of consumer's own concern and any recipe which they like most. It also suggests reasonable and affordable recipes. It offers different meals or several recipes with no. of calories within these meals at different timings daily. From the no. of calories consumer can estimate how much they can take for meal. The recipes involved several types of Salads, meats, juices or many other things to take during diet planning.

4.1.1 Workout programs

This app offers the consumers a number of different programs relevant to the workout and the physical activity having different levels such as beginner, moderate and advanced. Other than workout it also offers the yoga videos of the high intensity level for daily. This app offers the following challenges for its consumers at different levels such as

<pre> <Button android:id="@+id/beginnerWorkouts_btn" android:layout_rowWeight="1" android:layout_columnWeight="1" android:height="80dp" android:background="#FFA500" android:layout_margin="5dp" android:layout_marginTop="7dp" android:textStyle="bold" android:text="Beginner Workouts"/> </pre>	<pre> <Button android:id="@+id/absWorkouts_btn" android:layout_rowWeight="1" android:layout_columnWeight="1" android:height="80dp" android:background="#DA70D6" android:layout_margin="5dp" android:layout_marginTop="7dp" android:textStyle="bold" android:text="Abs Workouts"/> </pre>
--	--

Table 2 workout programs code

- 30 days challenge “Beginners Workouts”
- 30 days perfect ABS challenge “Abs Workouts.”
- 30 days challenge for 6-pack Abs “ 6 packs Workouts”
- 50 push-ups challenge “Push-ups Workouts”
- 30 days Cardio workout challenge “Cardio Workouts”

- 30 days plank workout challenge “Planks Workouts”

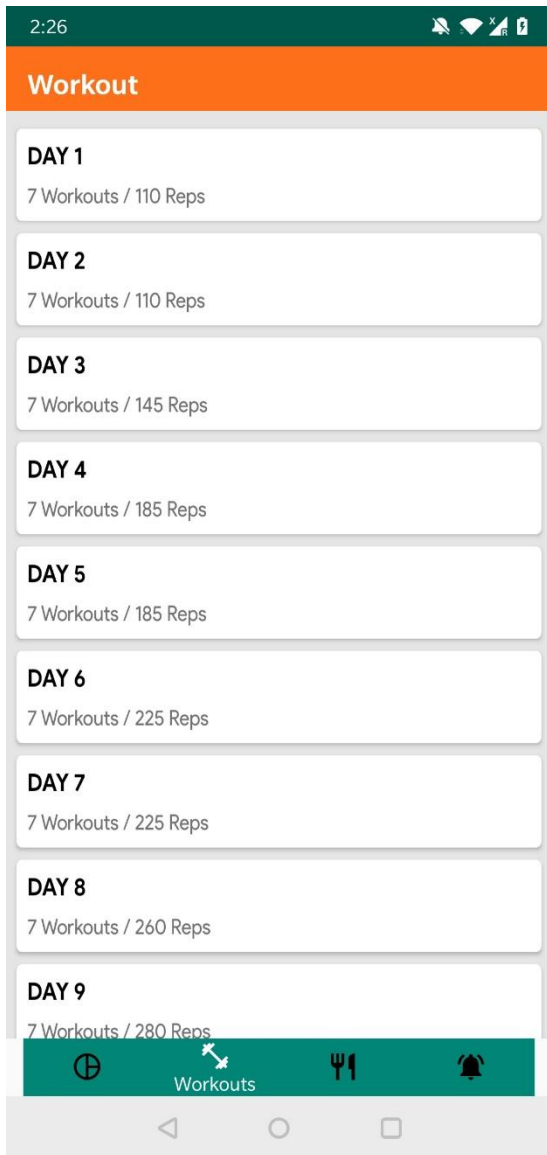


Figure 2 Workout list

Here also an reminder and calculator for the workout timing, to remind the consumers to get ready for workout daily and calculator is used for the calculation of the timing, days and no. of workout daily.

4.1.2 Reminder

The reminder is an option to set a time to get notification for proper or on-time intake of food, drink and other things that help to reduce wait. In this app, the Meals Reminder alarms at four different times, to remind the user that has meal at the right time. Reminder alarms in morning at 8:30 AM for breakfast, in afternoon at 12:30 PM for lunch, in evening at 4:00 PM for snacks and in night at 7:30 for dinner. There is also Medication Reminder for taking medicine at exact time to maintain the health of the consumer. Consumer can set reminder that alarms exactly at their medicine time. The consumer can also set it for the workout, yoga and physical activity timings to remind even after outside the home.

Reminder function is divided for smaller parts: open new window, write title, set time, create button click. By clicking on “Add reminder button” app starts this function:

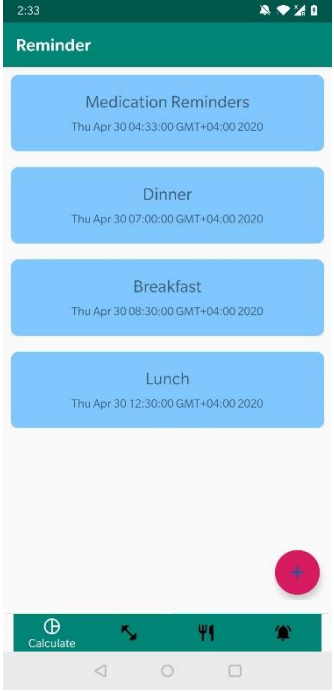
	<pre>public void addReminder(){ dialog = new Dialog(MainPage.this); dialog.setContentview(R.layout.floating_popup); final TextView = dialog.findViewById(R.id.date); Button select,add; select = dialog.findViewById(R.id.selectDate); add = dialog.findViewById(R.id.addButton); final EditText message = dialog.findViewById(R.id.message); final Calendar newCalender = Calendar.getInstance();</pre>
<p>Figure 3 Reminder</p>	

Table 3 Add reminder button code

after declaring this function need to set up “onClickListener” – what will happen when button will be clicked.

