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HEALTH CARE MANAGEMENT SYSTEM

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ABSTARCT

The primary goal of this study is to develop an android-based healthcare application, which can assist the users to monitor their health-related conditions for improving their health. Methods: The application is developed using android operating system environment. A Visual block programming language, namely MIT App Inventor is used to develop the system. The modification is presented as: (1) integration of different modules and their offline usage, (2) history facility, (3) user friendly. The qualitative method is used to study the objective. Findings: The research paper depicts a brief study of existing systems and the new development that has made in the application and also it is better in the manner that it works as a guide to control risk factors. The descriptive analysis point outs that the application is effective to deal with health related issue. Applications/Improvement: Integration of modules is performed on the android platform of different applications that are located on different websites, the storage facility is added by using Tiny DB, guidance in the form of charts and text is provided to the users. Such features are not provided in the previous work.

KEYWORDS—Health Care; App Inventor; Android; Diabetes; Target Heart Rate.

INTRODUCTION

The Expert System (ES), namely Computer Assisted diagnosis for red eye (CARDE) is proposed by [1], which assists the patients in the treatment of Red eye disease. It works like an ophthalmologist and it is not limited to only red eye diseases, but can be extended to diagnose other diseases.

A Web based expert system is proposed by [2]to diagnose red eye disease and to provide prescription with it. This system typically diagnoses disease, of the eye in which red eye is a common symptom. It has an attractive and easy to use graphical user interface.

[3]Proposed an ES to diagnose skin diseases. This system can diagnose almost 13 types of skin disease. This web based expert system can be enhanced to diagnose all types of skin diseases.

An automated alarm ringing system is developed and its center of interest is the interaction between doctor and patients. The description of medicines, date and time can be set by patients through an alarm. They received the notification through an email or messages [4].

There is a persistent disease known as diabetes mellitus, increasing globally that is caused due to the relative deficiency of insulin. Therefore, android based diabetes management health care application is developed, which helps in diagnosis and treatment of diabetes as well hypertension [5].

Chronic health patients suffer from multiple ailments, however, different patients have different such ailments. The objective of this project was to design and prototype a health monitoring system that has a capability to monitors multiple diseases [6].

An application, namely “smart carb”, is developed based on an Android OS for the management of Type2 diabetes. If the patients do not manage their diabetic level then it will lead to many complications; and if it is not treated properly, that it may even lead to death. In order to manage diabetes to avoid these complication, this application was developed [7].

Due to the refinement of wireless mobile technologies in the erstwhile years, the need for mobile data services has been aggravated dramatically. The location of the user can also be obtained to provide better facilities to the users by the service provider. However, it also has some issues like needing an approval of user privacy, standardization, and accessibility of smart services [8].

There are many systems on the health-related content analysis in the context of opinion mining and sentiment analysis [9, 10, 11,12], however, most of such studies are web-based and address the user generated contents. In addition to aforementioned studies, there are recent works [13, 14, 15, 16,

17, 18, 19, 20] performed for developing healthcare applications, which assist the users in taking care of their health. In this work, we present the development of an android-based health care application using the MIT App inventor software [21]. Nowadays, health related issues are getting common due to hectic daily routine and unbalanced diet. Therefore, it is an important task and a need to develop an android application that could assist the users to keep themselves aware of their daily activities including diet, exercise, and glucose level, B.P reading etc.

We have integrated different modules into one android application that were located on different websites such as calorie level, Target heart rate, blood volume, diabetes [22].

MATERIAL AND METHOD

The materials used to develop the software are as follows: (1) Window 8.1 Haier laptop, (2) MIT App Inventor 2 Software, (3) Samsung Tablet and (4) Infinix X551Android Cell Phone.

The experimental setup section presents detail about the implementation and evaluation of the proposed system. As described earlier, we developed the software using MIT App inventor and tested the apps in Bluestack emulator. To evaluate the effectiveness of proposed system, a web-based survey is conducted. The proposed system is given below.

