

**VIVEKANAND EDUCATION SOCIETY'S
INSTITUTE OF TECHNOLOGY**

Department of Computer Engineering



Project Report on
Health & Fitness Assistant

In partial fulfillment of the Fourth Year (Semester-VII), Bachelor of Engineering
(B.E.) Degree in Computer Engineering at the University of Mumbai
Academic Year 2017-2018

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Submitted by

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(2017-18)

**VIVEKANAND EDUCATION SOCIETY'S INSTITUTE OF
TECHNOLOGY**

Department of Computer Engineering



Certificate Of Approval

This is to certify that Simran Batra, Sahil Pamnani, Pranav Parab, Karan Parikh of Fourth Year Computer Engineering studying under the University of Mumbai has satisfactorily presented the project on “***Health And Fitness Assistant***” as a part of the coursework of PROJECT-II for Semester-VIII under the guidance of Mrs. Pooja Nagdev in the year 2017-2018.

Programme Outcomes	Grade
PO1,PO2,PO3,PO4,PO5,PO6,PO7,P O8, PO9, PO10, PO11,PO12 PSO1, PSO2	

Date:

Project Guide:

Project Report Approval

For B. E (Computer Engineering)

This is the project report entitled ***Health And Fitness Assistant*** by ***Pranav Parab, Sahil Pamnani, Simran Batra & Karan Parikh*** is approved for the degree of ***Bachelor of Engineering (B.E.) Degree in Computer Engineering.***

Internal Examiner

External Examiner

Head of the Department

Principal

Date:

Place:

Declaration

We declare that this written submission represents our ideas in our own words and where others' ideas or words have been included, we have adequately cited and referenced the original sources. We also declare that we have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in our submission. We understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

(Signature)

(Name of student and Roll No.)

(Signature)

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(Name of student and Roll No.)

Date:

Place:

ACKNOWLEDGEMENT

We are thankful to our college Vivekanand Education Society's Institute of Technology for considering our project and extending help at all stages needed during our work of collecting information regarding the project.

It gives us immense pleasure to express our deep and sincere gratitude to Assistant Professor **Mrs. Pooja Nagdev**(Project Guide) for her kind help and valuable advice during the development of project synopsis and for her guidance and suggestions.

We are deeply indebted to Head of the Computer Department **Dr. (Mrs.) Nupur Giri** and our Principal **Dr. (Mrs.) J.M. Nair**, for giving us this valuable opportunity to do this project.

We express our hearty thanks to them for their assistance without which it would have been difficult in finishing this project synopsis and project review successfully.

We convey our deep sense of gratitude to all teaching and non-teaching staff for their constant encouragement, support and selfless help throughout the project work. It is great pleasure to acknowledge the help and suggestion, which we received from the Department of Computer Engineering.

We wish to express our profound thanks to all those who helped us in gathering information about the project. Our families too have provided moral support and encouragement at several times.

Computer Engineering Department

COURSE OUTCOMES FOR B.E PROJECT

Learners will be able to:-

Course Outcome	Description of the Course Outcome
CO 1	Able to apply the relevant engineering concepts, knowledge and skills towards the project.
CO2	Able to identify, formulate and interpret the various relevant research papers and to determine the problem.
CO 3	Able to apply the engineering concepts towards designing solution for the problem.
CO 4	Able to interpret the data and datasets to be utilized.
CO 5	Able to create, select and apply appropriate technologies, techniques, resources and tools for the project.
CO 6	Able to apply ethical, professional policies and principles towards societal, environmental, safety and cultural benefit.
CO 7	Able to function effectively as an individual, and as a member of a team, allocating roles with clear lines of responsibility and accountability.
CO 8	Able to write effective reports, design documents and make effective presentations.
CO 9	Able to apply engineering and management principles to the project as a team member.
CO 10	Able to apply the project domain knowledge to sharpen one's competency.
CO 11	Able to develop professional, presentational, balanced and structured approach towards project development.
CO 12	Able to adopt skills, languages, environment and platforms for creating innovative solutions for the project.

ABSTRACT

A personal trainer is an individual certified to have a degree of knowledge of general fitness involved in exercise prescription and instruction. They motivate clients by setting goals and providing feedback and accountability to clients. Trainers also measure their client's strengths and weaknesses with fitness assessments. These fitness assessments may also be performed before and after an exercise program to measure their client's improvements in physical fitness. They may also educate their clients in many other aspects of wellness besides exercise, including general health and nutrition guidelines.

The goal of this system is to provide a personal trainer which suggests a diet plan and workout plan for a particular type of training that is selected.

Nowadays there is a widespread diffusion of mobile applications for weight and diet management. Even though, the most popular webapps are not usually experimented in clinical contexts, as well as apps are not supported by medical evidence. Further research is necessary to assess the effectiveness of apps for weight and diet management. Moreover, there are few examples of food recommender systems that provide to the users nutritional facts about suitable food choices. We propose HFA(Health and Fitness assistant), a recommender system to improve the quality of life of obese people, healthy people and individuals affected by chronic diet-related diseases. The proposed system is able to build a user's health profile, and provides individualized nutritional recommendation according to the health profile as well as list of exercises to be done in order to lead a healthier life.

There is more to being physically fit than simply doing a bunch of exercises. *How* you exercise is also important. Your diet and lifestyle choices also matter. Obesity is mostly preventable through a combination of social changes and personal choices. Changes to diet and exercising are the main treatments. Diet quality can be improved by reducing the consumption of energy-dense foods, such as those high in fat and sugars, and by increasing the intake of dietary fiber.

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HEALTH AND FITNESS ASSISTANT

Chapter 1 : Introduction

1.1 Introduction:

Health And Fitness Assistants are must in our lifestyles today. It is important to keep track of our health on a daily basis that helps in prevention of various diseases and health problems. This application helps us to achieve exactly that.

1.2 Motivation:

Nowadays there is a widespread diffusion of mobile applications for weight and diet management. Even though, the most popular webapps are not usually experimented in clinical contexts, as well as apps are not supported by medical evidence. Further research is necessary to assess the effectiveness of apps for weight and diet management. Moreover, there are few examples of food recommender systems that provide to the users nutritional facts about suitable food choices. We propose HFA(Health and Fitness assistant), a recommender system to improve the quality of life of obese people, healthy people and individuals affected by chronic diet-related diseases. The proposed system is able to build a user's health profile, and provides individualized nutritional recommendation according to the health profile as well as list of exercises to be done in order to lead a healthier life.

There is more to being physically fit than simply doing a bunch of exercises. *How* you exercise is also important. Your diet and lifestyle choices also matter. Obesity is mostly preventable through a combination of social changes and personal choices. Changes to diet and exercising are the main treatments. Diet quality can be improved by reducing the consumption of energy-dense foods, such as those high in fat and sugars, and by increasing the intake of dietary fiber.

1.3 Problem Definition:

A personal trainer is an individual certified to have a degree of knowledge of general fitness involved in exercise prescription and instruction. They motivate clients by setting goals and providing feedback and accountability to clients. Trainers also measure their client's strengths

and weaknesses with fitness assessments. These fitness assessments may also be performed before and after an exercise program to measure their client's improvements in physical fitness. They may also educate their clients in many other aspects of wellness besides exercise, including general health and nutrition guidelines.

The goal of this system is to provide a personal trainer which suggests a diet plan and workout plan for a particular type of training that is selected.

Sub-Goals:

- This system will have an overview “look” to see the improvement they have made.
- The system is able to learn about your diet and customize a diet plan according to type of workout selected..
- The app is able to produce custom workout plans for the user based on their recent activities throughout the day, in the last week or the last month.
- Database will be updated with information like calories consumed ,calories burnt and kilograms lost.
- The system will have various tools to compute fitness related parameter like Daily proteins requirement, Food fat, Target heart rate,One Rep max etc.

1.4 Relevance of the Project:

This assistance is for all your health and fitness needs. Browse through our diet and fitness section to learn about how you can control your daily diet, and how you can workout and exercise to lead a healthier , better and well-rounded lifestyle.

1.5 Methodology used:

- Login / Signup
- Set goal
- Select Target
- Schedule of the Workout plan and Diet to be followed each day
- Trainee inputs his Workout plan and Diet followed by him
- Customization of the schedule to reach the goal and target

Chapter 2: Literature Survey

2.1 Research Papers - Mentioned in IEEE format

- Investigating Eating Behaviours using Topic Models.
- Fitness Applications for Home-Based Training.
- Inside Me: A Proposal for Healthcare Mobile Application .
- Mobile-Based Expert System For Human Diet Planning Using Optimum Neighbour
- Human-computer interaction Patterns within the Mobile-Nutrition Landscape
- User-generated mobile services for health and fitness

2.1.a Abstract of the research paper

Investigating Eating Behaviours using Topic Models.

Chronic conditions, such as diabetes and obesity are related to quality of diet. However, current research findings are conflicting with regards to the impact of snacking on diet quality.[1] One reason for this is the lack of a clear definition of a snack or a meal. This paper presents a novel approach to understanding how foods are grouped together in eating events using a machine learning algorithm, topic models.In machine learning and natural language processing, a topic model is a type of statistical model for discovering the abstract "topics" that occur in a collection of documents. Topic modeling is a frequently used text-mining tool for discovery of hidden semantic structures in a text body. Intuitively, given that a document is about a particular topic, one would expect particular words to appear in the document more or less frequently. The amount of the written material we encounter each day is simply beyond our processing capacity. Topic models can help to organize and offer insights for us to understand large collections of unstructured text bodies.

Topic models were originally developed by the text processing community to aid the understanding of large text corpora. They allow hidden topical patterns within a corpus to be automatically uncovered using unsupervised learning. These topics can be used to annotate the

documents and hence allow them to be organised, summarised and searched in new and meaningful ways. Approaches for applying topic models to a nutrition application are discussed. A topic model is implemented for the UK National Diet and Nutrition Survey Rolling Programme dataset. The results demonstrate that the topics found are representative of typical eating events in terms of food group content and associated time of day. There is a strong potential for topic models to reveal useful patterns in food diary data that have not previously been considered.

Fitness Applications for Home-Based Training

Recent technological advances present opportunities for developing applications that support in-home training—particularly for older adults, who are often more isolated, less active, and less likely to train in a gym. [2] This review of fitness applications discusses design challenges and opportunities. Because older adults represent an important class of people for which home training might be the most convenient (and sometimes only) option, this paper specifically analyze research and applications in terms of their suitability for this particular user group. In addition to discussing current technologies and research, we also highlight limitations and research gaps in IT-based home-training solutions in general and for older adults in particular. In reviewing home fitness apps and emerging classes of applications, this paper analyzed the type of support currently implemented in commercial fitness applications. Here, we describe the selection criteria, the design dimensions and literature considered in the analysis, and emerging application archetypes.

Inside Me: A Proposal for Healthcare Mobile Application .

Abstract-Smart phone has been widely used as an ideal assistant for health and fitness.[3] In this paper, we proposed a mobile application for health monitoring-Inside Me-which can help users to become more aware of their health. This application aims to track user's workout activities and monitor and analyze user's health condition. It also gives some instructions and suggestions to the user for maintaining and improving his or her health. Moreover, it provides an assessment of the risk that the user may have one of these two diseases: coronary disease and diabetes. Input

data are collected from several sources such as questionnaire, medical check-up record, and wearable device. The risk assessment is carried out by machine learning algorithms.

The user can assess his or her risks of coronary disease and diabetes by himself or herself by responding to a questionnaire. This phase provides a basic diagnosis. The assessment questions do not ask about laboratory results. If the user is at a high risk, the application will suggest the user to consult a general practitioner to confirm the results. Medical Check-up Record: After the user has had a check-up in a hospital and obtained his or her medical checkup records, the user can fill them in on a screen of our application, and the machine learning algorithms will give a prediction of the chance of him or her having each of the two specified diseases. Activity Tracking: Health data-walking, workout, heart rate, sleep activity and skin temperature-are collected from a smartphone or a wearable device and shown on several application screens. In future development, symptoms such as hypoglycemia symptom (low blood Glucose) in diabetic patients that can be detected as certain levels of perspiration and skin temperature will be tracked.

Mobile-Based Expert System For Human Diet Planning Using Optimum Neighbour

This research proposes an expert system method to recommend the quantity of every ingredients food for a normal human or specific diet patient.[4] The proposed method initial state was 100 pairs of generated random value. Afterward, the pair of value which contains minimum error rate was chosen. The proposed method uses the generated optimum neighbor as the recommendation solution. Our proposed method was implemented as an android application. Based on the experiment, it was able to compose the food ingredients quantity with the macronutrient needs in the range about 25% above or below nutrition needs. This paper provides an expert system method to recommends the quantity of every single ingredient for ordinary human who has a specific diet.

User-generated mobile services for health and fitness

This research project uService (user generated service) is building a framework to enable end users to create small, sharply focused mobile services directly on the mobile device.[5] By this, end users are no longer only consumers of mobile services but also producers and providers, so-called ‘mobile super prosumers’. In the project, the scenario ‘Run’ serves as an application example for the uService framework in the field of health and fitness mobile applications. The goal is to provide a mobile assistant for runners, for the times before, during and after a run. This article presents survey results on experienced runners’ expectations on beneficial mobile services. It then describes how end users can create mobile services in the running application domain by means of the uService framework and explain the envisioned business models. In this section, firstly paper discusses related projects that are also investigating user-generated services and compare them with the approach of the uServiceproject. Describing the state-of-the-art in mobile running applications, which is the concrete application domain considered in this article. The uRun scenario is currently being implemented using so-called gadgets which are supported by the uService framework. A gadget is a dynamic web content that can be embedded into a web page. Gadgets are written in XML and can have HTML and JavaScript components. They interact via channels. Well known gadgets are Google Gadgets which can be executed within Google's iGoogle personalized home page.

