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1. Introduction

1.1 Need

Today's generation are facing many health related problems like obesity, high blood pressure, skin problems etc. The busy life schedule brings out these issues of unhealthy life. Approximately 1.9 billion people worldwide are overweight and over 600 million of them are obese.[1] These conditions increase the risk of health problems, such as hypertension, type-2 diabetes, coronary heart disease and many more. Therefore, it is important to arrange composition and serving suggestion to obtain balanced nutrition. Balanced nutrition mean fuelling ourselves with right things, right amount, and in the right time, to achieve a healthier body and immune to disease. [1] Food recommendation is one of the solutions to obtain optimal nutrition. A good recommendation can be achieved using appropriate optimization method.

1.2 Basic Concept

Food provides the energy and nutrients you need to be healthy. Nutrients include proteins, carbohydrates, fats, vitamins, minerals, and water. Not all the nutrients and other substances in foods that contribute to good health have been identified, so eating a wide assortment of foods helps ensure that you get all of the disease-fighting potential that foods offer. In addition, this will limit your exposure to any pesticides or toxic substances that may be present in a particular food. [2] Eating more fruit and vegetables, along with high fiber foods and low-fat dairy products daily, will improve your health. Calories plays an important role in people's diet as more calorie in their food can make them gain weight .Also, high calories diet can have major bad effects on your health. [3] So we need to arrange all the nutrition's in such a way that we would get the proper diet.

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1.3 Applications

- It will be useful to solve the health related issues.
- It can be useful in Gymnasium and Yoga Centre to record and analyse the performance.
- It helps user to get the nutrition values by eliminating the need of nutritionist.
- It helps user to track day to day healthy routine.

2. Review of Literature

Fidelson Tanzil, Lili A.Wulandhari propose system which provides the user food options in accordance to the user's BMI, healthy immune system and calorie intake. And the system will avoid the food option which will not be suitable for the user based upon the user information. The optimal solution obtains from fitness function, which is the difference between nutrition needed and nutrition suggested must minimum as possible. [1]

The Multi Armed Bandit (MAB) problem constitutes a special class of decision–making problems that focus on the trade–off between exploration (explore decision options with the prospect of better rewards) and exploitation (continue with decision options that are probingly associated with high rewards). [2]

Neha Gaur, Archana Singh proposed system which explores and recommends a model for systematic diet and healthy food. The proposed recommender system would help youth to maintain their healthy food habits which in turn would increase their energy and efficiency of work. The paper proposed the recommender system keeping various significant parameters as age, genetic disease, gender and recommended the right amount of calorie intake considering various situations. [3]

Daphney–Stavroula Zois, proposed system based on MAB formulations can used among others to model medical tests performed to individuals This paper focus on designing on recommender system which assists the daily routinely diet selections depend on some nutrition guidelines. It takes the user's profile, food taken by and nutrition database and some additional knowledgebase. [4]

Colin Patch, Bruce Gooch propose an exercise data logging system that collects data. Logging exercise data can help individual to keep track of their fitness progress and to plan an exercise history allows users to visualize their accomplishment as well as inactivity thus provide feedback and motivation. [7]

Silviu-Ioan Bejinariu, Hariton Costin, proposed system based on optimization problems, nature inspired algorithms are able to generate near optimal solutions faster than other optimization algorithms. ABC algorithm can be used for multimodal and multivariable optimization having the ability to avoid the local solutions and get the global one. [8]

3. Report on the Present Investigation (Existing System).

Instead of hard focus on the normal weight and lean body through artificial dietary plans healthy body should be the major priority in day to day life[3].There are many health related blogs and articles are available on the internet. And it mainly focused on particular type of nutrition only. So the users get confused and could not decide which method should follow. There are lot of difficulties user has to face while searching for the suitable exercise according to parameters. If the user is not regular in physical activity and he/she wants to track their activity data then user will be unable to do this. The data available related to nutrition and exercises over the internet is not so accurate. If user wants to prefer any expert then it will be cost his/her money and time also

4. Aim and Objectives

4.1 Aim

Currently users don't have one independent platform from where they can get expert details about nutrition and exercise activity both**.** So the main motive is to develop a system which will help user to maintain healthy food habits and fitness of the user.

4.2 Objective

- User will get the single platform where they can enter their input parameters and accordingly the best suitable suggestion will be shown.
- One of basic Objective behind designing system is that any non-expert user can also get the recommendation about the food.
- Aim behind using artificial bee colony algorithm is, the performance from ABC was better than other techniques; although it uses fewer control parameters.
- User's input parameters can change by time, so system will help him/her getting better recommendation by selecting best nutrition values.

