Analysis, Design and Implementation of Diet Control System

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Abstract

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The diet control system is a package to establish the best communication between dietitian, user, and admin. This work can give a flexible opportunity for the people who do not want to worry about time. The research is started to get in touch with various dietitians to understand their works. This consultation is used during the system analysis and design stages to determine deficiencies and redundancies. Things have become even more complicated when we deal with many dieters. Because in diet systems, analysis results are given irregularly only with papers. We have seen this for a long time and have seen various complaints. Moreover, the dieter has difficulty reaching the previous measurement results and dietary lists. Within the scope of our study, we considered these kinds of problems and our system can solve them easily. After analysis and design stages, the system is implemented using C# based on SQL. The dietitian has been provided better services by offering various possibilities; one of which, when a dieter asks for a measure, he or she is given the opportunity to access the desired measurement and diet information from anywhere. The dietician has also been able to display past diet lists, analysis results on the same screen, and to write the new diet list more efficiently. The most important feature is that the dieters do not waste time and money.

Keywords: Diet system, C#, SQL, dietitian, user, admin.

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1. Introduction

The most valuable thing we can have throughout our lives is our health. One of the basic steps of being healthy is adequate nutrition. Nutrition is the ability of the body to take in enough quantities of nutrients that are necessary for a person to grow, develop, maintain healthy and productive for a long time. Scientific studies have shown that when any of these items are not taken or taken more or less as needed, growth and development are prevented and health is impaired.

Nutritional behavior is the inevitable result of being alive and is being sustained for life. There are periods in which the structures of the buildings, if any, have their basis for human behavior. Early ages are very important for this. When we are based on nutritional behaviors and when we have the right behaviors in our lives, we are less likely to encounter health problems later on. If we have made the wrong nutritional behavior, then we will be dealing with the health problems created by obesity, unbalanced and unhealthy feeding.

Healthy eating is also important for good brain function. Inadequate and unbalanced nutrition reduces the ability of a person to study, plan and create. Countries that think and create are needed. It is one of the first conditions of economic development, productive and a hard working society.

The increase in consumers' demands for food that is rapidly consumed today, on the other hand, is the result of diminished physical activity and wrong eating habits; cardiovascular diseases, digestive system diseases, obesity, diabetes and intestinal diseases. The most noticeable of these major diseases is obesity [1]. The obesity of children has increased dramatically in recent years and is now considered a global epidemic [2, 3]. It has adverse health consequences [3, 4] and there is an urgent need for population- based interventions aimed at prevention [5, 6]. Besides all these, diabetes, hypertension and high cholesterol are among the top 10 causes of death in the world [7]. Nutrition plays a very important role in these diseases. Dietitians are also particularly needed. The effect of the system used by a dietitian as well as a dietitian in a successful diet is obvious. The main purpose of this study is to close the missing dietician system and to provide better service to the client and to prevent various health problems.

The study started with various researches. Several dieticians were contacted and various questions were asked and the systems used by them were examined and the deficiencies were determined accordingly. During this time the dieter's wishes have been taken into account. C # and SQL are used in the system. In general, there are 3 modules and 3 sub-menus in the system. These are shown below in Figure 1.
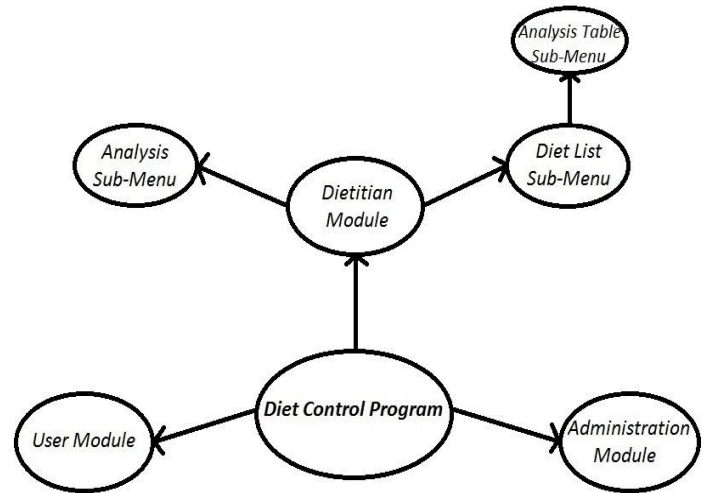