Human-computer interaction Patterns within the Mobile-Nutrition Landscape

Advances in mobile computing offer the potential to deliver better solutions in the growing health problem of obesity.[6] Poor nutrition and a lack of exercise have led to a situation where obesity is rapidly on the rise. As a result, mobile health interventions in the area of nutrition have been a great asset into changing the lives of many through the use of their devices. Smartphones and other mobile devices can be transformed into effective nutrition tracking tools that consumers can easily make use of to help improve their lives and wellbeing.

The academic community has conducted a vast amount of research in the area of mobile nutrition however a number of challenges still exist in the area of human-computer interaction

(HCI). HCI has been found to be a key contributing factor when developing systems that constantly and directly interact with their respective users. Effective HCI is required to bridge the communication barrier between a user and the device, thus ensuring a seamless approach. This research paper highlights the efforts done by academics in the area of mobile HCI within the nutrition landscape. Every study is discussed in detail by highlighted the key benefits together with a number of challenges that still exist. As a result, this review of literature will identify key lacunae that still exist in the field of mobile HCI within the nutrition landscape.

2.1.b Inference drawn from the paper

Investigating Eating Behaviours using Topic Models.

This paper has presented a novel application of topic models for investigating eating behaviours using the National Diet and Nutrition Survey Rolling Programme dataset.[1] It has been shown how the LDA model can be applied to food diary data, including a discussion on how to select a suitable vocabulary and create documents. The results have demonstrated that the topics found are representative of typical eating events both in terms of their food group content and the time of day they are most strongly associated with. These initial results could be used as the basis for further analysis of eating behaviours. This work could be extended in several directions. For example, new ways to effectively include the energy and weight variables of an eating event in the model could be explored. Furthermore, extensions to the LDA model, such as dynamic topic models or hierarchical Dirichlet processes could be applied to nutrition data. This would enable the discovery of changes in eating behaviours over a longer term and the automatic determination of the appropriate number of topics for the dataset respectively. In conclusion, topic models have a high potential to reveal useful patterns in food diary data and corresponding eating behaviours in a way that has not been previously investigated.

Fitness Applications for Home-Based Training

Training applications offer the most diverse output, with text (63%) and video (43%) at the top, but most trackers don't offer training programs.[2] Games prominently use virtual and

immersive (17%) environments. Training apps, primarily desktop (67%), are notoriously unidirectional in that the program doesn't require the user to provide feedback to function. Mobile and console games are often bidirectional, partly due to their use of the sensing capabilities.

Body-fixed (wearable) sensors are widely used in trackers (90%), while self-reporting is more popular in training apps (47%). Games use body-fixed (57%) and environmental (43%) sensors.

This investigation has shown that the home-fitness landscape is sprouting with ideas and applications, offering a variety of interaction modes, coaching methods, and measuring techniques. Current solutions provide good support for the general population, especially for those who don't require expert coaching. However, few applications explicitly target older adults or take into account their level of interaction skills and physical abilities, despite the fact that sustained training improves mental and physical health, which in turn can reduce government and family expenditures. Groups such as older adults thus find more limited support in current solutions which summarize the results of inspecting current applications against the various design considerations motivated in this article. In particular, none of the apps we studied complied with the design considerations from the literature in all four design aspects reviewed here, and very few solutions provided expert feedback during training. The principal lessons learned are the following specific ingredients for stimulating a higher level of engagement and adherence to training programs: social persuasion mechanisms in addition to the individual persuasion mechanism; a human coach (as opposed to no coach or a virtual coach); sensors that automatically detect activity (as opposed to manual data entry)—but only as long as the sensors are accurate and don't generate user distrust of measurement reliability; and multimodal interaction with the user.

Inside Me: A Proposal for Healthcare Mobile Application .

In this paper, introduced Inside Me, a mobile healthcare application, that was developed on iOS.[3] The purpose of this application is healthcare monitoring and helping users to become more aware of their health. The application was developed to be installed on smart phone and connect to wearable device such as smartwatch. We applied machine learning techniques to

predict the chance of the user having any of the specified diseases. It evaluated the performances of the algorithms that included either all of the features of the datasets or only some features of the datasets and found that the prediction performances resulted from using all of the features from special medical check-up records was better than those resulted from using only some features. For future work, plan to collect health data of Thai people to train and test models that will be best suited for Thai population. It also plan to utilize data from wearable device with machine learning for activity classification and symptom detection. Furthermore, it plans to conduct a user evaluation of the effectiveness of Inside Me.

Mobile-Based Expert System For Human Diet Planning Using Optimum Neighbour

In this research, an experiment has been done by comparing our proposed system with the nutrient menu consultation result which calculated manually by a nutritionist.[4] To be a fair test, the data which has been used in the test comparison was similar. Data which has been used was ten real data which acquired from hospital where consisted of patients with such of diseases like diabetes, cardiovascular diseases, and liver disease. We assumed that patient had medium activity level. The application was executed 10 times for every test case. We calculated the average result computation of nutrient fulfillment recommendation which has been done through the application. We also calculated the nutrient fulfillment which acquired from nutrient menu consultation. The comparison between application calculation and manual calculation by an expert. The application recommendation about macronutrient nutrient fulfillment provided a better results than manual calculation by an expert. On calorie and protein components, the application able to generated food composition which consisted nearly 100% nutrient fulfillment element. The application recommendation about macronutrient nutrient fulfillment provided a better results than manual calculation by an expert. On calorie and protein components, the application able to generated food composition which consisted nearly 100% nutrient fulfillment element.

User-generated mobile services for health and fitness

People are increasingly looking for mobile products and services that allow them to track, compete, socially interact, and share data related to health and fitness. [5] Furthermore, social interaction, challenge and reward systems are future trends for health and mobile applications. The project uService extends these future trends even further by enabling users to create mobile services on the mobile device themselves. As a proof of concept, different scenarios are investigated, one of which is called “uRun”.

The project uService is developing a framework for user-generated mobile services and is going to evaluate the framework by means of different scenarios, one of which is about health and fitness mobile applications. In the uRun scenario, people use the uService player as a mobile running assistant.

Different recommendations are provided to the user during and after the training. Furthermore, users can create their own custom mobile services on the mobile device for gathering data from different sources during their runs and for making this information accessible to others (e.g. for doctors or personal trainers) in a secure manner. Moreover, the player can be used for networking, e.g. for getting in touch with like-minded people or professional fitness service providers. Security is ensured by a number of built-in functions, like authentication of all actors in the system, secure connections for communication, creation and verification of signatures, or secure management of profile data.

Human-computer interaction Patterns within the Mobile Nutrition Landscape

Obesity and being overweight are serious concerns to the general health of a human being, thus interest in nutrition monitoring has increased.[6] As a result, the awareness of diet or nutrition tracking methods has gained vast ground in the recent years. Consequently, the use of Smartphone applications to assist with diet or nutrition management is on the rise, such that 50% of Smartphone owners actively search for health related information.

Research in the mobile nutrition landscape is vast, ranging from simple diet/ nutrition tracking techniques such as inputting the name of the food consumed to cutting edge methods of nutrition measurement such as the use of image and audio processing methods coupled with machine learning algorithms for more accurate results.

In this research the system was developed the user is required to take a photo of the food, before and after consumption. As a rule, two images are taken before consumption from two distinct angles in order to estimate the size and height of the food. The other image is taken after consumption to subtract what was left in the plate. The focused part of this research was on machine learning by making use of the support vector machine (SVM) algorithm and managed to effectively run a nutrient training set and automatically estimate food and calorie intake. Over time, through the continuous training of the data set, users will be able to receive more accurate results, thus providing them with better nutritional facts related to the food they would have consumed throughout the day.

Comparison Of Papers:-

Paper name	Related work	Algorithm, techniques used	Improvements
Investigating eating habits using topic models	Various definitions of snacks and meals are used when designing studies on nutrition. The reader is referred to recent reviews with a focus on snacking and meals for a comprehensive narrative on this area, including the advantages and disadvantages of different approaches.	Topic models	Extensions to the Topic model, such as dynamic topic models or hierarchical Dirichlet processes could be applied to nutrition data
Fitness application for home based training	Interaction, monitoring and sensing, coaching and tailoring, persuasion and motivation regarding home based training were discussed.	Random forest	It is still unclear which user interface representation and metaphors work better in terms of stimulating adherence
Inside me :A proposal for healthcare mobile application	Two prediction models were implemented to predict diabetes and coronary disease . Process medical check-up records and the percentage of probability that the user has the disease which was shown on the the disease-risk screen of	logistic regression and Random forest	Collect health data of people to train and test models that will be best suited for the population and also plan to utilize data from wearable device with machine learning for activity classification.

	the application.		
Expert system for human diet planning using optimum neighbour	The application set static distribution percentages of the three macronutrients which are protein, carbohydrates (CHO) and fat. The specific amounts of each macronutrient are then calculated based on total daily calorie needs.	Fuzzy logic fuzzy linear programming approach.	The food composition generated fat component which was worse than an expert. It made the next neighbor searching constant.
User generated mobile services for health and fitness	Discussion related projects that are also investigating user-generated services and describe the accuracy in mobile running applications.	Questionnaire and feedback , javascript	Data security, charging mechanisms as well as sensor integration could be applied.
HCI within mobile nutrition landscape	By using the data collected throughout the eating process, the neural net algorithm was trained.	Neural network, decision tree	Investigating HCI techniques that could further bridge the gap between the device and its user.

Table 1 : Comparison Of Papers

Chapter 3: Requirements

3.1 Functional Requirements:

1. This system will be able to record exercises and repetitions.
2. This system will have an alarm alert system
3. This system will have an overview “look” to see the improvement they have made.
4. Database has to be updated with information like number of steps, glasses of water consumed, calories consumed ,calories burnt and kilograms lost.
5. The system is able to learn about your diet and customize a diet plan accordingly.
6. The system keeps track of how much distance one covers in a day, tracks how many calories are burned and whether they should do more exercise to meet their fitness goal for that day.
7. Users can ‘bump’ their phones with each other to compete in a particular workout exercise.
8. The app is able to produce custom workout plans for the user based on their recent activities throughout the day, in the last week or the last month.

3.2 Non-Functional Requirements:

- 1. Security :**The system shall not grant Access to an unauthorized user.
- 2. Reliability:** The Application should not crash or close under any circumstances and should be available 24 x 7.
- 3. Maintainability:** The Application Shall Be maintained by the developers in unison with System or hardware updates.
- 4. Portability:** The Application shall be available for download onto any android device via the android app store.

5. Compatibility: This Software Shall be compatible with any Android powered device running Android version 2.3.3 or above.

3.3 Constraints

1. The first and foremost issue we will face is to record the distance while running exercise is performed
2. Recording the calories burned as per the workouts done.
3. Recording the exercises which are completed.
4. Correctly analysing the input data given by the user in order to create their customisable diet and exercise plans

3.4 Software Requirements

- Google Maps API
- Android Application
- Anaconda

3.5 Technologies Required For Proposed System

- Java- Used to make application of our web page. jframes can be used to make interactive UI
- Python- The database will be made using python
- PHP- To develop the backend of the system
- Javascript- To develop interactive webpages.
- BOOTSTRAP. - Used to create functional ui design also for navbars progress bars,etc

Chapter 4 : Proposed Design

4.1 System Block Diagram

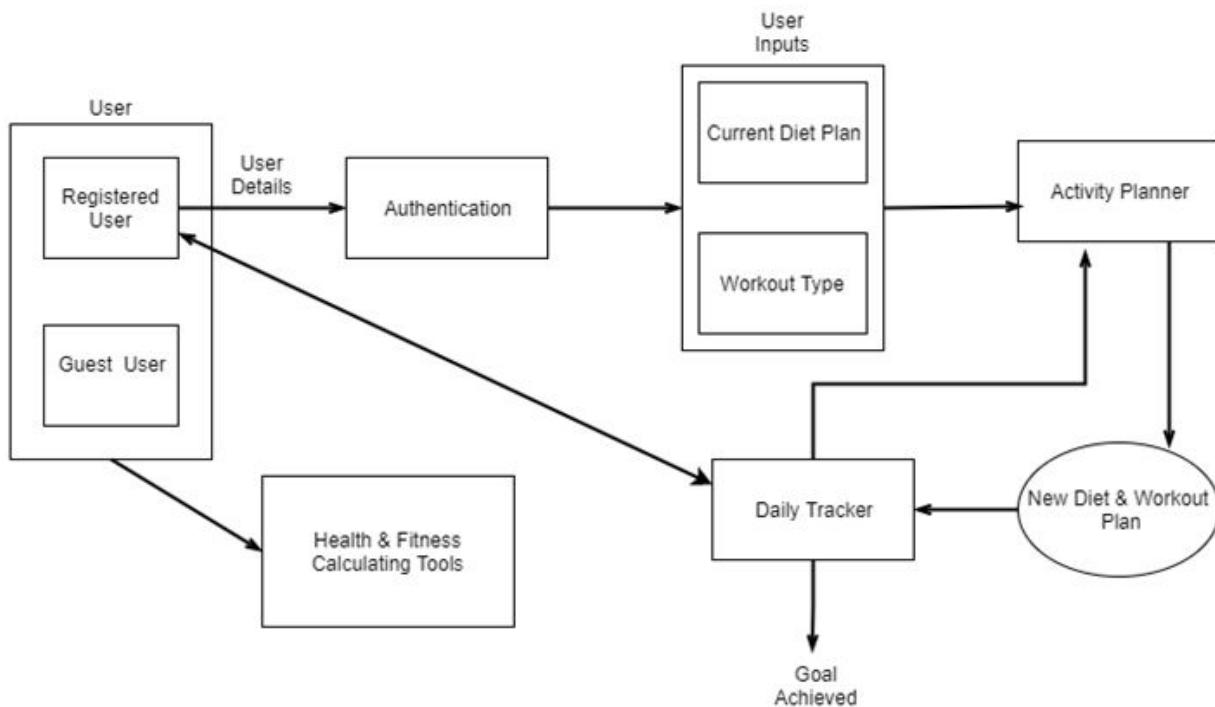


Fig. 1 : Block Diagram

This is block diagram of our system .It explains each module and working of each module of our system. This diagram shows two types of users for our system i.e guest user and authenticated user. Both type of users can access basic health and fitness tools whereas only authenticated users can access the main features of the system. Diagram also shows that authenticated users provide inputs which are supplied to machine learning algorithms to produce diet & workout plan. Tracker regularly takes inputs from the user and keeps on updating the planner.