5. Problem Statement

The long hours working style, wrong eating habits in people like fast food, unhealthy, junk food and excessive usage of media has caused various health related issues like Heart attack, stress, and hypertension. In daily busy schedule peoples don’t get time for systematic and proper diet and better fitness exercises and also there are lots of options available over the internet that provides such all information and suggestions.

To overcome this problem the idea is to provide optimal solution by using Recommender System Algorithm.

6. Proposed Work for System

The recommender system aims is to suggest proper diet and exercise to the user. Various steps involved in algorithm are input detection, BMI and BMR calculations, data comparison, data segmentation and extraction. The extracted data will be stored in a separate database and finally data will provide to user as per their requirements.

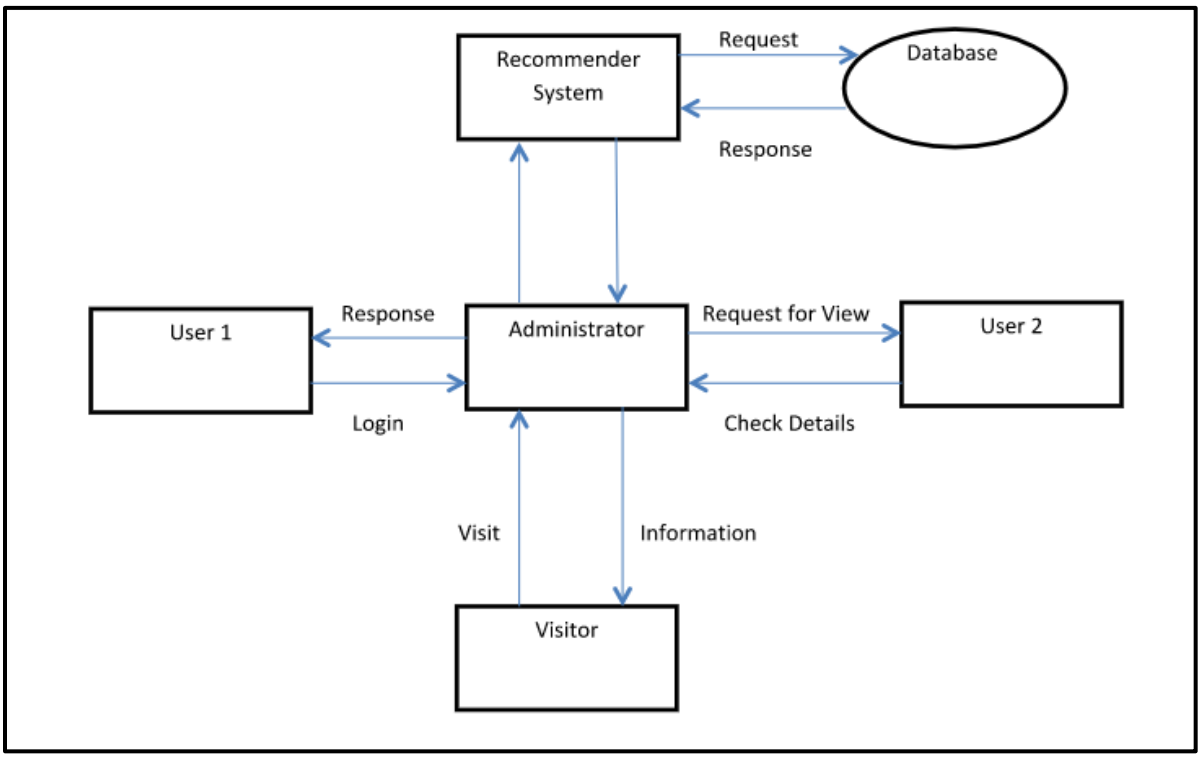

Figure 6. 1 Basic Working of system

We are providing suitable user login and registration form where user can put his personal information such as name, address, mobile number and late user get system generated user id and password. Visitors can take one time trial of system by putting inputs without creating user id and password but for more product information and suggestion they must need to create his own user id and password. After getting suitable inputs from user our system will calculate their BMI and BMR using particular formula. According to users BMI and BMR our recommender system will apply ABC algorithm to suggest matching data (diet and exercise plan) from our database to the user. User can also maintain records of daily/weekly diets and exercises and measurements details in his personal account, where he can access all these information anytime and from anywhere.

7. Requirement Analysis (SRS)

Many times there is a situation where user wants to search information related to his proper diet and exercise to become healthy in day to day life. There are lots of options available over the internet (websites, Blogs) which provides all this information but user need to copy the information from the various websites, he has to do it manually using pen and paper. To overcome this limitation we have proposed this system.