This part of code is a core function of reminder. It run title, calendar and time functions one by one. When this functions will be completed save button will redirect it here and display reminder, but if there will be any error it will display error message.

```

select.setOnClickListener(new View.OnClickListener() {@Override
    public void onClick(View v) {DatePickerDialog dialog = new DatePickerDialog(MainPage.this,
new DatePickerDialog.OnDateSetListener() {@Override
    public void onDateSet(DatePicker view, final int year, final int month, final int dayOfMonth)
{
    final Calendar newDate = Calendar.getInstance(); Calendar newTime =
Calendar.getInstance();
    TimePickerDialog time = new TimePickerDialog(MainPage.this, new
TimePickerDialog.OnTimeSetListener() {@Override
    public void onTimeSet(TimePicker view, int hourOfDay, int minute) {
    newDate.set(year,month,dayOfMonth,hourOfDay,minute,0);
    Calendar tem = Calendar.getInstance();
    Log.w("TIME",System.currentTimeMillis()+"");
    if(newDate.getTimeInMillis()-tem.getTimeInMillis())>0)
        textView.setText(newDate.getTime().toString());
    else
        Toast.makeText(MainPage.this,"Invalid time",Toast.LENGTH_SHORT).show();

    }},newTime.get(Calendar.HOUR_OF_DAY),newTime.get(Calendar.MINUTE),true);
    time.show(); }
},newCalender.get(Calendar.YEAR),newCalender.get(Calendar.MONTH),newCalender.get(Calenda
r.DAY_OF_MONTH));
    dialog.getDatePicker().setMinDate(System.currentTimeMillis());
    dialog.show(); }));

```

Table 4 Reminder core function

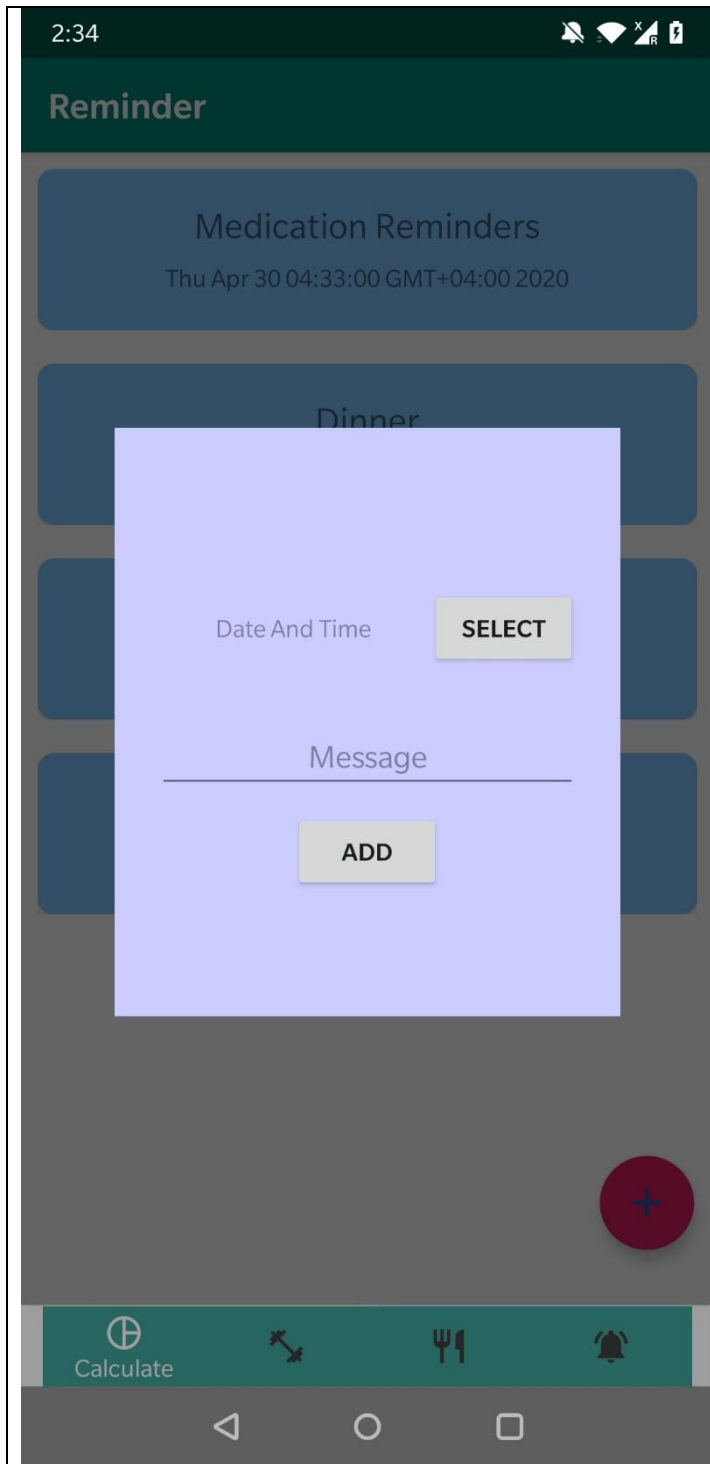


Figure 4 Reminder add button pop-up window

```

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="horizontal"
    android:layout_marginTop="70dp">
    <TextView
        android:id="@+id/date"
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:layout_weight="1"
        android:gravity="center"
        android:hint="Date And Time"
        android:layout_gravity="center"/>
    <Button
        android:id="@+id/selectDate"
        android:layout_width="wrap_content"
        android:layout_height="match_parent"
        android:layout_weight="0"
        android:gravity="center"
        android:text="SELECT"/>
</LinearLayout>
<EditText
    android:id="@+id/message"
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:layout_marginTop="30dp"
    android:layout_gravity="center"
    android:hint="Message"
    android:gravity="center"/>
<Button
    android:id="@+id/addButton"
    android:layout_width="wrap_content"
    android:layout_height="wrap_content"
    android:layout_marginTop="10dp"
    android:text="Add"
    android:layout_gravity="center" />