4.2 Detailed Design (DFD, Flowchart, State Transition Diagram, ER Diagram, etc...)

4.2a(1) DFD Level 0

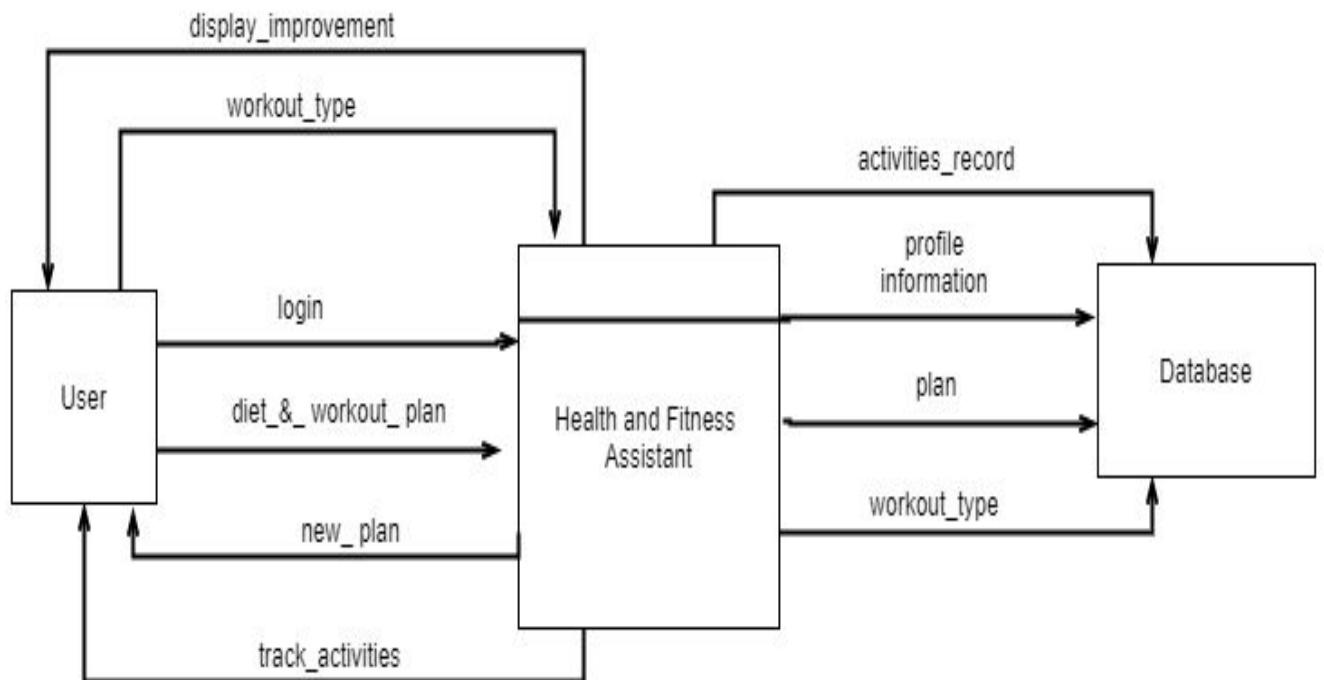


Fig 2 : DFD (LEVEL 0)

This is the DFD level 0 of our system. This diagram shows flow of the data abstractly. This diagram has external entity as user, process as health and fitness assistant and data storage as database.

4.2a(2) DFD Level 1

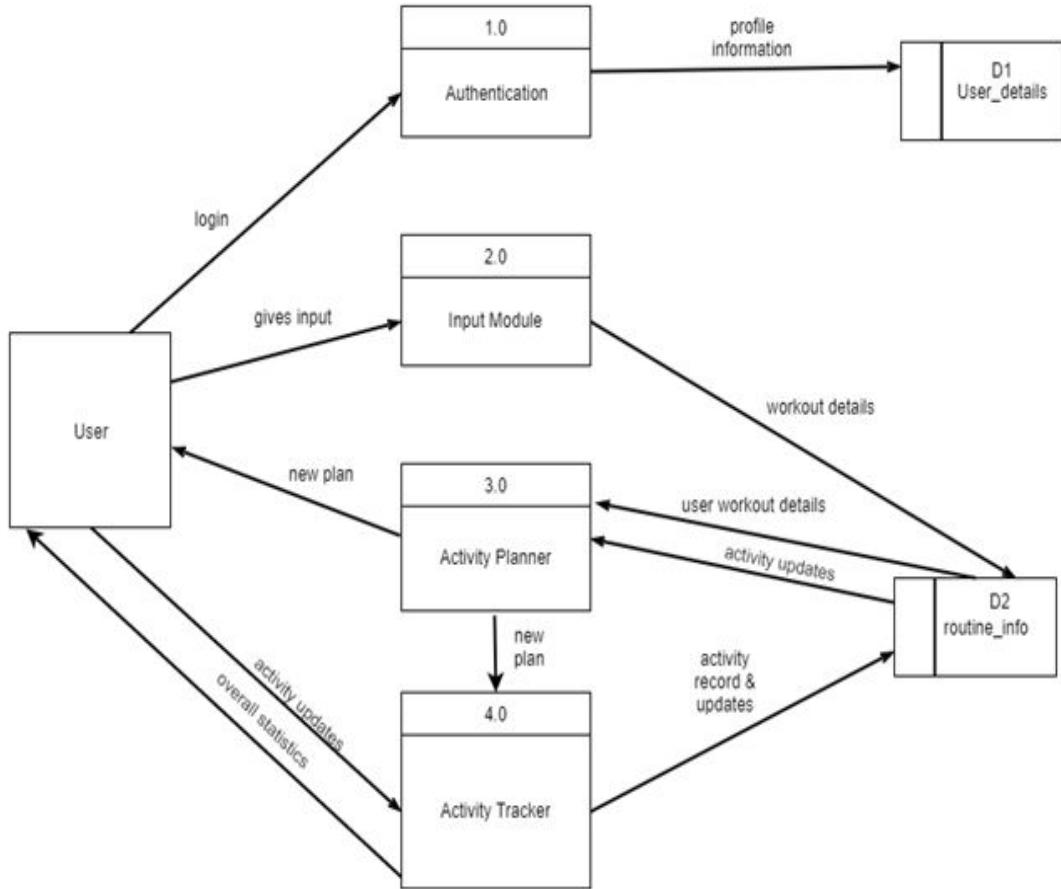


Fig 3 : DFD (LEVEL 1)

This is DFD level 1 of our proposed system. This diagram explains flow of the data in more detailed manner. This diagram has external entity as user. Authentication, activity tracker, input module are the processes in the system and databases like user details and routine info are the data storages.

4.2a(3) DFD Level 2

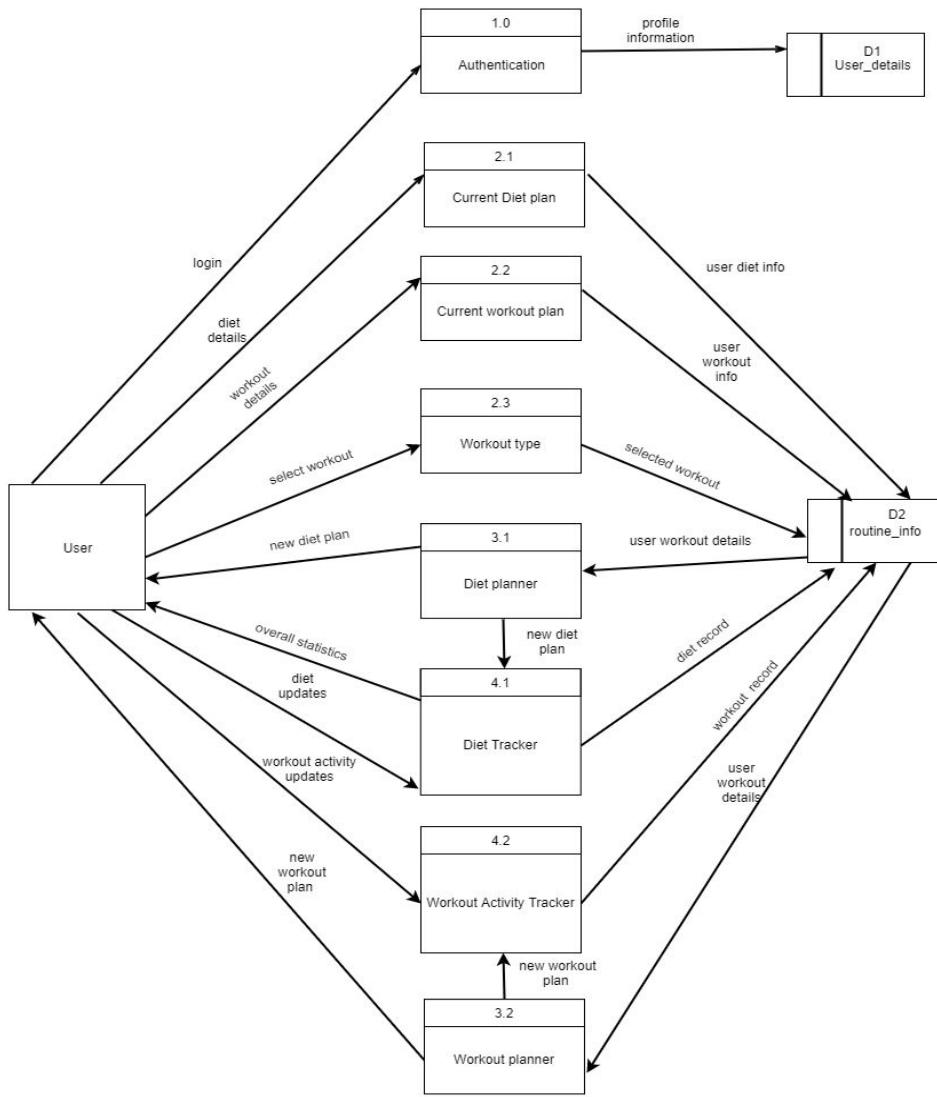


Fig 4 : DFD(LEVEL 2)

This is DFD level 2 of our system .This diagram explains the flow of the data in the system in more profound manner. This diagram has external entity as user.Authentication,current diet plan,current workout plan,workouttype,dietplanner,diettracker,workout activity tracker are the processes of the system and databases like user details and routine info are the data storage.