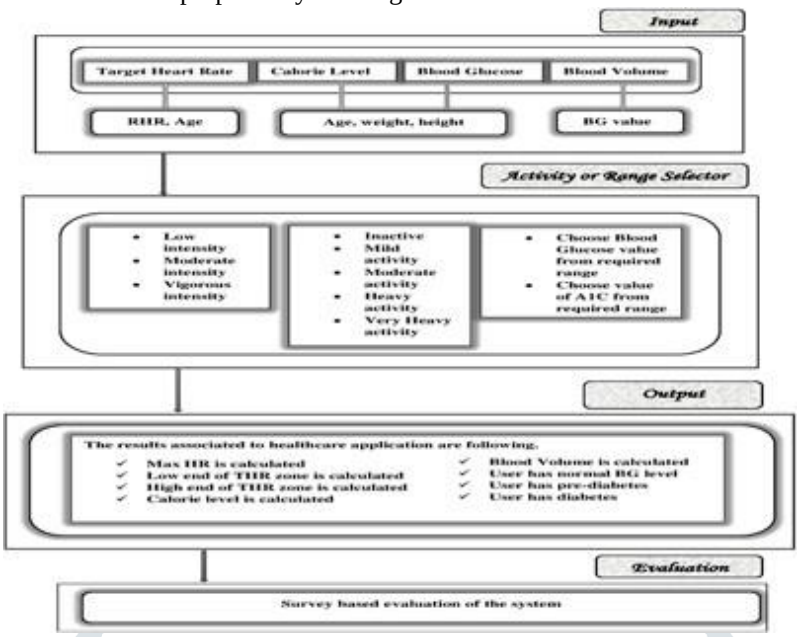


Figure 1. The proposed system

Target Heart rate: In the following code blocks Fig. 2, we used two text boxes to enter age, and resting heart rate, where age and resting heart rate are the variables. Also, a procedure is used to display the output: upper and lower limit of target heart rate; and a button is used to call a procedure. The clock component is used to display the current date and time.

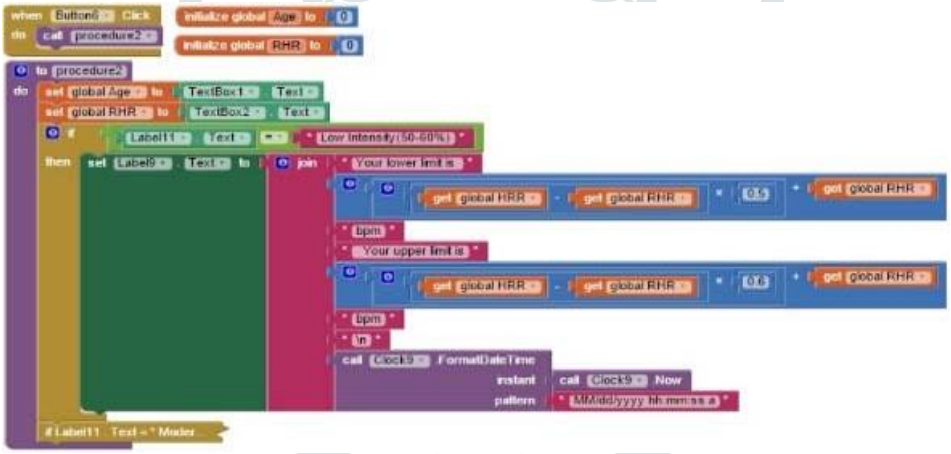


Figure 2. Code block for input and output of target heart rate

Calorie Level: The Spinner component provides the choice of male and female to the user. There are three variables age, height, weight that are initialized. Button 7 is used to call the procedure. The value of age, height and weight are entered in the textbox. A label is used to display the output that is used to determine the calorie level in the human body. The clock component is used to present the current date and time, below is a partial set of coding Fig. 3.