```

Table 5 Add reminder title

After opening new window User should enter title and select date and time. For selecting date user should click button. This button open new “onClickListener” function.

```

add.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        RoomDAO roomDAO = appDatabase.getRoomDAO();
        Reminders reminders = new Reminders();
        reminders.setMessage(message.getText().toString().trim());
        Date remind = new Date(textView.getText().toString().trim());
        reminders.setRemindDate(remind);
        roomDAO.Insert(reminders);
        List<Reminders> l = roomDAO.getAll();
        reminders = l.get(l.size()-1);
        Log.e("ID chahiye",reminders.getId()+"");
        Calendar calendar = Calendar.getInstance(TimeZone.getTimeZone("GMT+5:30"));
        calendar.setTime(remind);
        calendar.set(Calendar.SECOND,0);
        Intent intent = new Intent(MainPage.this,NotifierAlarm.class);
        intent.putExtra("Message",reminders.getMessage());
        intent.putExtra("RemindDate",reminders.getRemindDate().toString());
        intent.putExtra("id",reminders.getId());
        PendingIntent intent1 =
PendingIntent.getBroadcast(MainPage.this,reminders.getId(),intent,PendingIntent.FLAG_UPDATE
_CURRENT);
        AlarmManager alarmManager = (AlarmManager)getSystemService(ALARM_SERVICE);
        alarmManager.setExact(AlarmManager.RTC_WAKEUP,calendar.getTimeInMillis(),intent1);
        Toast.makeText(MainPage.this,"Inserted Successfully",Toast.LENGTH_SHORT).show();
        setItemsInRecyclerView();
        AppDatabase.destroyInstance();
        dialog.dismiss();
    }
});

```

Table 6 Reminder pop-up calendar

First user can select date from pop-up calendar, after clicking “ok” user will select time. At the end user can check if his entered information is correct and click “ADD” button to create reminder.

4.1.3 BMI

Body Mass Index is a measurement of consumer's leanness which is based upon the height, weight and quantify tissue mass. This is a kind of calculator through which we can calculate whether the weight of a person is suitable for body by knowing his/her height and weight. Usually this is used, whether a person having underweight, overweight normal weight or obese.

$$BMI = \frac{\text{Weight (Kg)}}{\text{Height (m)}^2}$$

Healthy BMI range: 18.5 kg/m² – 25 kg/m²

Healthy weight for the height: 59.9 kg – 81.0 kg

Ponderal Index: 11.1 kg/m³

```
public void onClick(View v) {  
    int bmiWeight = Integer.parseInt(editTextBMIWeight.getText().toString());  
    float bmiHeight =  
(float)Integer.parseInt(editTextBMIHeight.getText().toString())/100;  
    float bmiAnswer = (float)(bmiWeight/(Math.pow(bmiHeight,2)));  
    if (bmiAnswer<18.5){  
        textViewBMI.setText("Underweight");  
    }else if (bmiAnswer>=18.5 && bmiAnswer<=24.9){  
        textViewBMI.setText("Healthy Weight");  
    }else if (bmiAnswer>=25.0 && bmiAnswer<=29.9){  
        textViewBMI.setText("Overweight");  
    }else{  
        textViewBMI.setText("Obese");  
    }  
}
```

Table 7 BMI formula code

4.1.4 Blood pressure

Blood pressure of a person is the measurement of the blood flow within the main arterial system in millimeters of the Mercury. It is basically separated into the systolic and diastolic determinations. Usually the blood pressure is written as the systolic pressure over

the diastolic pressure (e.g., 120/80 mm Hg). Blood pressure is most important to measure to plan a diet and workout for the consumer particularly that suffers this situation

$$MAP = \frac{2DBP + SBP}{3}$$

Where SBP and DBP are the systolic and the diastolic blood pressures, respectively

```
public void onClick(View v) {  
    int systolicNumber = Integer.parseInt(textInputSystolic.getText().toString());  
    int diastolicNumber = Integer.parseInt(textInputDiastolic.getText().toString());  
    if (systolicNumber >= 80 && systolicNumber <= 120 && diastolicNumber >= 60 && diastolicNumber <= 80){  
        Toast.makeText(Calculate_Blood_Pressure.this, "Normal Blood Pressure",  
Toast.LENGTH_SHORT).show();  
    }else{  
        Toast.makeText(Calculate_Blood_Pressure.this, "Normal range is 90 to 120 and 60 to 80",  
Toast.LENGTH_LONG).show();  
    }  
}
```

Table 8 Blood pressure code

4.1.5 Lean Body Mass (LBM)

Lean Body Mass is the part of the composition of the body in which we take the difference between the actual body weight and the body fat weight. So until we don't have any information or don't know about our body fats, we can't get rid of it. The consumer can make all these calculations, though these mobile apps.