- Functional Requirements:

1. Selection of duration for processing algorithms.
   The user can select Diet and Exercise related information according to his choice. This will enable the user to extract the data which is required by him.
2. The filtered data for users requirements is totally depends on the body measurements i.e. BMI and BMR which our system take from user as input .Hence it is the responsibility of user to enter perfect and valid data and also select the required option which will directly affect the accuracy of the data.[3]

- Non Functional Requirements:

1. The GUI for the system will be designed in such a way that a person not from a technical background can easily understand the functionality of the system.
2. All the data necessary for output that we will take from food experts or diet recommender doctors and then we will put it manually inside our system database.

8. Scope (Feasibility of System)

The feasibility analysis of system:

1. OPERATIONAL:

- The system will be user friendly and hence it does not require High Level Technical Knowledge of Computers.
- The system will be flexible and can be extended.
- We will try to reduce errors to great extent.
- The system will have user friendly Interface and can be easily used without any special usage knowledge**.**

2. TECHNICAL:

- The System will have minimum hardware and software requirements. It runs on Windows XP, Windows 7/8/10.
- The application does not require huge amount of memory and makes optimal usage of RAM.
- The application does not require additional graphic card for processing video and hence works efficiently on most of the computers.

3. ECONOMICAL:

- The system can be implemented even with the use of home PC.
- The system automates the manual process that saves a lot of money in terms of time and human efforts.