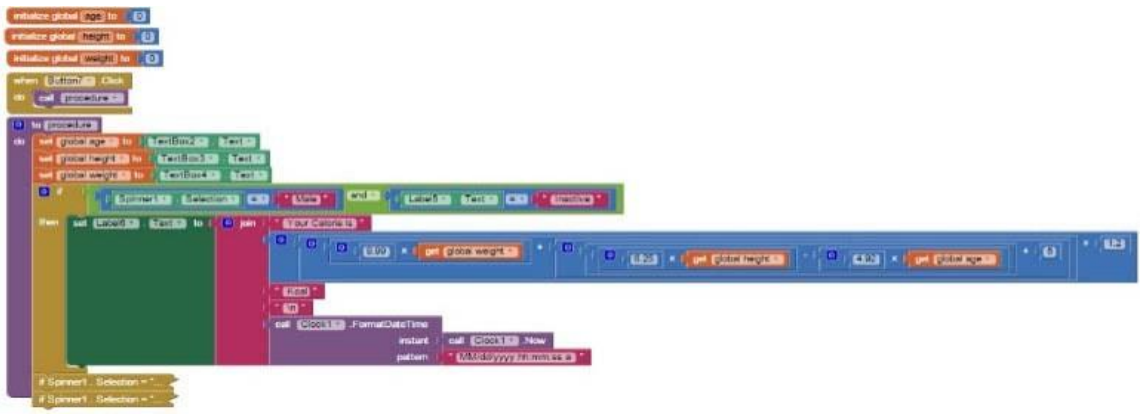


Figure 3. Code block for input and output of Calorie level

Blood Volume:In Fig. 4 the partial code blocks for blood volume module is presented, where a button is used to call a procedure to initialize three variables: cm, height and weight. The procedure textbox invites users to enter height and weight

,spinners for selection of gender, and labels to display that how much blood is in the human body.

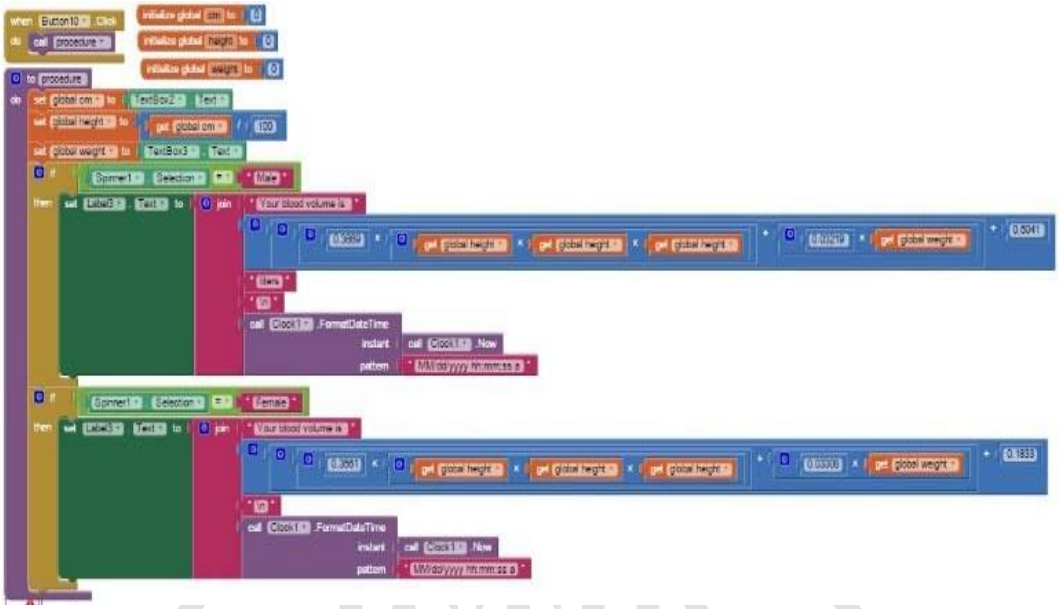


Figure 4. Code block for input and output of Blood volume

Diabetes: The diabetes module code blocks has three list pickers to display a list of items for assisting the user to make a selection from a list. A button is an event handler in which variables, list picker, and labels are used to exhibit the output in terms of blood glucose level, which is either normal, pre diabetes or diabetes. Similarly, for Random blood glucose level, three list picker are provided and a button event handler, which executes a sequence of commands; and also for HbA1c test type, a button contains spinner component that gives a list of choices to the user for making a selection. The partial code of blocks is shown in Fig. 5.