For males:

$$eLBM = 1.1W - 128\left(\frac{W}{H}\right)^2$$

For females:

$$eLBM = 1.07W - 148\left(\frac{W}{H}\right)^2$$

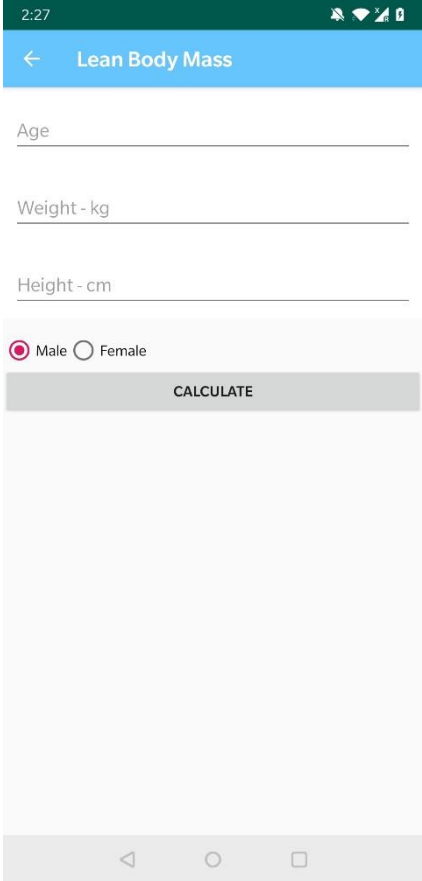
	<pre> <com.google.android.material.textfield.TextInputLayout android:layout_width="match_parent" android:layout_height="wrap_content" android:padding="10dp" android:background="@android:color/white"> <com.google.android.material.textfield.TextInputEditText android:id="@+id/leanBodyMassAge" android:layout_width="match_parent" android:layout_height="wrap_content" android:hint="Age" android:inputType="number"/> </com.google.android.material.textfield.TextInputLayout> </pre>
<p>Figure 5 Lean body mass</p>	

Table 9 Lean body mass index code

4.1.6 Blood alcohol content (BAC)

Blood alcohol content revealed the percentage of alcoholic content present into the bloodstream of the individuals. This percentage can be measured within 30 – 70 minutes after taking alcohol, and with the time being this percentage gets decrease into the blood.

- Ounces of beverage consumed: 1 beer = 12 oz

One glass of wine = 5 oz. / 1 shot = 1.5 oz

- Weight (lbs) alcohol percentage in beverage: 1 Beer = 4 – 7% / One glass of wine = 11 – 13% / 1 shot = 40%

$$BAC = \frac{[\text{Alcohol consumed in grams}]}{[\text{Body weight in grams} \times r]} \times 100$$

“r” is the gender constant: r = 0.68 for males and 0.55 for females.

```
public void onClick(View v) {
    double alcoholLevelInBloodPercentage;

    int alcoholConsumed = Integer.parseInt(textInputVolumeConsumed.getText().toString());
    int alcoholLevel = Integer.parseInt(textInputAlcoholLevel.getText().toString());
    int weight = Integer.parseInt(textInputWeight.getText().toString());

    radioButton = findViewById(R.id.radio_Male);

    if (radioButton.isChecked()==true){
        alcoholLevelInBloodPercentage=(0.071*alcoholConsumed*alcoholLevel)/(weight);
    }else
    {
        alcoholLevelInBloodPercentage=(0.085*alcoholConsumed*alcoholLevel)/(weight);
    }

    textView.setText(String.format("Alcohol level in blood: %.2f", alcoholLevelInBloodPercentage));
}
```

Table 10 Blood alcohol code

4.1.7 Daily Calories

Calorie is a unit to measure energy that is present in our food we take daily. We need calories on daily basis through the food, but we should be aware about how number of calories we are taking and how much we need. This estimation prevents the obesity and we can estimate it by knowing little about our age, weight and height. The mobile applications also provide this feature of function for our ease. Average women can take 2000 cal/day to maintain its weight while and 1500cal/day to lose a pound per week. While an average man can take 2500 cal/day or to lose the weight 2000 cal/day for a pound per week.

- Men BMR = $66.4730 + (13.7516 \times \text{weight in kg}) + (5.0033 \times \text{height in cm}) - (6.7550 \times \text{age in years})$
- Women BMR = $655.0955 + (9.5634 \times \text{weight in kg}) + (1.8496 \times \text{height in cm}) - (4.6756 \times \text{age in years})$

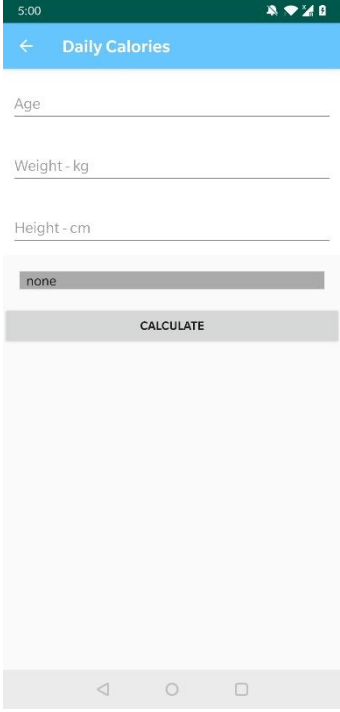
 <p>Figure 6 Daily calories</p>	<pre> <Spinner android:id="@+id/dailyCaloriesSpinner" android:layout_width="match_parent" android:layout_height="wrap_content" android:layout_margin="20dp" android:background="@android:color/darker_gray" android:entries="@array/dailyCaloriesSpinner_items"/> <Button android:id="@+id/dailyCalories_Calculate_btn" android:layout_width="match_parent" android:layout_height="wrap_content" android:text="Calculate" /> </pre>
--	--

Table 11 Daily calories code

4.1.8 Smoking Cost

Smoking is injurious to health as it increases the blood leukocytes in the blood that thicken the blood and increase cholesterol level in the blood. So that it can be avoided if we calculate its index per day and adjust its intake daily basis that may lead to get rid of smoking. It also disturbs the blood oxygen carry capacity and decline the stamina of a person due to its bad effect on lungs. It can be calculate by multiply the no. of cigarette packs smoked per day by the no. of years one has smoked.