9. Design Details

9.1 Context Level diagram

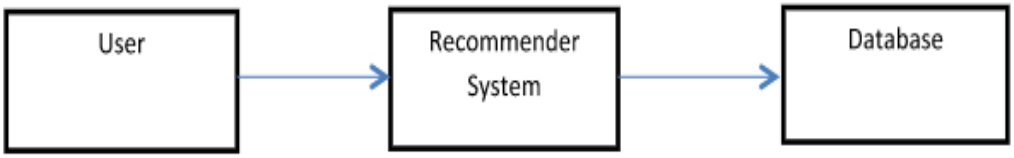

Figure 9. 1 Context Level diagram

9.2 DFD Diagram

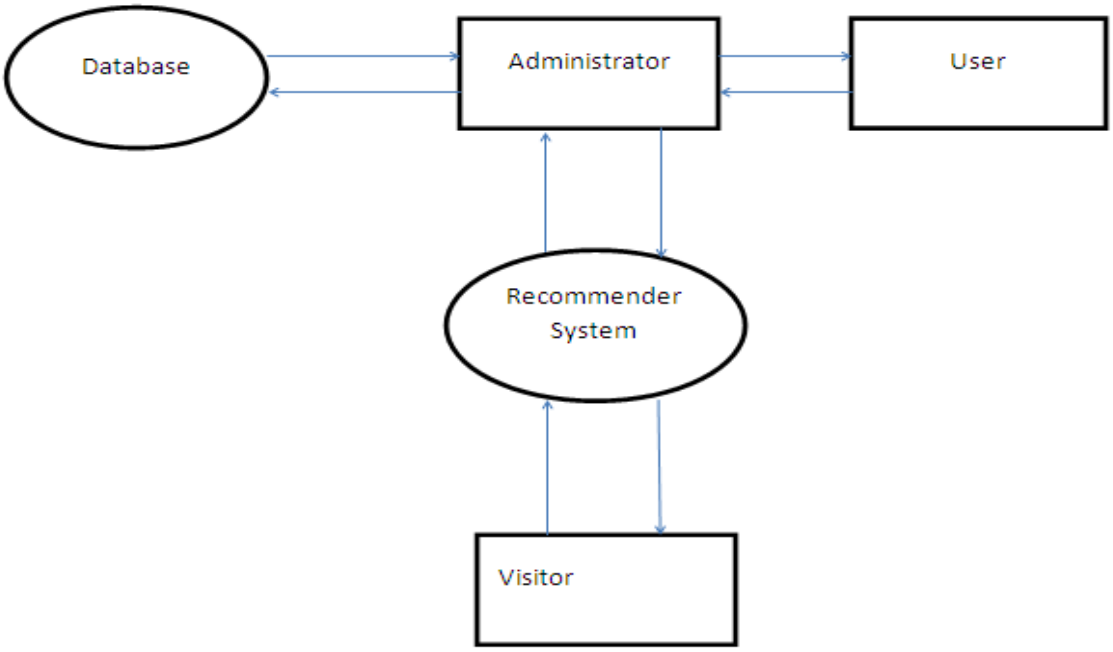

Figure 9.2. 1 Level 0 DFD

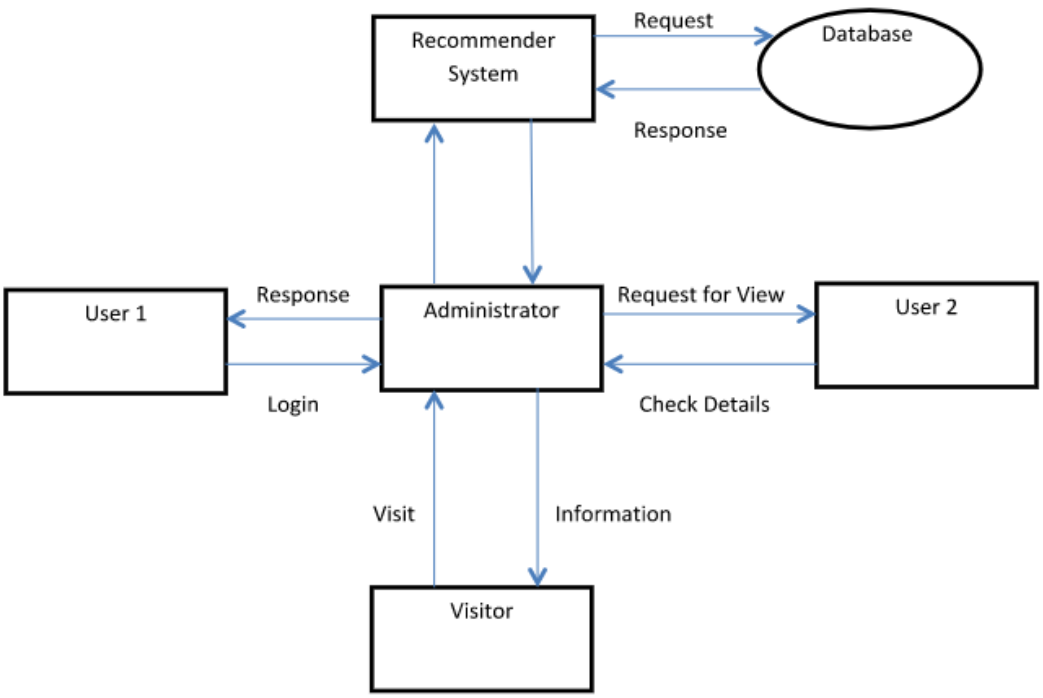

Figure 9.2. 2 Level 1 DFD

9.3 Sequence Diagram

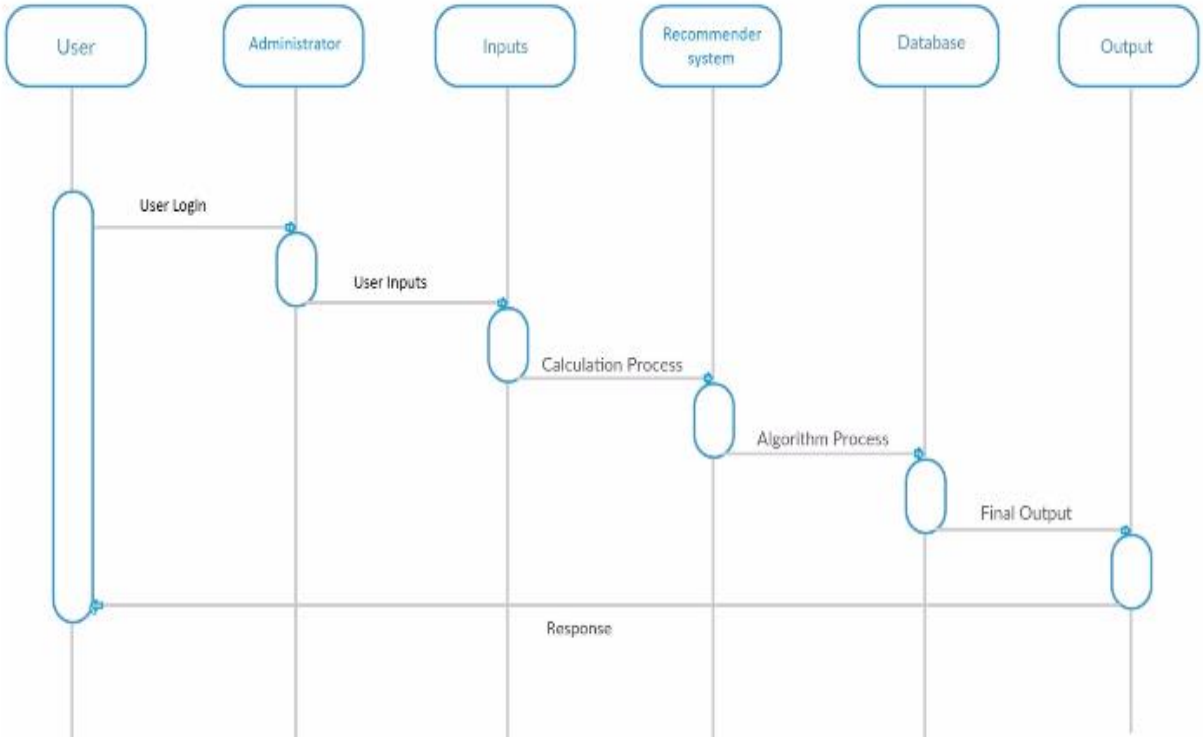