4.2b(1) Activity Diagram

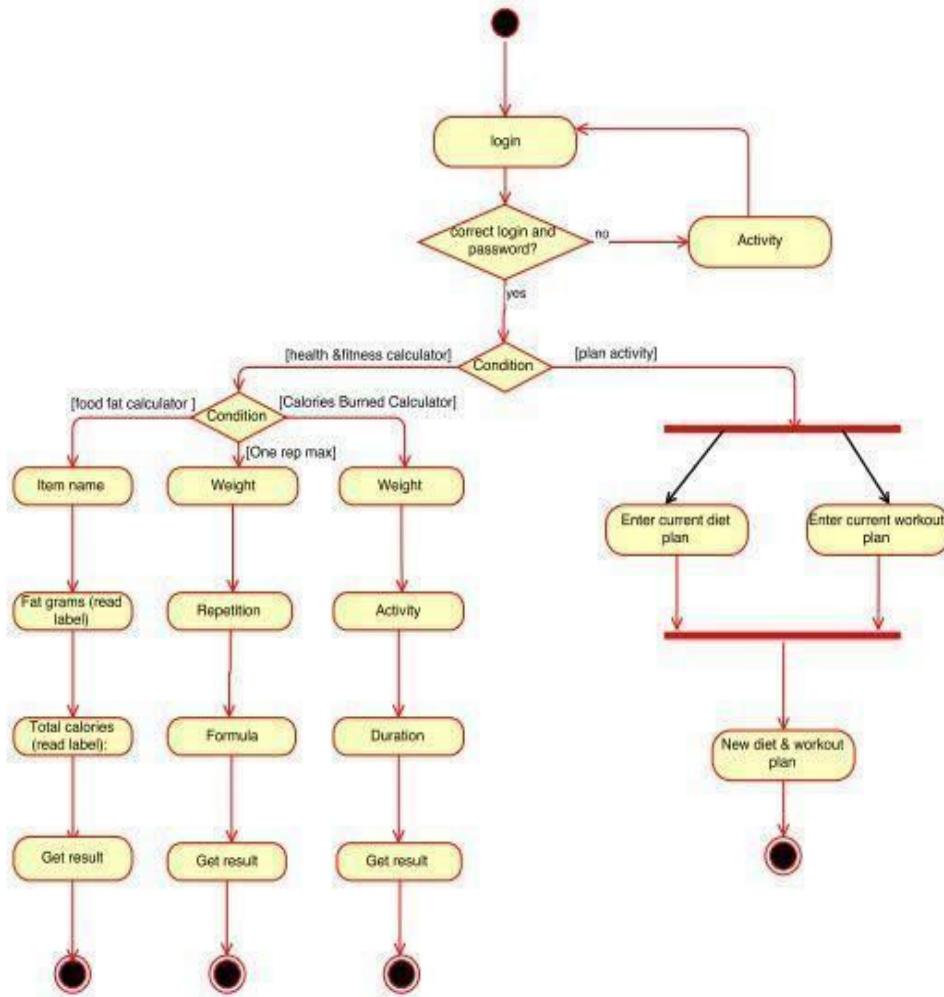


Fig 5 : Activity Diagram

In this activity diagram user logs into the system and enters basic personal details along with some health related details like height, weight, medical condition etc user then enters his/her current diet plan and selects the type of training he/she wants to go for. In the end a special diet plan along with specific workout plan is generated to achieve the goal that he/she selected earlier. Moreover the user can calculate other health and fitness related parameters.

4.2c(1) Use case diagram

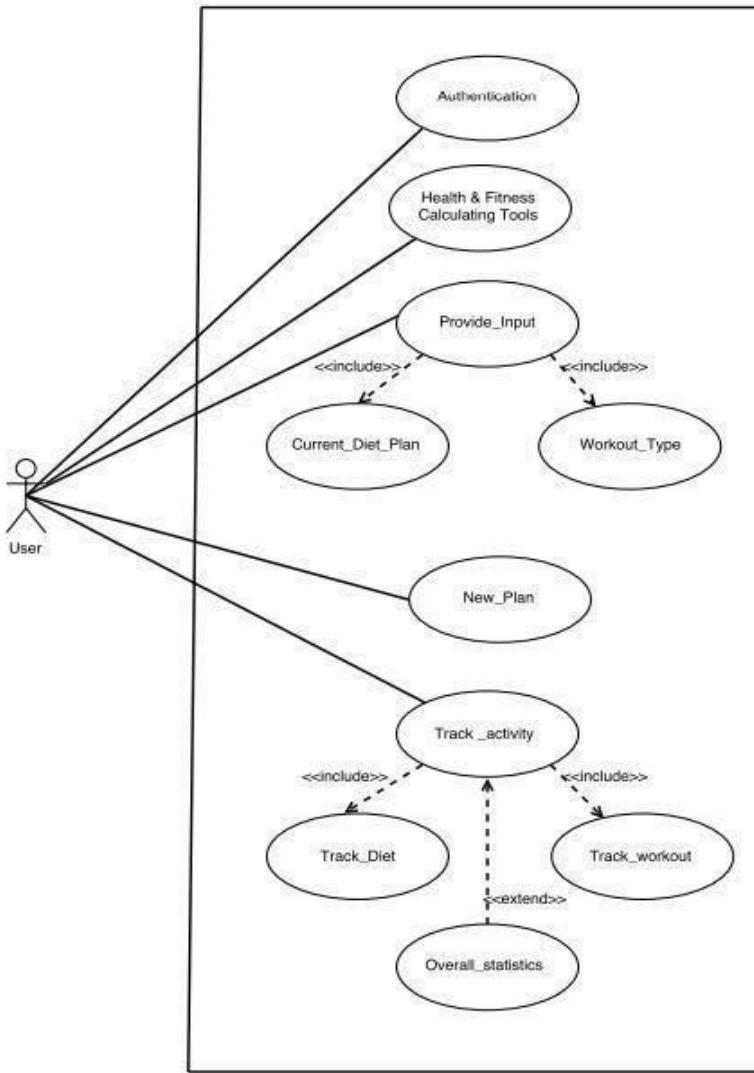


Fig 6 : Use Case Diagram

This is use case diagram of our system. It explains major functionality of our system . This diagram shows authentication block, input block, new plan block,track activity block. Input use case further includes two sub-use cases current diet plan and current workout plan. Track activity use case is further includes includes two sub-use cases track diet plan and track workout plan. Track activity extends another use case overall statistics which gives overall statistics of the workout type selected by the user.

4.2d(1) ER diagram

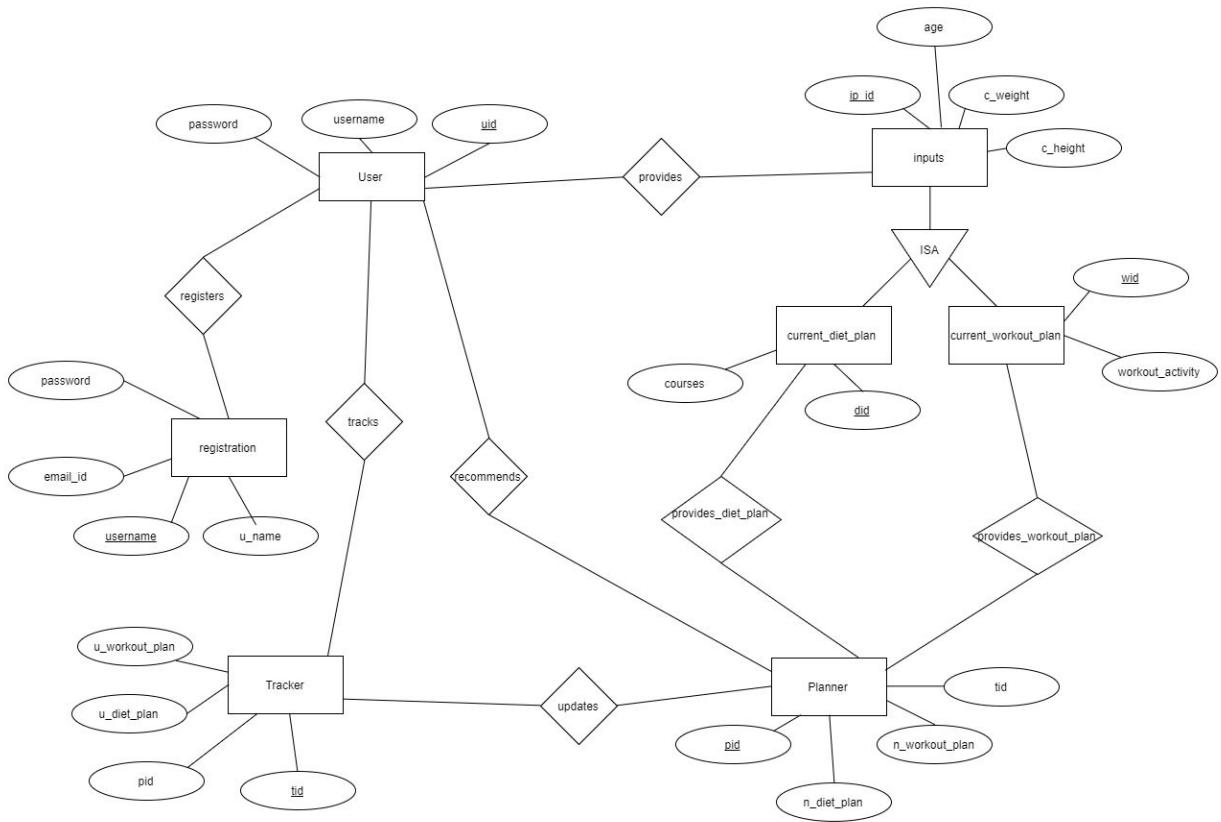


Fig 7 : ER Diagram

This is the ER diagram of our system. This diagram explains various relationships between entities that are present in our system. There are six main entities in our system namely registration, current diet plan, current workout plan, user, tracker, planner. Entities current diet plan and current workout plan is generalized into single entity inputs.

4.3 Project Scheduling & Tracking using Time line / Gantt Chart

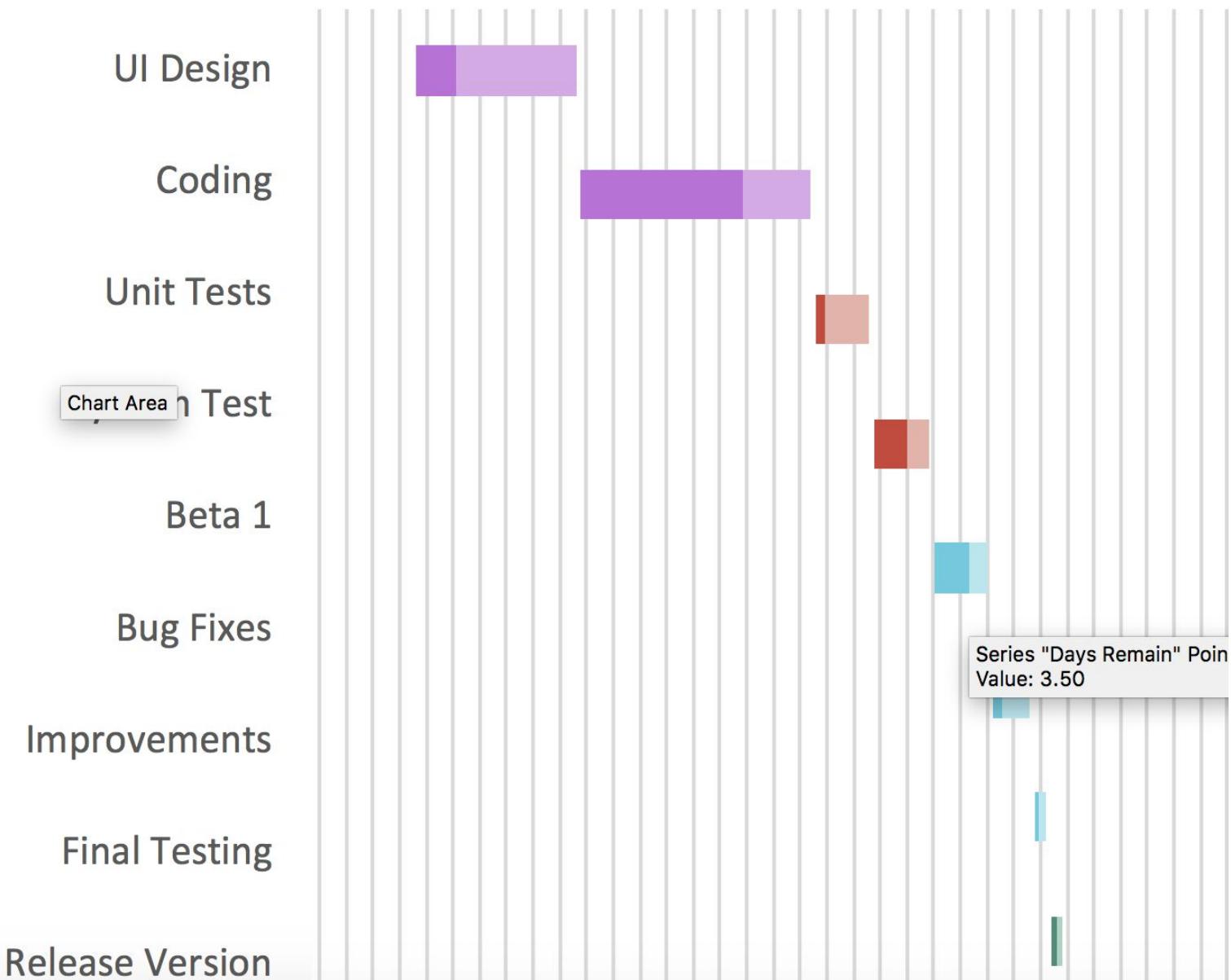


Fig 8 : Gantt Chart

Chapter 5: Implementation Details

5.1. Algorithms for the respective modules developed:

1. Random Forest

Random forests or random decision forests are an ensemble learning method for classification, regression and other tasks, that operate by constructing a multitude of decision trees at training time and outputting the class that is the mode of the classes (classification) or mean prediction (regression) of the individual trees. Random decision forests correct for decision trees habit of overfitting to their training set. Random forest algorithm is a supervised classification algorithm. As the name suggest, this algorithm creates the forest with a number of trees. In general, the more trees in the forest the more robust the forest looks like. In the same way in the random forest classifier, the higher the number of trees in the forest gives the high accuracy results.