1 pack-year = smoking 20 cigarettes/per day for 1 year, or 40 cigarettes per day for half a year, and so on.

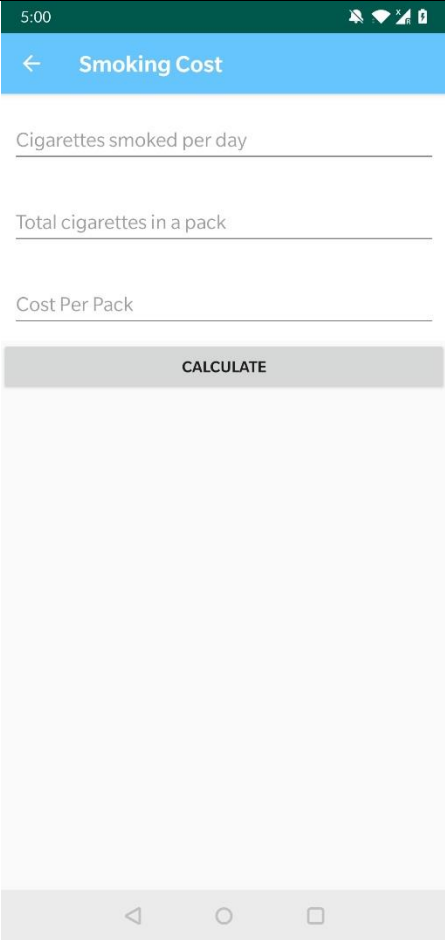
	<pre> <com.google.android.material.textfield.TextInputLayout android:layout_width="match_parent" android:layout_height="wrap_content" android:padding="10dp" android:background="@android:color/white"> <Button android:id="@+id/smokingCost_Calculate_btn" android:layout_width="match_parent" android:layout_height="wrap_content" android:text="Calculate" /> <TextView android:id="@+id/smokingCostAnswerText" android:layout_width="match_parent" android:layout_height="wrap_content" android:padding="10dp" android:gravity="center" android:text=""/> </pre>
<p>Figure 7 Smoking cost</p>	

Table 12 smoking cost code

4.1.9 Energy Expenditure (TDEE)

TDEE stand for the total daily energy expenditure means the total energy expands by a person per day into his daily activities. The energy usually expands by a person on the daily task such as Basal metabolic rate, physical activities and thermic food effect. Moreover the TDEE is also calculated on the basis of these factors mention above. We consider the weight, height, age, gender, body fat and workout of a person to calculate the TDEE of a person.

To calculate TDEE of a person we first calculate the BMR and then multiply it with daily activity factor.

$$\text{Women BMR} = 655 + (9.6 \times \text{weight in kg}) + (1.8 \times \text{height in cm}) - (4.7 \times \text{age in yrs.})$$

$$\text{Men BMR} = 66 + (13.7 \times \text{weight in kg}) + (5 \times \text{height in cm}) - (6.8 \times \text{age in yrs.})$$

TDEE = BMR x Activity Factor

4.1.10 Water requirement

Water is vital for everybody in the world, as approximately 60% of our body is water. Our cells, tissues and organs need water for their proper functioning. Our body need few liters of water daily which can be estimate by consider the body height, weight, urine, sweating, perspiration, breathing, and even bowel movements. According to estimation by under-consideration all the factors discussed above the females require 2.7 liters while males required 3.7 liters of water.

- Multiply weight by $\frac{2}{3}$ to calculate amount of water one required to drink daily
- Weight = 160 pounds: $160 \times \frac{2}{3} = 107$ ounces
- 107 ounces = 3.15 liters/day.

- **Weight Loss**

Weight loss is the basic thing to maintain the health and fitness of a person. Obesity is a disease itself and an obese person never attains fitness until it loses its weight according to its height and age. However, through this function consumer can estimate that how much should be their weight and how much to lose him/her. If consumer knows about its weight and height it can calculate the amount of weight, he should reduce to become fit by avoiding the unhealthy food and making a habit to eat good and healthy food. We can calculate the amount of weight to be lose by calculation can make by knowing the height, weight, sex, age, physical activity and the days you want to achieve this goal.

- To calculate your weight loss %age = lbs lost divided by starting weight
- Then, multiply this result by 100.
- So, if starting weight is = 150lbs
- lost weight = 5lb , lost weight =3.33%

4.1.11 Ideal Body Weight (IBW)

Many people try to lose their body weight, but they don't know about hot to lose weight. People want to lose weight on the perception of the ideal body weight, which is mostly promoted by the social media, movies, television, magazines etc. Although the ideal body weight is perceived by the direct visual appeal, but it is necessary to calculate it properly

by knowing about the height, weight, age and gender of a person. However, there are many formulas through which we can estimate the ideal body weight.