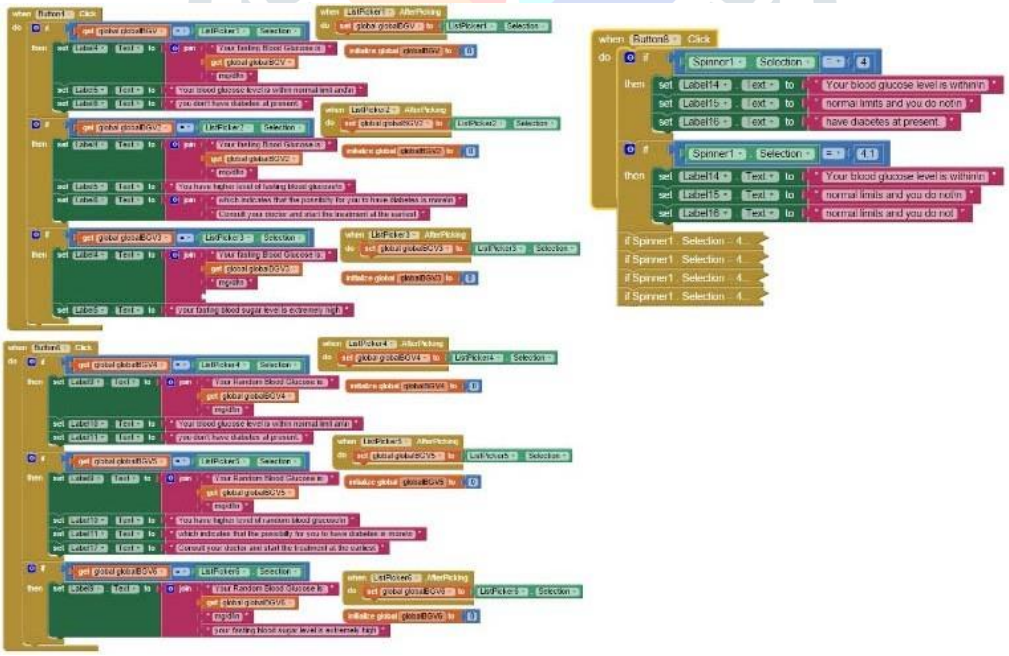
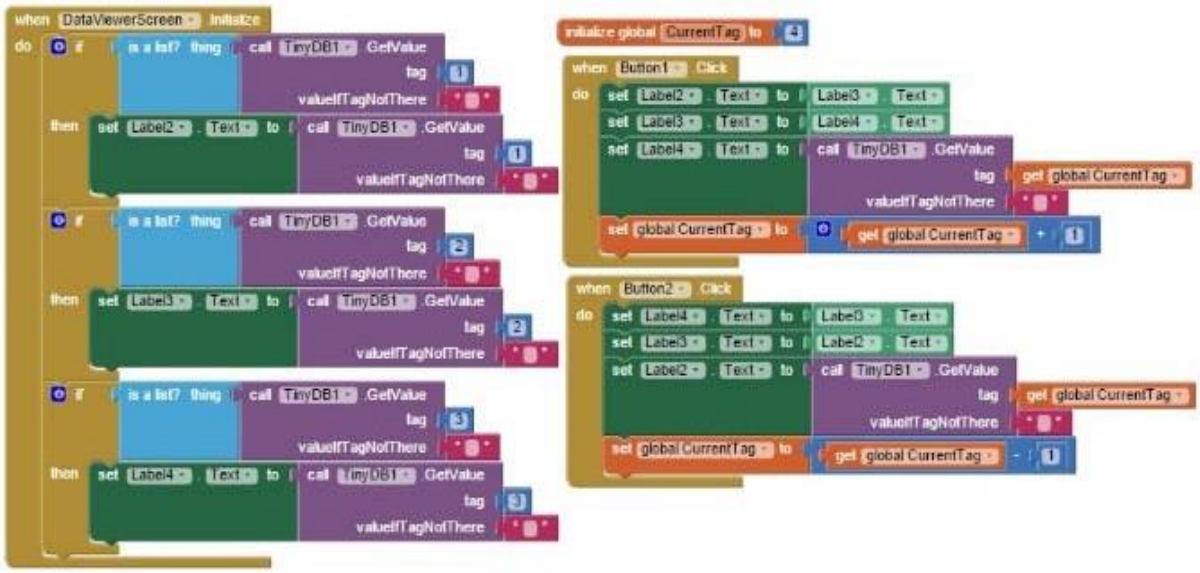


Figure 5. Code block for fasting blood glucose, random blood glucose andhba1c test type

Data Viewer Screen: Below is the partial code blocks Fig. 6, which are used to store data by using tiny DB. It involves Data viewer screen and a button event handler. Labels are used to display the results of all the modules that are stored in tiny DB. It helps the user to organize the history of their records.

Figure 6. Code block for data viewer screen



Methodology

The proposed system is comprised of four modules, namely
(1) target heart rate, (2) calorie level, (3) blood volume, and
(4)diabetes. The flow chart of proposed system is described in Fig. 7.