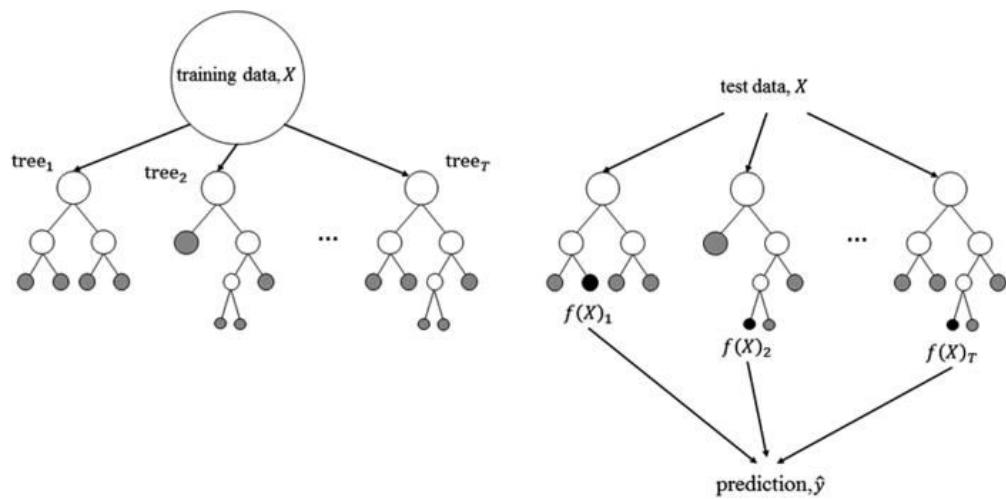


Fig 9 : Random Forest

Random Forest algorithm is used after Decision tree algorithm is applied. It can be used to provide result in a particular group. For example the percentage of elderly people doing exercises in the morning are more as compared to the adults who prefer workout in the evening.

Pseudocode:

1. Randomly select “k” features from total “m” features.
(i)Where $k \ll m$
2. Among the “k” features, calculate the node “d” using the best split point.
3. Split the node into daughter nodes using the best split.
4. Repeat 1 to 3 steps until “l” number of nodes has been reached.
5. Build forest by repeating steps 1 to 4 for “n” number times to create “n” number of trees.

5.2 Comparative Analysis with the existing algorithms:

PARAMETERS	SUPPORT VECTOR MACHINE	DECISION TREE	RANDOM FOREST
1.Overfitting (for our system)	Not Applicable	YES	NO
2.Underfitting	Not Applicable	NO	NO
3.Accuracy (for our system)	Low	Medium	High
4. Type of classifier	LINEAR CLASSIFIER	MULTIPLE CLASSIFIER	NON-LINEAR
5.Error rate	Not Applicable	9/50	7/50

Table 2 : Evaluation of the developed system (Accuracy, Effectiveness, Efficiency)

Chapter 6: Testing

- **Black Box Testing**

Black box testing also known as Behavioural Testing, is a software testing method in which the internal structure/design/implementation of the item being tested is not known to the tester.

These tests can be functional or non-functional, though usually functional. This method is named so because the software program, in the eyes of the tester, is like a black box; inside which one cannot see. Black box testing is basic used for validating functional requirements of the system. Equivalence partitioning, is a software test design technique that involves dividing input values into valid and invalid partitions and selecting representative values from each partition as test data. Boundary value analysis, is a software test design technique that involves the determination of boundaries for input values and selecting values that are at the boundaries and just inside/outside of the boundaries as test data. Cause-effect graphing, is a software test design technique that involves identifying the cases (input conditions) and effects (output conditions), producing a Cause-Effect Graph, and generating test cases accordingly.

- **White Box Testing**

It is testing method based on an analysis of the internal structure of the component or system.

White Box Testing (also known as Clear Box Testing, Open Box Testing, Glass Box Testing, Transparent Box Testing, Code-Based Testing or Structural Testing) is a software testing method in which the internal structure/design/implementation of the item being tested is known to the tester. The tester chooses inputs to exercise paths through the code and determines the appropriate outputs. Programming know-how and the implementation knowledge is essential. White box testing is testing beyond the user interface and into the nitty-gritty of a system. This method is named so because the software program, in the eyes of the tester, is like a white/transparent box; inside which one clearly sees

- **Integration Testing**

In this type of testing two or more components are combined and are tested together. It is performed to expose defects in the interfaces and in the interactions between integrated components or systems. Integration Testing is the second level of testing performed after Unit Testing and before System Testing. Developers themselves or independent testers perform Integration Testing.

- **Unit Testing**

The testing of each and every individual software components is called unit testing. The purpose is to validate that each unit of the software performs as designed. A unit is the smallest testable part of any software. It usually has one or a few inputs and usually a single output. Unit testing frameworks, drivers, stubs, and mock/ fake objects are used to assist in unit testing.

- **System Testing**

System Testing is a level of software testing where a complete and integrated software is tested. The purpose of this test is to evaluate the system's compliance with the specified requirements. System Testing is the third level of software testing performed after Integration Testing and before Acceptance Testing. Normally, independent Testers perform System Testing.

Positive Test cases:

Test case no.:	Description	Expected value
1	Check plan generated for valid input	Plan generated must be accurate as per inputs provided by the users

2	Check values stored in database	Values stored in database should be in same order as that of input given to algorithm
---	---------------------------------	---

Negative Test cases:

Test case no.:	Description	Expected value
1	Check for null values	The null values should be discarded and model should raise an error

TESTING:

- 1] Initial testing was done by taking into account all the aspects of the dataset into consideration



Showing rows 0 - 3 (4 total, Query took 0.0017 seconds.)

```
SELECT * FROM `user_exel`
```

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all | Number of rows: 25 ▾ Filter rows: Search this table

+ Options	user_name	age	gender	weight	height	bmi	healthy	overweight	obese	veg
	tanny	18	1	70	178	22	1	0	0	1
	pp	63	0	90	173	30	0	0	1	0
	ak	18	1	70	180	22	1	0	0	0
	kp	20	1	70	178	22	1	0	0	0

Showing rows 0 - 3 (4 total, Query took 0.0164 seconds.)

```
SELECT * FROM `user_exe2`
```

Profiling [Edit inline](#) [Edit](#) [Explain SQL](#) [Create PHP code](#) [Refresh](#)

Show all | Number of rows: 25 ▾ Filter rows: Search this table

+ Options

disease	situps	rc	bc	fk	lr	eb	lu	hk	sk
0	0	0	0	0	0	0	0	0	0
4	1	1	1	1	1	1	1	0	1
0	0	0	1	1	1	0	0	0	0
5	0	0	0	0	0	0	0	0	0

Showing rows 0 - 3 (4 total, Query took 0.0089 seconds.)

```
SELECT * FROM `user_exe3`
```

Profiling [Edit inline](#) [Edit](#) [Explain SQL](#) [Create PHP code](#) [Refresh](#)

Show all | Number of rows: 25 ▾ Filter rows: Search this table

+ Options

climb	pj	lsu	squats	dk	bri	jkt	fs	slr	cgp
0	0	0	0	0	0	0	0	0	0
0	1	0	0	1	0	0	1	0	0
0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0

Show all | Number of rows: 25 ▾ Filter rows: Search this table

Showing rows 0 - 3 (4 total, Query took 0.0264 seconds.)

```
SELECT * FROM `user_exe5`
```

Profiling [Edit inline](#) [Edit](#) [Explain SQL](#) [Create PHP code](#) [Refresh](#)

Show all | Number of rows: 25 ▾ Filter rows: Search this table

+ Options

pspl	pus	shrugs	backlifts	legplank	reverse	pushups	cet	chestsqueezes	ppu
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0

Showing rows 0 - 3 (4 total, Query took 0.0117 seconds)

```
SELECT * FROM `user_exer`
```

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

	tea	coffee	fries	chapati	rice	leaf_vegetable	fish	eggs	chicken	soup	bandp	desert
0	0	1	0	0	0		1	0	0	0	1	1
1	0	0	0	0	0		1	1	1	0	0	1
1	0	1	1	1	1		1	1	1	1	1	1
0	0	0	1	1	1		0	1	0	1	0	0

Show all | Number of rows: 25 ▾ Filter rows: Search this table

2] The final output was shown by taking into consideration all the inputs the user took.

This show the correct diet and the correct exercises to be followed everyday.

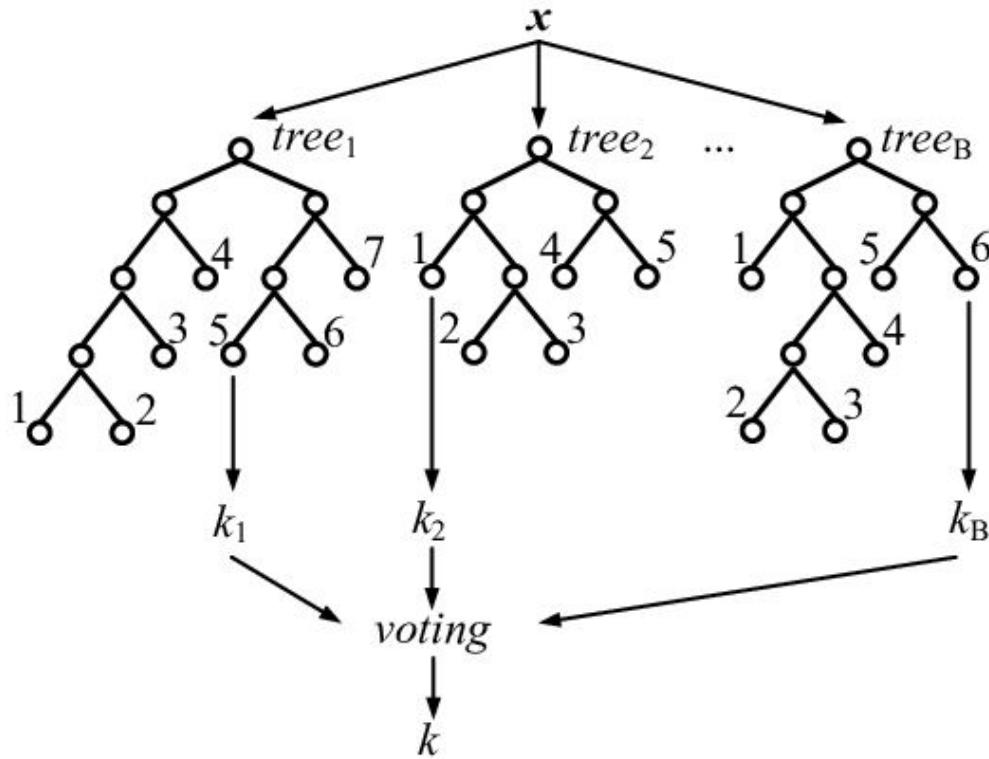
The screenshot shows a fitness application interface. At the top, there are navigation links: HFA, ABOUT, VIDEOS, SIGNUP, PLAN, and CONTACTUS. On the left, there is a sidebar for a user named 'kp' (user no 1) with a profile picture of a bald man flexing his bicep. Below the profile picture, there is a list of days: day 1, day 2, day 3, day 4, day 5, day 6, REST day, and day 7. The main area displays a grid of exercises:

- Top row: reverse crunches (repetition), leg raises (repetition)
- Middle row: calories (calories), side to side chops (repetition)
- Bottom row: calories (calories), Activate Windows (Go to Settings to activate Windows.)

Each exercise entry includes a small icon of a person performing the exercise and the source 'SPOTIFI.COM'.

Chapter 7: Result Analysis

7.1 Simulation Model:



Random forest is a committee of decision trees . Majority voting is applied to aggregate trees into a committee when solving classification tasks. As the number of trees in RF increases, the test set error rates converge to a limit, meaning that there is no over-fitting in large RFs .

Low bias and low correlation are essential for accuracy. To get low bias, trees are grown to maximum depth. To achieve low correlation, randomization is applied:

- i) Each tree of RF is grown on a bootstrap sample of the training set.
- ii) When growing a tree, at each node, n variables are randomly selected out of the N available. At each node, only one variable, providing the best split, is used out of the n selected.