Women: $IBW [kg] = (height [cm] - 100) - ((height [cm] - 100) \times 15\%)$

Men: $IBW [kg] = (height [cm] - 100) - ((height [cm] - 100) \times 10\%)$

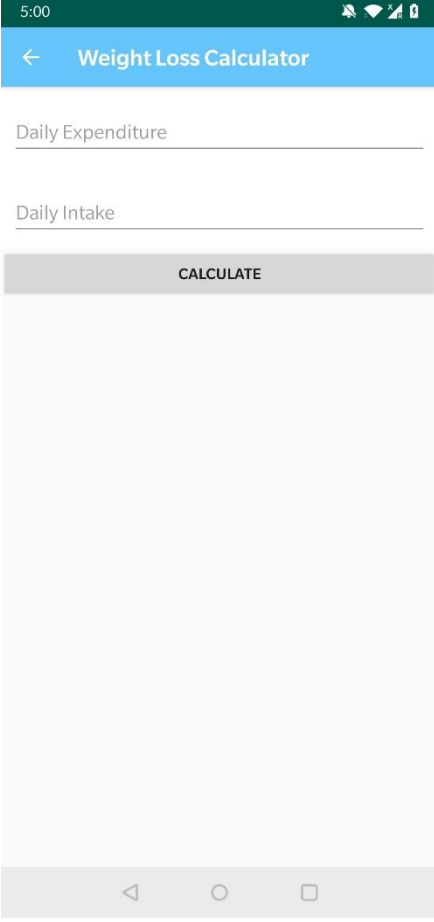
 <p>Figure 8 Weight loss calculator</p>	<pre> <LinearLayout xmlns:android="http://schemas.android.com/apk/res/android" xmlns:app="http://schemas.android.com/apk/res-auto" xmlns:tools="http://schemas.android.com/tools" android:layout_width="match_parent" android:layout_height="match_parent" android:orientation="vertical" tools:context=".Calculate_Weight_Loss_Calculator"> </LinearLayout> </pre>
--	---

Table 13 Ideal body weight code

4.1.12 Calories Burned

The weight loss or gain and weight maintenance directly associated to the no. of calories burned daily. A person must burn more calories if he want to lose weight and that can be burn through the less calories intake but for this one need to know how much calories he/she want to lose every day. For burn the extra calories we should also have knowledge about the consumption of them into other functions of the body and in our daily activities. The amount of energy or calories people burned or consume during exercise is based upon their height, weight and the workout intensity. Moreover, the calories burring also depend

upon the age, body consumption, temperature, fitness level, diet, and sleep and oxygen intake. To calculate the calories burned per day we must be measured the value of physical activity and the basal metabolic rate.

$$MET \text{ in } Kg = \frac{\text{Calories}}{\text{Hour}}$$

- MET refers to metabolic equivalent
- To calculate the calories burned in ½ hour, divide the answer by 2
- To calculate the calories burned in 15 minutes, divide the answer by 4
- Fat Intake

Fats, carbohydrates and the proteins are the major macronutrients into the human body which provides us the energy needed for our metabolic functions that we can take through intake of food. There are various types of dietary fats such as trans-fat, saturated fat, poly-unsaturated fats, monounsaturated fats, and omega-3 fatty acids. The dietary fat is very essential to our body, but more intake of this fat causes the weight gain and overweight is associated to the unhealthy outcomes. The fat intake can be estimate by the amount of dietary fat consumed by a person daily. We can calculate the necessary fat intake by knowing the daily caloric needs, age gender, height, weight, physical activity and the risk of heart disease.

Fat calculation:

- Multiply the Grams of fats by 9 (1 gram of the fat = 9 calories kcal)
- Divide the answer by the total number of calories present in the food = % fat

Saturated Fat:

- Multiply the Grams of saturated fats by 9 (1 gram of the fat = 9 calories kcal)
- Divide the answer by the total number of calories present in the food = % of saturated fat

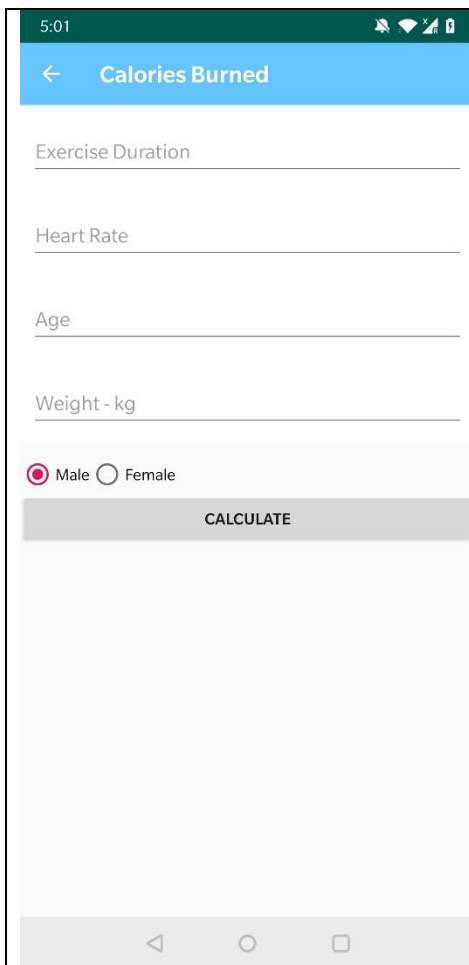


Figure 9 Calories burned

```

<LinearLayout
    android:layout_width="match_parent"
    android:layout_height="wrap_content"
    android:orientation="horizontal">
    <RadioGroup
        android:id="@+id/caloriesBurnedRadioGroup"
        android:layout_width="match_parent"
        android:layout_height="wrap_content"
        android:orientation="horizontal"
        android:paddingTop="15dp">
        <RadioButton
            android:id="@+id/caloriesBurnedRadio_Male"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Male"
            android:tag="Male"
            android:checked="true"
        />
        <RadioButton
            android:id="@+id/caloriesBurnedRadio_Female"
            android:layout_width="wrap_content"
            android:layout_height="wrap_content"
            android:text="Female"
            android:tag="Female"/>
    </RadioGroup>
</LinearLayout>

```

Table 14 Calories burned code

4.1.13 Body water

Water is vital for the life of humans, all the functions and the systems of our body depends upon the water as human body consist of 50 percent of water. It is the building block of the new body cells and key nutrient for every cell. The average percentage needed by a human body or a person vary as it depends upon the gender, age and weight of the person.