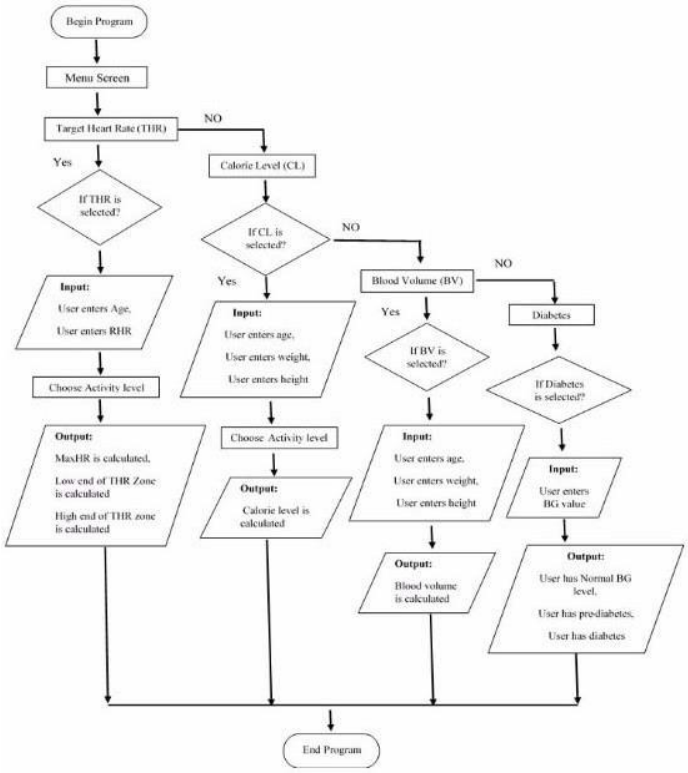


Figure 7. Flow chart of proposed system

RESULTS AND DISCUSSION

We executed our healthcare application using android based platform, which encourages users to nourish their health and improves their healthy habits. Visual block programming language is used for the development of the application. Fig. 8 shows menu screen of our application, Fig. 9 to Fig. 13 show input and output of our application and Fig. 14 shows the data storage screen of our application.

Figure 8. Main menu screen

SHOWING THE GENDER-WISE BASIC STATISTICS

Sr.no	Basic Statistics				
	Minimum	*Maximum*	*Median*	*Mean*	*Standard deviation*
1.	1.00	4.00	2.00	1.83	0.37

The minimum and maximum mean the smallest and largest number answer choice that collects not less than one response. It is useful to find the range of answer by subtracting the minimum and maximum. In Table I, minimum (1) and maximum (2) presents that there were 5 responses in the uppermost answer (i.e. Male) and 25 responses in the lowermost answer (i.e. female). The answer choice that is in the center of all responses shows a median, means there is 50% response before median are smaller and 50% response after median are larger. The median of 2.00 (higher than the
1.83 mean) shows that there were more respondents who were Female than respondents who were Male. The mean gives the average of entire responses by adding all number answer choices and then divide them by total amount of number. In this case, a mean of 1.83 represents the overall respondents came in somewhere between Male, and the Female. Finally, the standard deviation shows the growth or alteration of your responses, so here the standard deviation is 0.37.

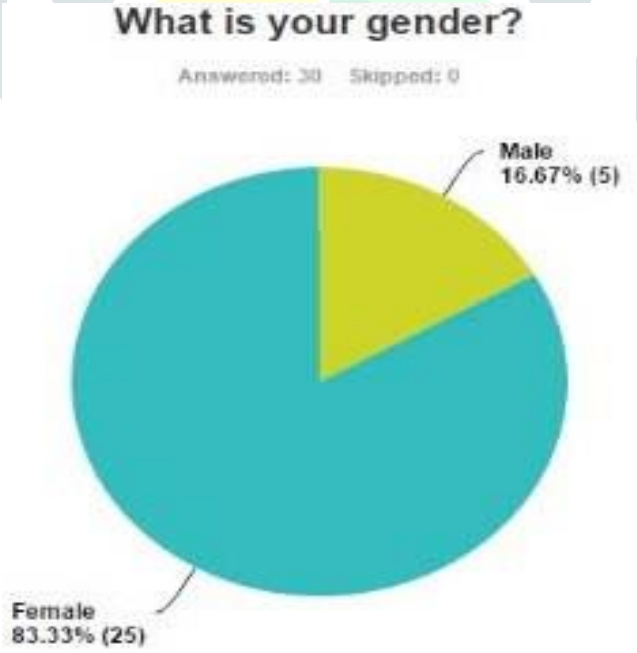
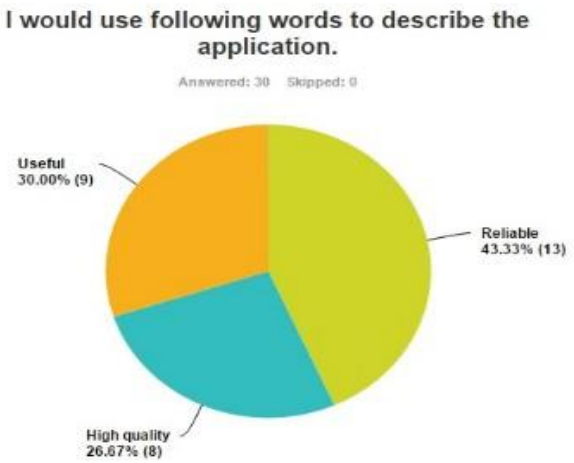