Figure 1. Diet control system

Rather than saving diet systems in separate word files, a database is created and the information is stored automatically. In the system that is created, the dietician creates a diet list for his / her client and can look at both the past analysis results and past diet lists at the same time and make more accurate decisions. In the module defined for the consultant, various services are offered. The person is able to see the results of the analysis on the desired date and reach the diet list. It has been given the opportunity to follow its own development in a comfortable manner from the system. Admin can remove dieticians or consultants from the system. The diet control system provided more opportunities than today's dietician programs. In the old system, the client does not have an interface. The results are given in papers. Thus an irregularity occurs. This affects success. This has been overcome with the new system.

2. Mathematical Background

2.1 Body Mass Index

Body Mass Index is used to calculate individual body fat based on his or her body weight and height. The formula is very simple and universally used. BMI formula 1 can be calculated dividing body mass to individual's square of height [8].

$$BMI = mass(kg) / height(m)^2 \qquad (1)$$

2.2 Basal Metabolic Rate

Basal metabolic rate (BMR) refers to the energy that your body makes during a routine rest. This rate is the calorie value burned during a day. Knowing the basal metabolic rate gives us an idea of the amount of calories we need in our days of training or rest. Factors such as age, gender, body type and living conditions are influential in the calculation of basal metabolic rate. The rate of basal metabolism is higher in younger

individuals, and this tends to decrease as age progresses. BMR formula 2 is given for men in 2 and 3 for women.

BMR men = 66 + (13.75 x weight in kg) + (5 x cm in height) - (6.8 x years)   (2)

BMR women = 655 + (9.6 x weight in kg) + (1.9 x cm in height) - (4.7 x years)   (3)

Today, however, these are automatically calculated by the machines used by dietitians.

2.3 Total Calories

The calorie requirement consists of three main components: "basal metabolism", "energy spent in exercise" and "energy consumed in the digestion of food taken with diet". The greatest determinant of your calorie needs is the rate of basal metabolism. This includes a number of calories consumed when resting or sleeping, i.e. when no activity is shown and accounts for 60 to 80 percent of the daily calorie expenditure. Physical activity is also the most important factor in energy consumption, weight gain and loss. If you increase your physical activity, you can increase your metabolic rate so you will need your daily calorie. It is calculated using Formulas 4.1 and 4.2 as follows.

Total Required Calories = Basal Metabolism Activity Factor x BMR x Number of days the diet is valid   (4.1)

Or

Total Calories = Activity Calories + Sport Calories   (4.2)

3. Modules of Diet Control System

Diet Control System contains a main menu with different sub-menus and modules. In sub-sections, the modules can be given in detail.

3.1 Dietitian Module

The dietitian can perform different operations on various interfaces. On the first entry page, the incoming client can see if it is already registered and if not, create a new one. If it exists, it can also update its information. This is shown in Figure 2.
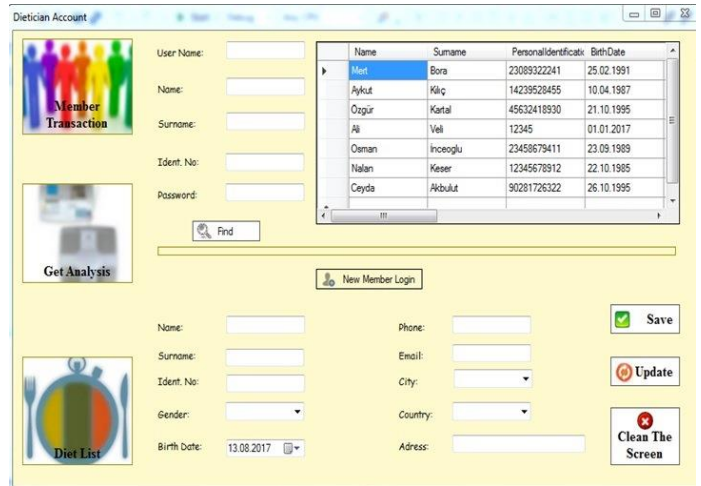