Water as %age of BW in adults

Table 15 Water as %age of BW in adults

Adults	Ages 12 to 18	Ages 19 to 50	Ages 51 and older
Male	Average: 59% Range: 52% – 66%	Average: 59% Range: 52% – 66%	Average: 56% Range: 47% – 67%
Female	Average: 56% Range: 49%–63%	Average: 50% Range: 41%–60%	Average: 47% Range: 39%–57%

Water as %age of BW in infants and children

Table 16 Water as %age of BW in infants and children

	Birth to 6 months	6 months to 1 year	1 to 12 years
Infants and children	Average: 74% Range: 64% – 84%	Average: 60% Range: 57% – 64%	Average: 60% Range: 49% – 75%

4.1.14 Blood Donation

Blood donation mainly refers to the blood transfusion from one person to the other. It is some time necessary to save the others life but is very necessary to take care of yourself first. As always, an healthy blood transformed, and healthy person can donate the blood. One thing which is more necessary between one donation to another that you should know about the time period after which you can donate blood to maintain the donor's health. So for this reason one should calculate the time period between its two subsequent blood donations and can be maintain your health by the health and fitness application. For the blood donation calculations there is need of knowledge about age, gender, weight and the physical activities of the person. Second thing which is most important and comes first that the person should be non-smoker, don't have any risk of heart disease, HIV-Aids, hepatitis and many other diseases.

- Blood donors' age should be 17 – 65
- Blood donors' weight should be more than 50 kg

- For men two subsequent donations should be after 12 weeks and for women after 16 weeks.
- Blood amount retrieved should be up to 500 mL

For Men = $0.3669 \times \text{Height in m}^3 + 0.03219 \times \text{Weight in kg} + 0.6041$

For Women = $0.3561 \times \text{Height in m}^3 + 0.03308 \times \text{Weight in kg} + 0.1833$

```

calculateButton = findViewById(R.id.calculate);
calculateButton.setOnClickListener(new View.OnClickListener() {
    @Override
    public void onClick(View v) {
        //blood donation time +56 day
        c.add(Calendar.DAY_OF_MONTH,56);
        String bloodDonationDate=DateFormat.getDateInstance().format(c.getTime());
        Toast.makeText(Calculate_Blood_Donation.this,"You can donate after:
"+bloodDonationDate, Toast.LENGTH_LONG).show();
        c.add(Calendar.DAY_OF_MONTH,-56);
    }
});

```

Table 17 Blood donation code

4.1.15 Blood Volume

Blood volumes mean the volume of blood in the circulatory system of an individual. Blood volume varies person to person and gender to gender. Blood volume is estimated to calculate the time of two subsequent donations and to see if you are donating more than is safe for you. Before surgery to give anesthesia, doctor should know about the blood volume. There are many ways to calculate blood volume by knowing the age, gender, weight and height of the person. A normal woman should be containing 5 liters of blood. Kidneys regulate the blood volume in an individual’s body.

$$BV = \frac{PV}{1-HC}$$

Where BV is Blood Volume, PV is Plasma Volume, HC is Hematocrit.

For Men: $(0.006012 \times \text{Height}) + (14.6 \times \text{Weight}) + 604$

For Women: $(0.005835 \times \text{Height}) + (15 \times \text{Weight}) + 183$

```
public void onClick(View v) {
    double bloodVolumeAnswer;
    int bloodVolumeWeight =
Integer.parseInt(editTextBloodVolumeWeight.getText().toString());
    int bloodVolumeHeight =
Integer.parseInt(editTextBloodVolumeHeight.getText().toString());
    float h=(float) bloodVolumeHeight/100;
    if (radioButtonBloodVolume_Male.isChecked()==true){

bloodVolumeAnswer=0.3669*(Math.pow(h,3))+0.03219*bloodVolumeWeight+0.6041
;
    }else {

bloodVolumeAnswer=0.3561*(Math.pow(h,3))+0.03308*bloodVolumeWeight+0.1833
;
    }
    textViewBloodVolume.setText(String.format("Blood Volume: %.2f",
bloodVolumeAnswer));}}
```

Table 18 Blood volume code

4.1.16 Body Fat

Scientifically the body fats named as adipose tissue. Adipose tissues have very significant function in an individual's body as it store lipids from which we take energy. Moreover, it secretes several hormones and also protects the body by insulation. The quantity of essential fats are vary male to female such as the male have 2 – 5% and women have 10 – 13%. For male a healthy range of body fat should be between 8 – 19% while in female 21 – 33%. To calculate the Normal body fats one should have information about the age, gender, height, weight, neck, forearm, waist, hip and circumference. Through this calculation one can estimate its body fat to be reduced to maintain a healthy body weight.