7.2 Parameters considered:

Age	Gender	Weight	Height
describes the age of the user	describes the gender of the user	describes the weight of the user	describes the height of the user

BMI	Normal weight	Over weight	Obese
bmi obtained	categorises the user	categorises the user	categorises the user

Veg	Non Veg	Diseases	Food Items
users diet division	users diet division	diseases suffered	input to the system

Various Exercises	Cardiovascular Exercises
input to the system	input to the system

7.3 Screenshots of User Interface (UI):

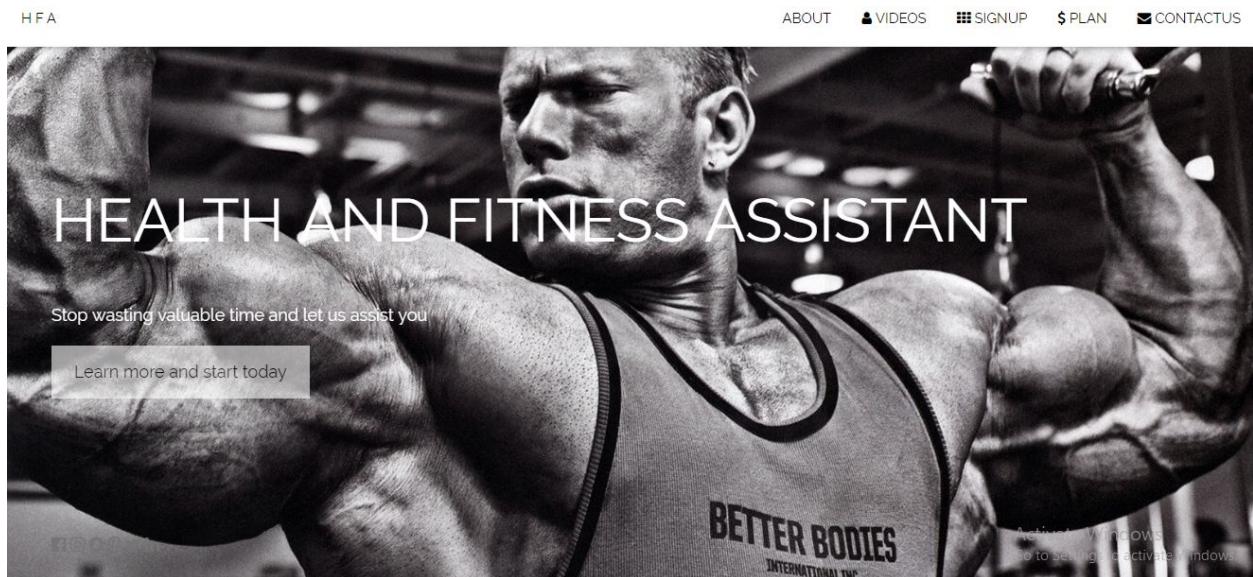


Fig 10 : Home Page

A screenshot of the "About The Website" section of the HFA website. The page has a light blue header with the "HFA" logo and a navigation bar with links for "ABOUT", "VIDEOS", "SIGNUP", "PLAN", and "CONTACTUS". Below the header, the title "ABOUT THE WEBSITE" is centered, followed by the subtitle "Key features of our website". There are four main sections: "DIET" (represented by a red coffee cup icon), "WORKOUT" (represented by a red heart with a pulse icon), "STAY MOTIVATED" (represented by a yellow smiley face icon), and "Support" (represented by a black gear icon). Each section has a brief description: "DIET" says "Eat quality protein. Eat lots of vegetables. Try this approach and see how it works for you!", "WORKOUT" says "Quality training doesn't have to be a complicating factor in your life. Let us show you how!", "STAY MOTIVATED" says "Got the Health Blues? We will ensure you get up and get going... Everytime!", and "Support" says "Need help achieving your fitness goals? The Health & Fitness support will provide you with the best advice to get there.". A watermark for "Activate Windows" is visible in the bottom right corner.

Fig 11 : About The Website

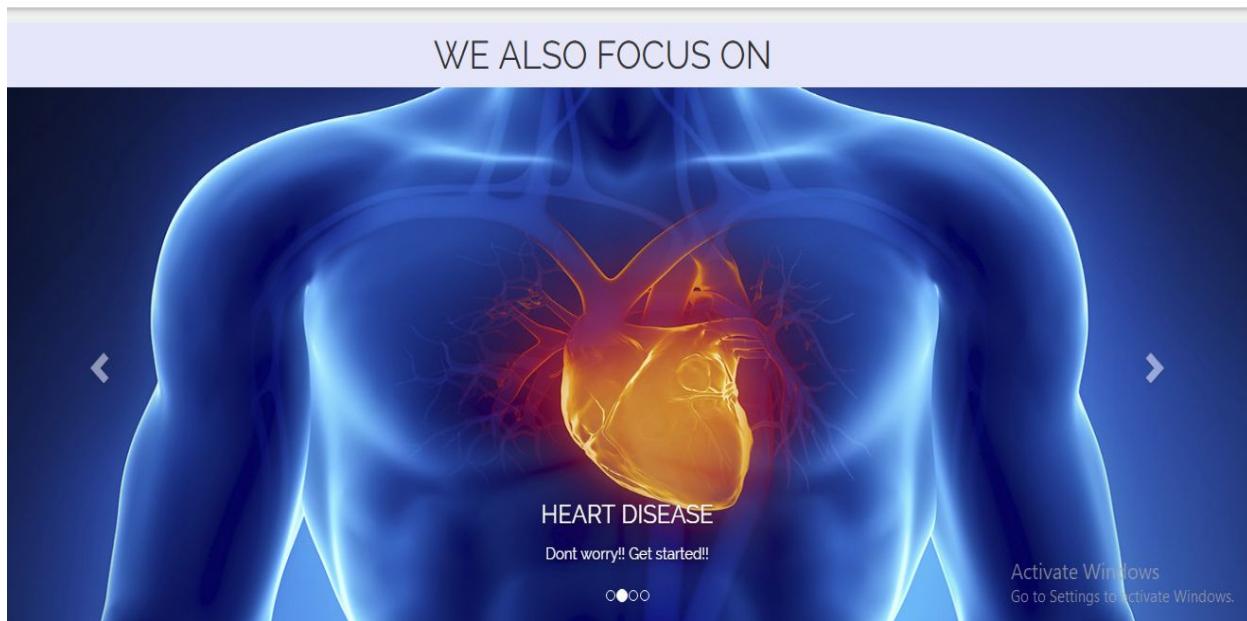


Fig 12 : Features / Focus of the Website

This screenshot shows the "Over Weight" category page from the HFA website. The layout is identical to the homepage's weight categories, featuring three main sections: "Normal Weight" (black), "Over Weight" (red, highlighted), and "Obese" (black). Each section contains four items: "Goals", "Diet", "Workout", and "Endless Support". Below these is a "Watch videos" button and a "Sign Up" button. A "Activate Windows" button is also present at the bottom right. The "Over Weight" section is currently active, indicated by its red background.

Fig 13 : Weight Categories

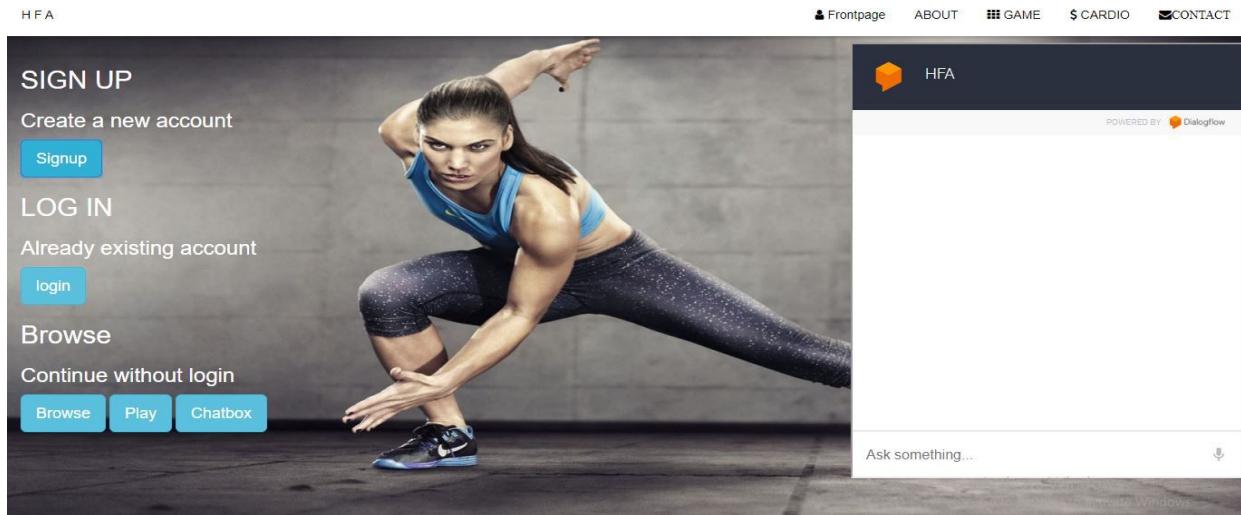


Fig 14 : Login / Sign Up / Guest Page

The sign-up form is titled "Be a Member!!" and contains fields for First name, Last name, User name, Password, Re-Enter Password, and E-mail. A "Submit" button is at the bottom. To the right of the form is a stylized black-and-white illustration of a muscular man flexing his biceps. A "Next" button is located at the bottom right of the form area.

First name:	<input type="text"/>
Last name:	<input type="text"/>
User name:	<input type="text"/>
Password:	<input type="password"/>
Re-Enter Password:	<input type="password"/>
E-mail:	<input type="text"/>
<input type="button" value="Submit"/>	
<input type="button" value="Next"/>	

Fig 15 : Sign Up Page

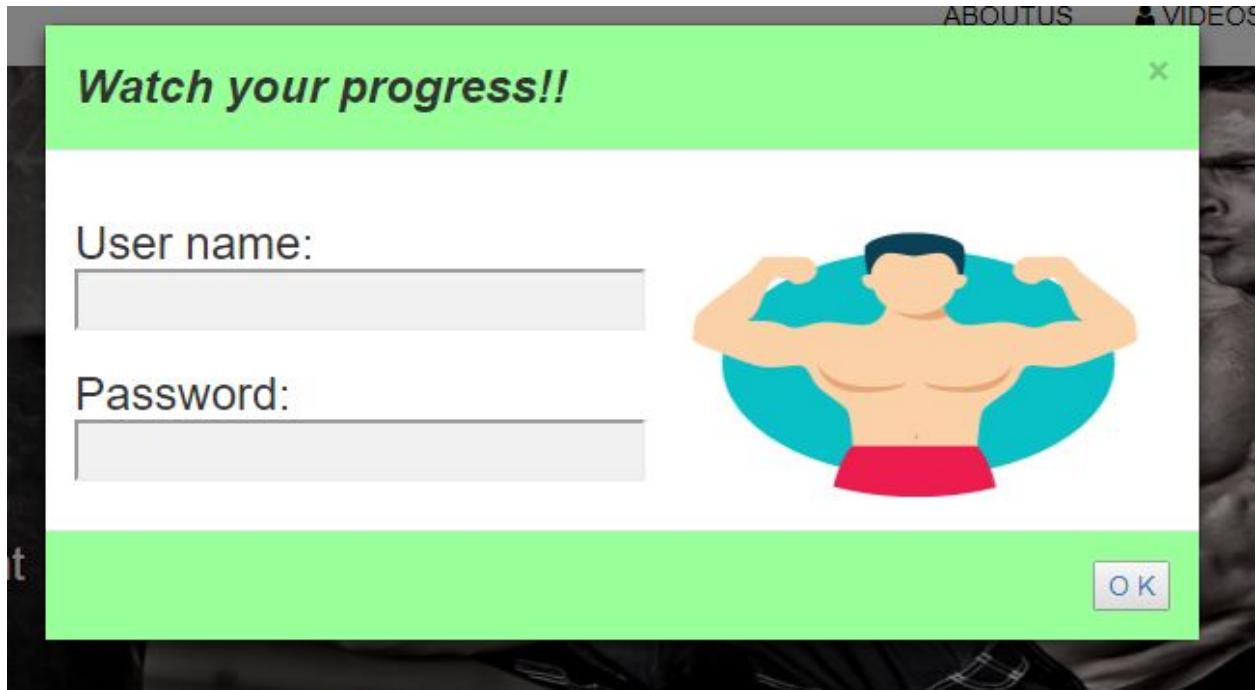


Fig 16 : Login Page

A screenshot of an exercise information page. On the left, there is a vertical sidebar with icons and text for "ABS", "QUADS", "GLUTES", "TRICEPS", "BICEPS", and "BACK". The main content area has a dark background. At the top, it says "KNOW THE EXERCISES" and "Half knowledge is dangerous knowledge". Below this is a small illustration of a muscular man. The word "ABS" is prominently displayed in large white letters. Underneath "ABS", there are two smaller text labels: "SIT UPS" and "REVERSE CRUNCHES". A large, light blue rectangular box is positioned between these two labels. At the bottom right, there is a watermark for "Activate Windows" featuring a hand holding a key.