Figure 15. Pie Chartof gender

In the Table.IX, minimum (1) and maximum (3) presents that there were 13 responses in the uppermost answer (i.e. strongly agreed) and 2 responses in the lowermost answer (i.e. Satisfactory).The median of 2.00 (higher than the 1.63 mean) shows that there were more respondents who were agreed than respondents who were strongly agreed. In this case, a mean of

1.63 shows that overall respondents came in somewhere between strongly agreed, and the agreed. Finally, the standard deviation shows the growth or alteration of your responses, so here the standard deviation is 0.60.



Sr. no	Excel Data Analysis												
	Mean	*Standar dError*	*Median*	*Mode*	*Standard Deviatio n*	*Sample Varianc e*	*Kurtosis*	*Skew-ness*	*Range*	*Mini-mum*	*Maxi-mum*	*Sum*	*Count*
1.	1.896	0.109506	1.815	1.6	0.346288	0.119916	-0.49301	0.9092	0.97	1.53	2.5	18.6	10

- T

Questionnaire

Fig. 25shows the questionnaire of an individual respondent in order to obtain the feedback and also to analyze the result. The respondent chooses one option from multiple choice.

•A question was asked from the respondent to gather information about the performance of application that whether application helps them to keep track of their diet. So,

33.3% respondents were strongly agreed that the application is helpful to maintain their diet, while 53.3% respondent were agreed with the statement, 33.3% respondents were satisfied and there are no respondents that disagree with the statement.

•The objective of the Second question was to get respondents views about the integration of module. The separated modules arexcombined or coordinated into main application so respondents look at the integration that it is well organized or not.

62.23% respondents were strongly agreed with the statement,20.00% respondentwere agreed with the statement that module were well integrated while at the same time 16.67% respondents were satisfied with the statement moreover no respondent were found who disagree with the statement.

16.67% respondents strongly agreed that application is helpful to control blood glucose level. There are 56.67% respondents who consider that application is helpful to control blood glucose level, 23.33% respondents found application satisfactory to control blood glucose level, 3.33% respondents disagree with the statement.

From the above questions we conclude that the users find that the application is beneficial to maintain their health

CONCLUSION AND FUTURE WORK

The main purpose and focus of developing the healthcare application is to help people to maintain their health. This healthcare application includes the four modules, namely (1) Target heart rate, (2) calorie level, (3) blood volume, and (4) diabetes app.

The first module describes the pulse rate (in beats per minute) that allows the user to exercise safely while getting the maximum benefits from your workout. It includes THR zones which range from low to vigorous i. e (50 to 85) % of MaxHR.

The second module is the calorie level, all essential process of our body, uses this measurement unit of energy. In order to encounter the energy needs of our body the speed at which the calorie is used alters continually. Throughout different phases of life, it changes from individual to individual. It is used to determine the caloric needs based on the age, weight, and height and activity level.
The third module is the blood volume, which reflects the amount of the blood in human body. This app assists in answering about how much blood is in the human body, more precisely in your own body depending on the height and weight.
The fourth module is the diabetes app tells about that when the body does not properly use or store glucose. Its records, the blood sugar readings, and assists users to track their diet properly.

Future Work: In the future, we will integrate more apps to our main application to make it a more sophisticated auto-help tool and to provide a wide range of facilities to the end user. These apps will include: (1) Measuring blood pressure and Measuring Weight of the body, (2)Provide reminders to users about their medications which help them to take medicine on time. Therefore, through these reminders, the user can take care of their health, and (3) Graphs of the output obtained will help the user to keep track of the changes in diabetes-related readings and to manage their diet and health in a more effective way.

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