Figure 2. Dietitian module

On this page, the dietician can search the patient's record. At this point, the records in SQL are mapped. If there is information on the screen. Otherwise, the new record opens. Information can be updated with the update button. Similarly, it can be cleared with the clean button. This module also belongs to various sub-menus like analysis and diet list.

3.1.1 Analysis Sub-Menu

The dietician can go into the system of information he / she has received from this interface and transfer it to the information database. Previously mentioned mathematical formulas like BMI, BMR, total calories are done automatically. Some values (labelled B) have been made more noticeable in the Series chart as shown as in Figure 3.

Figure 3. Analysis sub-menu of dietitian module

The dietician enters the measurement results of the client into this page and the information is transferred to the SQL by the save button. The information is updated with the Update button. Clean the page with the clean the screen button.

3.1.2 Diet List Sub-Menu

In this interface, the dietitian can look past the old diet lists. Accordingly, it may create a new diet list. At the same time you can see the results of past measurements when you click on the button above (see analysis table). It can be seen in Figure 4.

The dietician can access the client's old diet lists. With Fetch the data key, the information in SQL is transferred to C#. On the side, the newly entered diet list is transferred to the database with the save the data key.

Figure 4. Diet list sub-menu of dietitian module

3.1.3 Analysis Table Sub-Menu

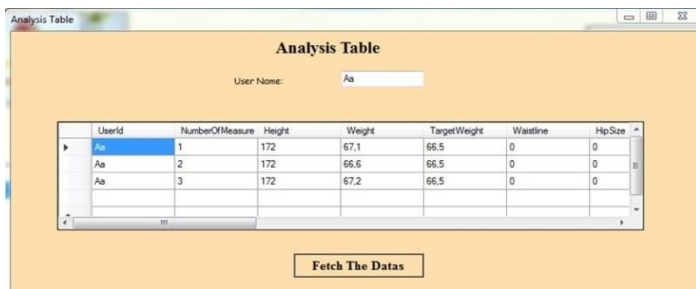The dietician can make various assessments based on the client's past measurement results as shown as in Figure 5.

Figure 5. Analysis table sub-menu of dietitian module

Fetch the data to transfer the analysis information of the client to the table from SQL.

3.2 User Module

The counsellor in Figure 6 can change the password given to him/her here. It can also reach diet lists and analysis results.

Figure 6. User module

The client can update the password. It can change the password stored in SQL. With the Fetch the list button, the diet list is transferred from the SQL. By clicking on the See the analysis button, past analysis results are displayed from the database.

3.3 Administration Module

Admin in Figure 7 has the authority to delete members. A dietitian can add a person.

Figure 7. Admin module

Admin has the authority to delete users. Delete key is deleted from the user database.

4. Conclusions and Future Works

Within the scope of the project, the requirements are generally reached. A variety of additions have been made to the existing old diet control system. Extra interfaces have been added and access to the data has been facilitated. At the same time, data security is provided. Because a more systematic order has been achieved. This prevented the loss of information. A healthier system has been created. In addition, various implications could be made by taking advantage of data mining. For example, various analyzes can be made according to the data held in the database or the change in seasonal metrics can be viewed. This will show how a season can affect measurements. In addition to this, according to the eaten food, the inferences can be made and the other dietary list can be changed accordingly. At the same time, interpretations can be made by looking at the differences between dietitians and their clients. According to the changes, the performances of dieticians can also be evaluated.

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