Fig 17 : Exercise Information Page

" Enter your current diet "



Fig 18 : Diet Input Page

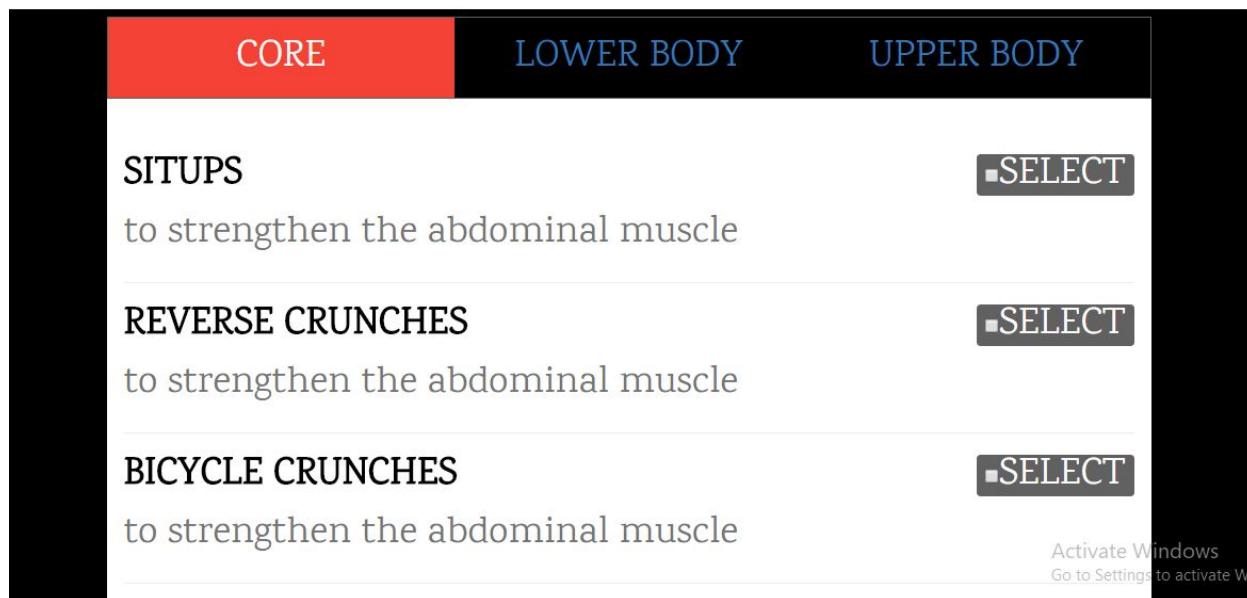


Fig 19 : Exercise Input Page



My PLAN

Details:

workout and diet

water intake

watch videos

cardio

JASMINE D. F.

user no 1

- day 1
- day 2
- day 3
- day 4
- day 5
- day 6
- REST day
- day 7

workout:



sit ups repetition calories



Lunges repetition

calories

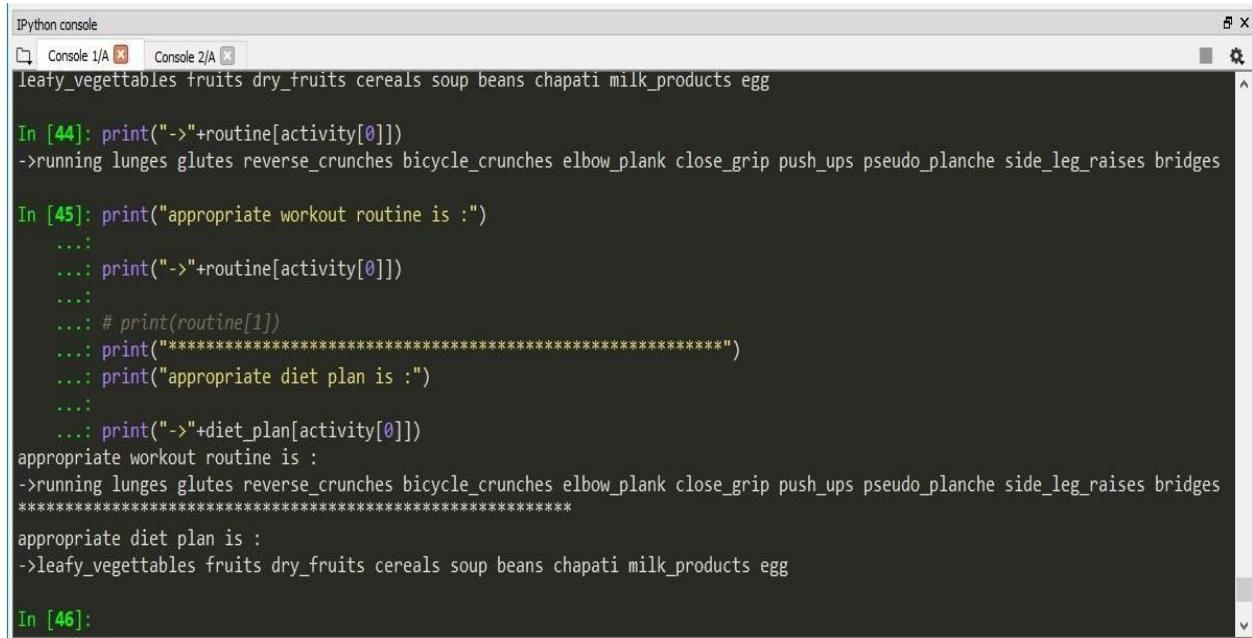


squats repetition calories

Activate Windows
Go to Settings to activate Windows.

Fig 20 : User's Personalised Plan Page

7.4 Graphical outputs:



The screenshot shows an IPython console window with two tabs: 'Console 1/A' and 'Console 2/A'. The code in the console is as follows:

```
leafy_vegetables fruits dry_fruits cereals soup beans chapati milk_products egg

In [44]: print("->"+routine[activity[0]])
->running lunges glutes reverse_crunches bicycle_crunches elbow_plank close_grip push_ups pseudo_planche side_leg_raises bridges

In [45]: print("appropriate workout routine is :")
...
...: print(" ->"+routine[activity[0]])
...
...: # print(routine[1])
...: print("*****")
...: print("appropriate diet plan is :")
...
...: print("->"+diet_plan[activity[0]])
appropriate workout routine is :
->running lunges glutes reverse_crunches bicycle_crunches elbow_plank close_grip push_ups pseudo_planche side_leg_raises bridges
*****
appropriate diet plan is :
->leafy_vegetables fruits dry_fruits cereals soup beans chapati milk_products egg

In [46]:
```

7.5 Reports generated / Tables obtained

Total Training Samples	1000
Train - Test Split	19:1
Test - Set Accuracy	99.01%
Number of workout plans	18
Number of inputs taken	73
Disease considered	yes

Table 3 : Reports generated

Chapter 8: Conclusion

8.1 Limitations:

- The System is not generally adopted at managing the highly sophisticated sensory inputs.
- The Systems do not respond well to the various situations out side their range of the expertise.
- The human self – awareness is lacking in the Systems.

8.2 Conclusion:

- To create a System which will accept the parameters as mentioned in the definition, goals, methodology.
- The System will communicate with the database where the Machine Learning is implemented.
- Machine Learning algorithm will evaluate the data , it predicts whether given input is susceptible for any change .
- The correct schedule is returned to the System.
- The Health and Fitness Assistant will help each user get started on the right track by first evaluating them and determining baseline fitness levels for movement imbalances.
- This information is important to better design a customized workout for each user.
- We plan to involve adults and children in our project as it is a fitness application for everyone.
- Data Sets will be used over the next semester of our academic year to populate and train the system.
- We will even consider various conditions that the users are currently suffering from such as diabetes, obesity, arthritis, etc...
- Knowing the user's current medical conditions is a must and is required to provide a safe and appropriate workout plan.

- Its also a great social workout app which allows friends and family to “bump” their phones with each other to create “on the go” workout competitions which the winner will even be awarded for.

8.3 Future Scope

- A chatbot is a computer program which conducts a conversation via auditory or textual methods.
- Chatterbots use sophisticated natural language processing systems, and they scan for keywords within the input, then pull a reply with the most matching keywords, or the most similar wording pattern, from a database.
- Chatbox give their users a more convenient and easier way to ask FAQs from them.
- Chatbots are a much better fit for user engagement than Standalone apps.
- Through this HFA Bots, users can ask health related questions and receive immediate responses.
- These responses are either original or based on responses to similar questions in the database.
- The impersonal nature of a bot could act as a benefit in certain situations, where an actual gym-trainer is not needed.
- Chatbots ease the access to healthcare and industry has favourable chances to serve their users with personalised health tips.

References

- [1] ImanKhaghani-Far; Svetlana Nikitina; Marcos Báez; Ekaterina A. Taran:“Fitness Applications for Home-Based Training “ Fabio Casati IEEE Pervasive Computing Year: 2016, Volume:15,Issue:4,Pages:56-65
- [2] SarawutBussadee; SittipongSuwannatria; ArnonChonrawut; EkThamwiwatthana; KitsuchartPasupa: “Inside Me: A proposal for healthcare mobile application” 2016 Fifth ICT International Student Project Conference (ICT-ISPC)Year: 2016 Pages: 85 - 88
- [3] Ruth White; William S. Harwin; William Holderbaum; Laura Johnson 2015 :“Investigating Eating Behaviours Using Topic Models” IEEE 14th International Conference on Machine Learning and Applications (ICMLA) Year: 2015 Pages: 265 - 270
- [4] Marji; Dian EkaRatnawati2016 : “System For Human Diet Planning” International Conference on Advanced Computer Science and Information Systems (ICACSIS) Year: 2016 Pages:283-287
- [5] Stefan Scerri; LalitGarg; Christian Scerri; RamandeepGarg2014 :“Human-computer interaction Patterns within the Mobile Nutrition Landscape” International Conference on Future Internet of Things and Cloud Year: 2014 Pages: 437 - 441
- [6] Haitao; Shi Qing 2010 :“Development and Application of Teenager Physical Fitness and Mental Health Detection System :“Second International Conference on Multimedia and Information Technology Year: 2010, Volume: 1 Pages: 144 - 147.
- [7] AlexandraChapko; Marc Gräßle; Andreas Emrich; Dirk Werth; NicoLaum; Christian Lerche; Carsten Rust; Jürgen Tacken; Stephan Flake; Alexander Weber :”User-generated mobile services for health and fitness”ETFA2011 Year: 2011 Pages: 1 – 8
- [8] HaoHaitao; Dai Xinyan2010 :”Development and Application of Undergraduate Physical Fitness and Mental Health Detection System” Second International Conference on Computer Modeling and Simulation Year: 2010, Volume: 3 Pages: 486 - 488

PAPER PUBLICATIONS

PAPER 1

HEALTH AND FITNESS ASSISTANT

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Abstract: A personal trainer is a fitness professional that provides motivation needed to reach your target. Personal Trainer plays a vital role in your fitness success. When the target is selected, the trainer will instruct appropriate workout methods and helps in overall development of his client. But all of this comes at great cost. Generally, more qualified the Trainer is, the more personal sessions will cost. This paper enables us to understand how the need for the Personal Trainer can be fulfilled in a web app, by using machine learning algorithms. This app will be able to learn about your diet and customize a diet plan according to type of workout selected. It will also be able to produce custom workout plans for the user based on their recent activities throughout the day, in the last week or the last month. Each plan will bring you closer to the body and healthy lifestyle the user want.

IndexTerms - Machine Learning algorithms, Web App

Introduction

People nowadays have got more conscious about their health. They consult a dietician or a personal trainer regularly so that to make sure they fit all the time. But visiting a dietician or a personal trainer regularly can be costly and time consuming. Moreover a dietician or a personal trainer cannot keep track of the day to day activities of the user in order to give a diet plan and workout routine. So these problems will be solved by the proposed system.

The goal of this system is to provide a personal trainer which suggests a diet plan and workout plan for a particular type of training that is selected. The personal trainer has the ability to take the workouts to an another level irrespective of the ability to remain motivated. When humans are been watched, humans have the tendency to pull, push and act amongst themselves in a better way. These workouts, exercises and training would always be at a greater level, accurate and proper, if that person training them is a professional in fitness and diet. This professional knows the correct exercises and their techniques.

Health and Fitness Assistant (HFA) is a simple to use , user friendly, free web app.

This assistant has been trained, using various machine learning algorithms, to create and implement customised workout and diet plan that are suitable for specific user. Hence this app would create a proper plan and schedule for the users diet and workout sessions according to the goals and target selected by the user using research-proven and published protocols. If the user has not completed or reached his current daily target provided by the web app, the current plan would be customised to the current schedule for the upcoming days. As a result, progress of each day would be monitored and analysed by the system and each day there will be plan and schedule according to the previous activities. Each piece of advice has one motive: to reach the user's fitness goals.

This assistance is for all your health and fitness needs. The diet and fitness section gives information about how you can control your daily diet, and how you can workout and exercise to lead a healthier , better and well-rounded lifestyle.

This system will have an overview "look" to see the improvement they have made. This system is able to learn about your diet and customize a diet plan according to type of workout selected.. The app is able to produce custom workout plans for the user based on their recent activities throughout the day, in the last week or the last month Database will be updated with information like current diet consumed and exercise done. The system will have various tools to compute fitness related parameter like Daily proteins requirement, Food fat, Target heart rate, One Rep max etc.

I. Motivation

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Most people lack the knowledge on how to get a good workout. Going to gym frequently, people don't have any support and the information to get proper results. Health and Fitness Assistant, free web app, will get a customised workout with a clear focus on users goals and results. If the user wants to lose weight, tone or tighten muscles, or simply lead a better life, the HFA has a simple

philosophy. It pairs the user with a Personal Trainer that is made using machine learning along with diet and workout sessions to be carried out.

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A healthcare application called inside me was published in a research paper,[2] according to this paper, this application, monitored various activities of the people and analysed them. It kept track of various activities of the user. Similarly we aim to implement such features in our system which will monitor daily diet plan and workout routine of the user and provide them with a new workout plan and diet plan considering the parameters like medical report, age etc. This allotment of customized diet plan and workout routine will be facilitated by using two main classification algorithms like Decision tree and Random forest. These machine learning models will be given training input data which is verified and provided by various dieticians and gym trainers. Thus the activities that will be provided to the user will be completely safe considering the health issues of the user.

It indicated various activity performed and activities that have to be performed by the user. Diabetes and other disease about the people were known using questionnaire. It also checked the various medical report of the user using the application. From these research papers, observation was focussed on algorithms such as decision tree, random forest, topic model, logistic regression ,etc and techniques used were questionnaire feedback systems, etc. These algorithms were used to get information about various activities as well as various diet people used in their daily lives .