Figure 9. 2 Sequence Diagram

9.4 E-R Diagram

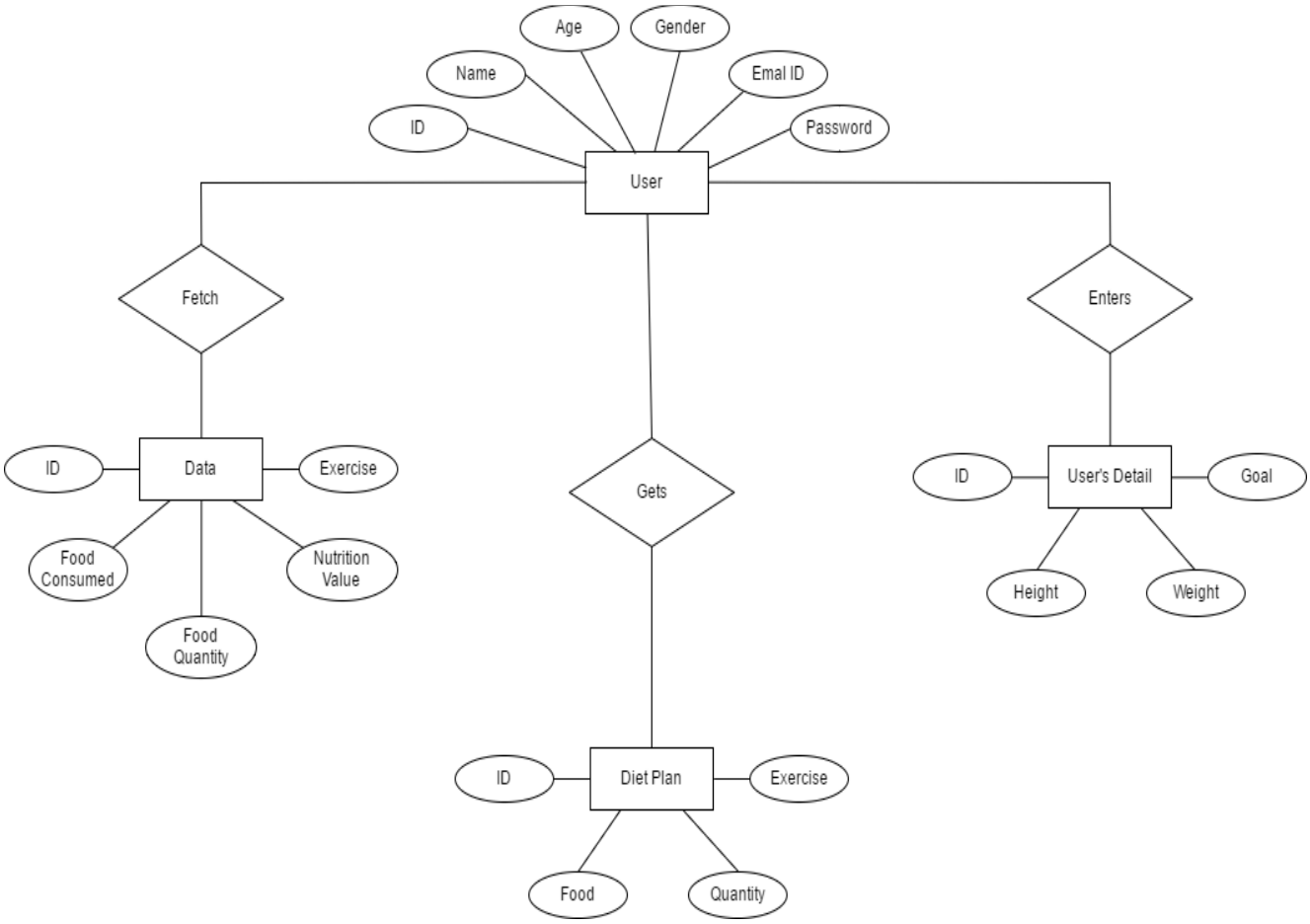

Figure 9. 3 : E-R Diagram

9.5 Control Flow Diagram

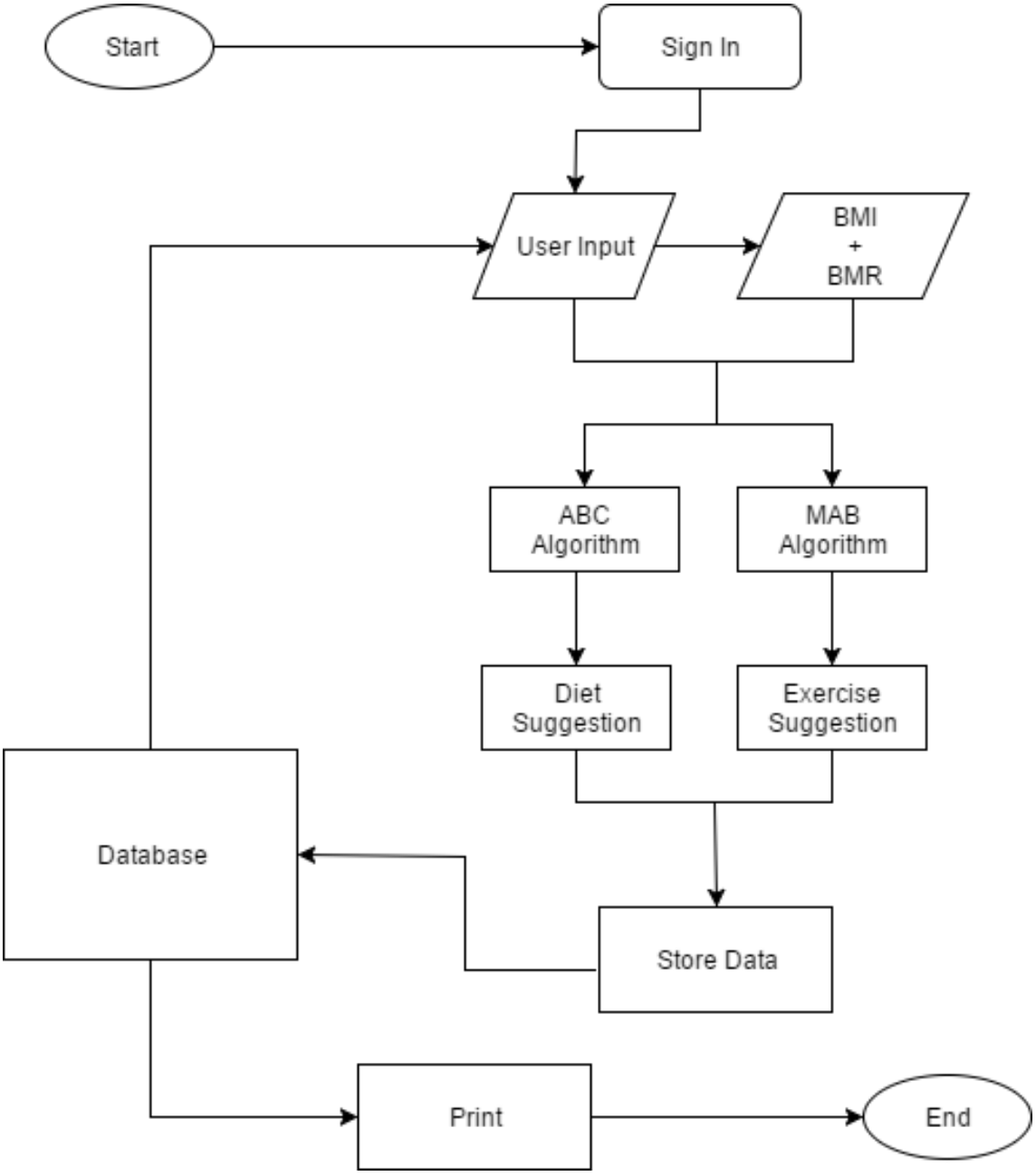

Figure 9. 4 : Control Flow Diagram

10.Implementation Plan

10.1 H/w and S/w requirements

❖ **Hardware:**

- **Intel Pentium IV or Further Processor:** The system we designed will be used by people having minimum of Intel Pentium processor. This is because maximum number of people can use the system.
- **Minimum 512 MB RAM:** Minimum of 512 MB ram is required for user to Access the system smoothly. A system with 512 or more RAM will give a better performance.