For Men: Lean Body Mass = (weight x 1.082) + 94.42 – Waist x 4.15

For Women: Lean Body Mass = (weight x 0.732) + 8.987 + wrist / 3.140 – waist x 0.157
– hip x 0.249 + forearm x 0.434

Body Fat Weight = weight - Lean Body Mass

Body Fat Percentage (BFP) = Body Fat Weight / weight

4.1.17 Waist to Height Ratio

Waist to height ratio is a common measurement in which one try to estimate the risk of overweight and lifestyle. Measurement of waist to height ratio has much popularity in the society of Science as most researchers have revealed that this is much better than the BMI. People like to estimate this measurement to prevent obesity and many other problems related to obesity. To calculate this one should know about the height and the waist circumference of an individual.

$$**WHtR** = \frac{\text{Waist circumference}}{\text{Height}} \times 100$$

5 Results and Discussion

This application was developed successfully. It contains four different but related functions from the health care segment. As mentioned above there is a lot of competitors in the health segment, but there is no many applications which have merge of different functions from this field, as usually, they focus on one function like workout or recipes. People prefer to have all functions in one application systemized and connected.

As mentioned above health care segment is huge on Google play store, to compare Healthy Lifestyle with it's competitors top applications from diet and workout were taken.

Weight Loss Recipes is one of the best Google play store diet application. It has simple, beautiful and user-friendly design. App has a wide variety of diet and weight loss recipes to choose from with nutritional information. user can find all sorts of diet, weight loss and sugar-free recipes from soups to main courses.

Both applications Healthy Lifestyle and Weight Loss Recipes has there own advantages. Weight Loss Recipes has better design and it's focused only on weight lose, while Healthy Lifestyle is multifunctional application and contains way more recepies.

Home Workout - No Equipment is one of the best Google play store workout application. It's provides daily workout routines for all main muscle groups. No equipment or coach needed, all exercises can be performed with just body weight.

Healthy Lifestyle is focused on home exercises like Home Workout - No Equipment application. Main difference is in design and functionality.

Mostly young people owned mobile phone as approximately 77% people aged from 16 – 24 years (OfCom., 2014). As the percentage of mobile phone ownership increasing rapidly so the mobile phone companies offering a lot of different software applications in the market. These applications are commonly give attention to improve health, as more the 100,000 health applications are available in the iTunes and the Google play stores (Research, 2016). These a lot of applications explores to both the wide market of mobile phone and the demand for the new applications to help people manage their weight loss goals, fitness, diet and the health care limitations to giving such resources. A recent research reveals that more than 53% mobile phone users like to use smart-phones and a half of these people use health applications to maintain their health and fitness (Fox S, 2012).

Mobile health application usages are increasing among the patients, health-care professionals and general public (Moorhead, 2013). These applications are playing a vital role in providing education to patients, self-management of diseases, patients' remote monitoring, and the dietary data collection (Zhu F; 2010, O'Malley, 2014). By using the mobile phone and applications consumer can easily approach the social media, and a number of people are utilizing the social media to attain health education with clear significances and limitations (Moorhead, 2013).

In spite of the more use of mobile phone and its applications and their potential to promote health, specific health app limitations are the lack of clinical effectiveness, lack of integration towards the health care providing system, the requirement of the formal review and evaluation and potential threats to privacy and the safety (Research; 2016, Knight E; 2015, Eng DS; 2013).

Today, the mobile phones are used as the medical devices for the health care, cancer care, infectiology, and ophthalmology. The mobile phone devices are used by the health care professionals that can be transformed the clinical practices through them. Mobile phone app are now becoming a commonplace in the settings of health care, that leading to the rapid development of the medical applications in the clinical field (Zhang D; 2005, Aungst; 2013). Nowadays, there are several health applications to assist the Health care professionals significantly in many fitness related task such as health-record maintenance and access, time management and information, consulting and communication, information gathering and references, monitoring and patient management, medical education, clinical decision making and the training (Zhang D; 2005, Aungst; 2013, Kiser; 2011, Ozdalga E; 2012, Yoo JH; 2013, O'Neill; 2013, Mosa; 2012, Divali, 2013).

Smartphone application can be used as the coaching systems that help to enhance the physical activity levels, as they have intertwined in the advanced society, always available for the user, because they can decrease the hindrance to overcome the health problems (Griffiths, 2006). Other than this fact several adults never meet to the desired activity guidelines, so the applications of fitness and health improvement are getting popular (Steel, 2016). Smart-phones refer a huge range of technological approaches, in addition to these techniques used in m-Health and e-Health, such as monitoring, telecommunication and any-time-any-place support (Middelweerd; 2014, Direito; 2014).

6 Conclusion

This paper shows the role of mobile applications in a daily healthy life. Application users can manage their daily routines. Create and control healthy habits.

The problem with trying to make exercise a habit, and it's something that everyone faced, is that people usually try to exercise 3 or 4 times a week ... and that makes creating a new exercise habit difficult. The reason is that the more consistent an action is, the more likely it is to be a habit.

For creating good and healthy habits people need to repeat and repeat the same action every day. Study shows that for creating habit need minimum 21 days or more for workout it's six weeks. Reminder helps the user to control his routine, by sending a notification every day at the same time.

One of the most important things for a healthy life is diet. If people who workout don't follow the diet, they can't achieve their dream bodies. Study shows that to lose weight only workout is not enough more than 70% depends on diet. With this application, users can select a different kind of diets and search for recipes.

In workout section, there is 8 kind of different workouts for beginners, abs push-ups and so on. It's focused on home exercises, not for the gym. Regular physical activity can improve muscle strength and boost endurance. Exercise delivers oxygen and nutrients to tissues and helps your cardiovascular system work more efficiently.

In calculating section users can find almost everything related with healthy calculations body mass index, daily calory intake, body fat and so on. This section gives user information about his current and ideal state. By getting this information user can decide what kind of diet and workout he needs.

It should be mentioned that during the development of this application focus was on audience interests. Application is user-friendly with a simple interface and it's a merge of related functions from healthy industry.

7 References

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