❖ **Software:**

- **HTML, CSS, Bootstrap, and PHP-MySQL:** HTML is used for designing basic building block and structure of GUI. CSS is used for making styling. And Bootstrap is used for making the GUI more attractive and user friendly.
- **Latest Browser (e.g. Google Chrome, Firefox, etc.):** The system will be run on every browser including Google chrome, Firefox Internet Explorer so more and more users can be beneficial with the system.
- **Operating System (Windows XP and above):** System will be applicable for the windows operating system XP and above like Windows 7, Windows 8, Windows 8.1, Windows 10 etc. Systems will also run on UNIX and Linux Platform as well.
- **XAMPP:** It is free and open source web server solution stack package developed by apache. XAMPP stands for Cross-platform (X), Apache (A), Maria DB (M), PHP (P), and Perl (P).It is developer tool for website designers, programmers to generate and test their work without any access to internet

10.2 Gantt chart

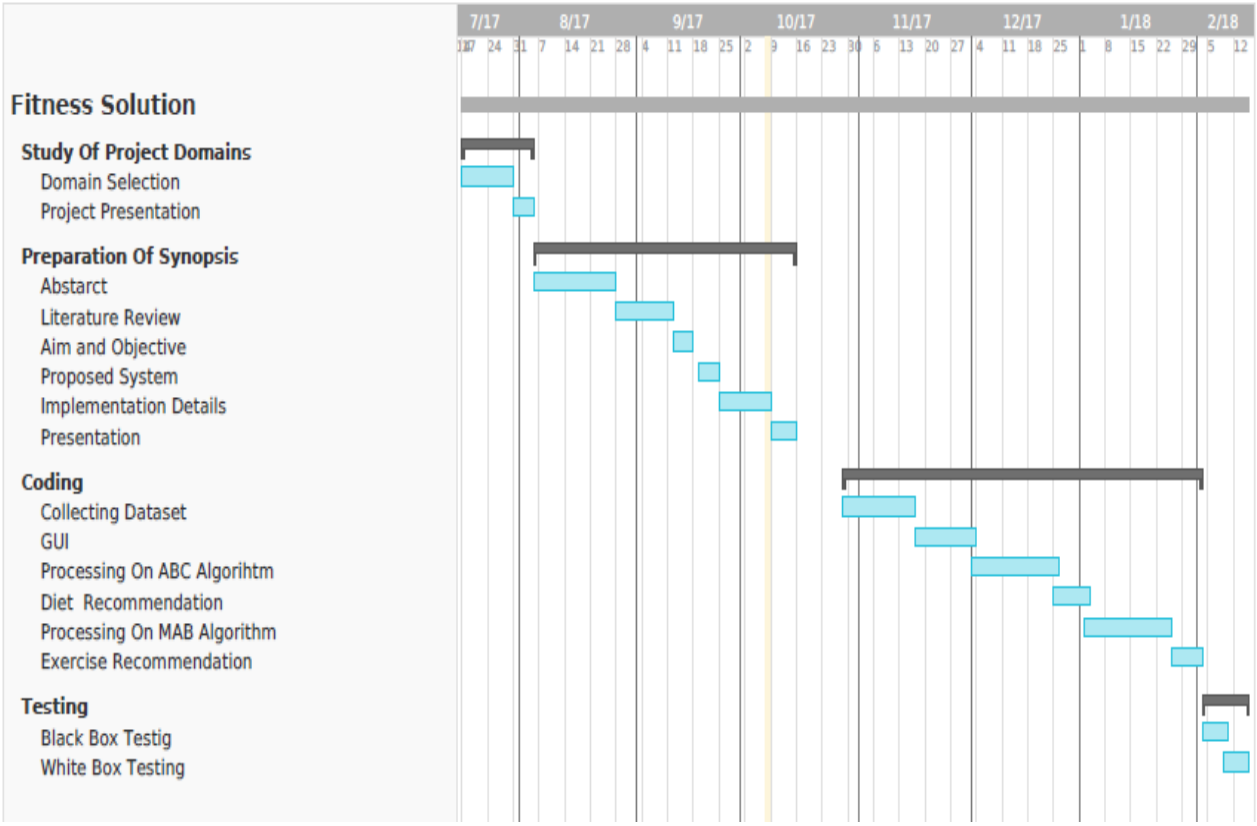

Figure 10.2. 1 Gantt chart

11.Methodology

The method we are going to follow is we Recommender system and it consists of two main tasks as illustrated by Fig 8. Accept inputs from User and ABC and MAB algorithms applied to the accepted inputs.

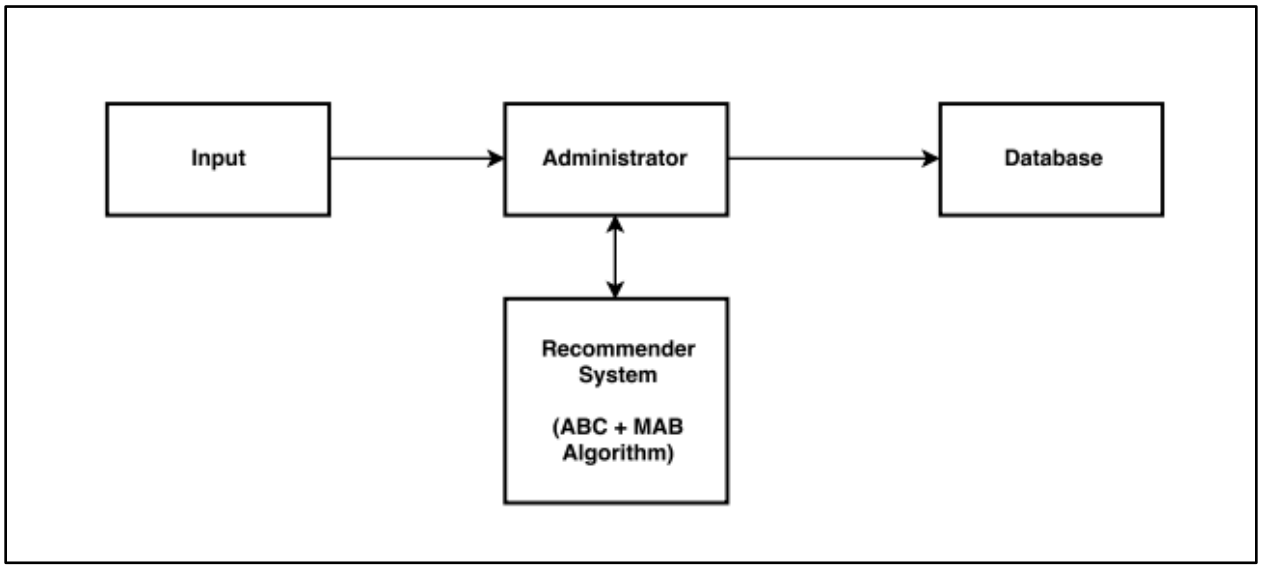

Figure 11. 1 : Methodology

The initial task is decomposed into two subtasks. Accept users Body measurements such as body weight, height and age, using these inputs our system will calculate the users BMI and BMR using particular formulas. Then the main goal of recommender system is to match proper data from database with calculated users BMI and BMR.

ABC (Artificial Bee colony) In the ABC model, the colony consists of three groups of bees: employed bees, onlookers and scouts. It is assumed that there is only one artificial employed bee for each food source. In other words, the number of employed bees in the colony is equal to the number of food sources around the hive. Employed bees go to their food source and come back to hive and dance on this area. The employed bee whose food source has been abandoned becomes a scout and starts to search for finding a new food source. Onlookers watch the dances of employed bees and choose food sources depending on dances.

MAB (Multi Armed Bandit) The multi-armed bandit problem models an agent that simultaneously attempts to acquire new knowledge (called "exploration") and optimize his or her decisions based on existing knowledge (called "exploitation"). The agent attempts to balance these competing tasks in order to maximize his total value over the period of time considered.

We use same concept in proposed system. Various steps involved in algorithm are input detection, BMI and BMR calculations, data comparison, data segmentation and extraction. The extracted data will be stored in a separate database and finally data will provide to user as per their requirements

12.Conclusion

This paper provides a solution which is based on the people lifestyle, food habits and way of living standards and. In this paper, it focused on the food habits of people and observed the food pattern means food intake habits in them. The recommender system keeping various significant parameters as age, weight, height, genetic disease and gender and recommended the proper food diet and exercise considering various situations in order to keep the young generation healthy. The appropriate metabolism is essential to be healthy and for that it is necessary to know what is good and bad for our health. So we have proposed a solution which will recommend healthy food options available for an individual depending upon the food calorie needed for that body.

13.Acknowledgement

It gives us great pleasure in presenting this system report titled: ’Fitness Solution Using ABC and MAB Algorithm’.

On this momentous occasion, we wish to express our immense gratitude to the range of people who provided invaluable support in the completion of this system. Their guidance and encouragement has helped in making this system a great success.

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We are extremely thankful to all staff and the management of the college for providing us all the facilities and resources required.

14.References

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