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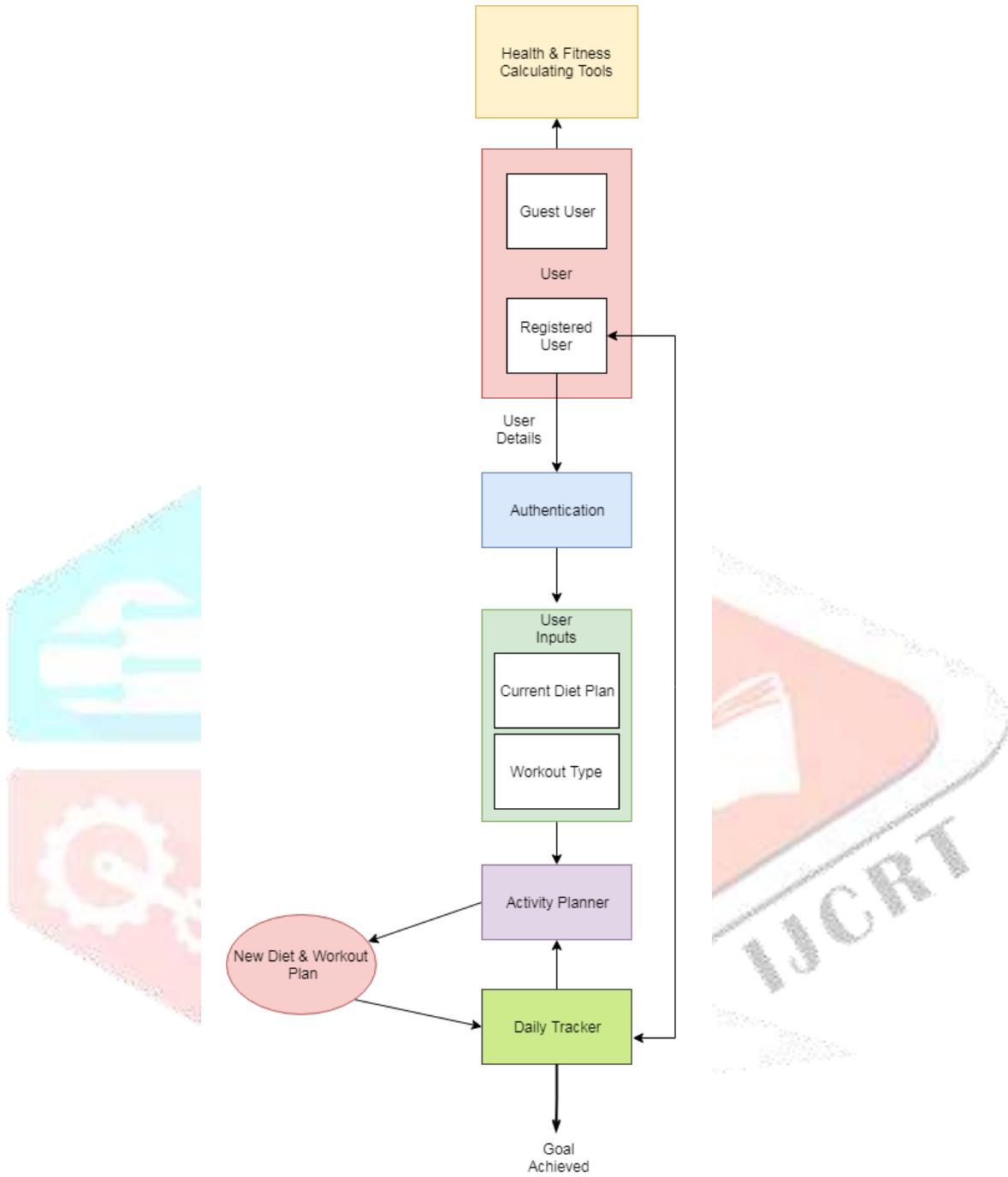


Figure 1.0 :Overall flow

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4. Activity Planner - This module receives the input from user input module. This basically comprises of machine learning algorithm which are trained using the training data provided and verified by various dieticians and gym trainers. The two classification algorithm used to implement the model are:
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variable. This algorithm classifies with respect to various parameters and predicts most appropriate workout and diet plan based on inputs given by the user.

b) Random Forest - This is another classification model which classifies using answer of multiple decision trees. It not only gives high accuracy and precision but also reduces overfitting.

At the end of this step a new diet and workout plan is generated considering all the parameters given by the user. This plans are saved in database for future applications

5. Daily Tracker - This module keeps track of user activities by taking inputs from user like workouts done and diet eaten regularly, and comparing them with the original plan which was stored in the database in the above step, if there are any dissimilarities between inputs provided by the user and plan retrieved from the database then these changes are loaded back again to activity planner for creating the new plan, else system notifies users that their task is accomplished successfully.

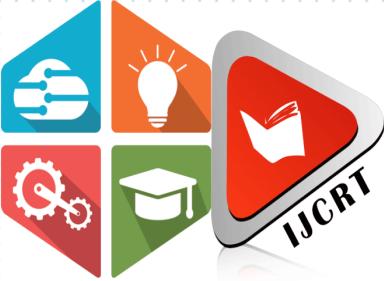
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IV. References

- [1] Iman Khaghani-Far; Svetlana Nikitina; Marcos Báez; Ekaterina A. Taran: "Fitness Applications for Home-Based Training" Fabio Casati IEEE Pervasive Computing Year: 2016, Volume: 15, Issue: 4 Pages: 56 - 65
- [2] Sarawut Bussaddee; Sittipong Suwannatria; Arnon Chonrawut; Ek Thamwiwatthana; Kitsuchart Pasupa: "Inside Me: A proposal for healthcare mobile application" 2016 Fifth ICT International Student Project Conference (ICT-ISPC) Year: 2016 Pages: 85 - 88
- [3] Ruth White; William S. Harwin; William Holderbaum; Laura Johnson 2015 "Investigating Eating Behaviours Using Topic Models" IEEE 14th International Conference on Machine Learning and Applications (ICMLA) Year: 2015 Pages: 265 - 270
- [4] Marji; Dian Eka Ratnawati 2016 : "System For Human Diet Planning" International Conference on Advanced Computer Science and Information Systems (ICACSI) Year: 2016 Pages: 283 - 287
- [5] Stefan Scerri; Lalit Garg; Christian Scerri; Ramandeep Garg 2014 :"Human-computer interaction Patterns within the Mobile Nutrition Landscape" International Conference on Future Internet of Things and Cloud Year: 2014 Pages: 437 - 441
- [6] Haitao; Shi Qing 2010 "Development and Application of Teenager Physical Fitness and Mental Health Detection System :"Second International Conference on Multimedia and Information Technology Year: 2010, Volume: 1 Pages: 144 - 147.
- [7] Edith Talina Luhanga; Akpa Akpro Elder Hippocrate; Hirohiko Suwa; Yutaka Arakawa; Keiichi Yasumoto "Identifying and Evaluating User Requirements for Smartphone Group Fitness Applications" Year: 2018, Volume: 6 Pages: 3256 - 3269
- [8] Chaitanya Suvarna; Abhishek Sali; Sakina Salmani "Efficient heart disease prediction system using optimization technique" 2017 International Conference on Computing Methodologies and Communication (ICCMC) Pages: 374 - 379
- [9] Kento Morita; Atsuki Tashita; Manabu Nii; Syojo Kobashi 2017"Computer-aided diagnosis system for Rheumatoid Arthritis using machine learning" International Conference on Machine Learning and Cybernetics (ICMLC) Year: 2017, Volume: 2 Pages: 357 - 360
- [10] Sivaramakrishnan R Guruvayur; R. Suchithra "A detailed study on machine learning techniques for data mining."2017 International Conference on Trends in Electronics and Informatics (ICEI) Year: 2017 Pages: 1187 - 1192
- [11] P. S. Madanayake; W. A. D. K. Wickramasinghe; H. P. Liyanarachchi; H. M. D. M. Herath; A. Karunasena; T. D. Perera"Fitness Mate: Intelligent workout assistant using motion detection" 2016 IEEE International Conference on Information and Automation for Sustainability (ICIAs) Year: 2016 Pages: 1 – 5
- [12] Anilkumar Kothalil Gopalakrishnan 2017 "Recommended weight prediction system based on BMI, BMR, food calorie and a neural network." International Conference on Intelligent Informatics and Biomedical Sciences (ICIIBMS) Year: 2017 Pages: 15 - 22

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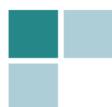
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People nowadays have got more conscious about their health. They consult a dietitian or a personal trainer regularly so that to make sure they fit all the time. But visiting a dietitian or a personal trainer regularly can be costly and time consuming. Moreover a dietitian or a personal trainer cannot keep track of the day to day activities of the user in order to give a diet plan and workout routine. So these problems will be solved by the proposed system. The goal of this system is to provide a personal trainer which suggests a diet plan and workout plan for a particular type of training that is selected. The personal trainer has the ability to take the workouts to an another level irrespective of the ability to remain motivated. When humans are been watched, humans have the tendency to pull, push and act amongst themselves in a better way. These workouts, exercises and training would always be at a greater level, accurate and proper, if that person training them is a professional in fitness and diet. This professional knows the correct exercises and their techniques. Health and Fitness Assistant (HFA) is a simple to use , user friendly, free web app. This assistant has been trained, using various machine learning algorithms, to create and implement customised workout and diet plan that are suitable for specific user. Hence this app would create a proper plan and schedule for the users diet and workout sessions according to the goals and target selected by the user using research-proven and published protocols. If the user has not completed or reached his current daily target provided by the web app, the current plan would be customised to the current schedule for the upcoming days. As a result, progress of each day would be monitored and analysed by the system and each day there will be plan and schedule according to the previous activities. Each piece of advice has one motive: to reach the user's fitness goals. This assistance is for all your health and fitness needs. The diet and fitness section gives information about how you can control your daily diet, and how you can workout and exercise to lead a healthier , better and well-rounded lifestyle. This system will have an overview "look" to see the improvement they have made. This system is able to learn about your diet and

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There are large amount of mobile applications for weight and diet management. Although, applications for these management are not experimented and checked in many contents as well as there is no support for accuracy. Efficiency, improvements, quality are important in their own aspects. There are handsome, less, few amount of examples of food systems and diet systems that provide to the users nutritional information about proper diet and proper workout plan. We propose HFA(Health and Fitness assistant), a recommender system to improve the quality of life of obese people, healthy people and individuals affected by chronic diet-related diseases. The proposed system is able to build a user's health profile, and provides individualized nutritional recommendation according to the health profile as well as Iphilosophy. It pairs the user with a Personal Trainer that is made using machine learning along with diet and workout sessions to be carried out.

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This system works using various modules listed below. Refer fig. 1.0 given below shows various modules in the system and the relationship that exists between them.

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PAPER 2

Study on Health and Fitness Assistant

Prof. Pooja Nagdev¹, Simran Batra², Sahil Pamnani³, Pranav Parab⁴, Karan Parikh⁵

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Abstract— People have become more cautious about their health as well as fitness, trying to know all the areas where they can learn to be better by the help of a personal trainer or by themselves. As a result there is increase in the daily use of workout, fitness, diet related search over the internet. One such website application that falls into this category is the “Health and Fitness Assistant” which is easy to use user friendly assistant for men as well as women. This application focuses on five main diseases suffered by majority of the population. Proper knowledge about the food intake and the exercises to be carried out is a major aspect of this application. The paper discusses the advantages of having a chatbot in the health application. Discussion about generation gap can create change in the daily workout routine of individuals. Study on this application helps us understand various goals and different targets people have and how to reach to that goal. Each user can have their own plans based on the input they provide to the application. Users can learn their exercises by watching videos provided by this application and can gain information about the calories burnt on each exercise. This project was developed using html, css, bootstrap, php, python, api.ai and machine learning algorithm called Random Forest.

Keywords—diet, workout, exercise, random forest, chatbot, videos, diseases

Introduction:

The use of social networks, internet, applications are increasing on a daily basis. People have become more advanced in learning and thinking. As a result, majority of the crowd are completely or partially dependent over the internet, spending most of their time on social networking sites or the internet. Hence, they become lazy, less active, lethargic as well as obese. Many

people have allergies as well as irritations from various substances like smoke, pollen grains, smell of flowers, dust particles etc these are the people suffering from chronic disease called asthma. Cardiovascular diseases also called as heart diseases are often found in people over the age of 30, these people may suffer from chest pain, nausea, short breath taking etc. High blood pressure is a type of disease that is found in people who undergo hypertension. There are many cases where people are not aware that they are suffering from high blood pressure. People may suffer from nose bleeding, dizziness, etc. Whereas low blood pressure causes stroke, can relate to heart disease and can also cause kidney failure. Arthritis refers to pain in the joint causing joint stiffness, joint pains, as well as numbness.

This paper highlights the Health and Fitness assistant website application which focuses on heart, high and low blood pressure, asthma and arthritis, making this website accessible even to those people who are suffering from these diseases. This web application acts as a personal trainer or a fitness guide which provides a proper, easy to follow workout routine and a healthy diet plan.

Problem Statement:

To create a web application with a simple user interface where each user using the application fills his details which consists of his current diet and his current workout routine. According to the details filled by the user a workout and a diet plan is provided to the user. The user can also learn his exercises by videos provided by this web application.

Objective:

- 1] To create a home based system that acts a personal trainer also as a dietitian which provides a correct diet and workout plan for every user.

2] To focus on number of diseases the user suffers and to separate users into two main categories that is vegetarian and non-vegetarian.

3] To create a platform where users can learn various exercises on their own together with some tips and steps to be followed.

4] To provide information to the users about the number of repetitions carried out for each exercise and provide information regarding the calories burnt.

Proposed Module:

A. Home Feed :

This Home feed acts as the user friendly front page which describes the entire website application. The users using this application have to sign up or login to get access to the plans provided by this fitness assistant. Non logged in users can only get direct information about guide to various videos regarding the exercises.

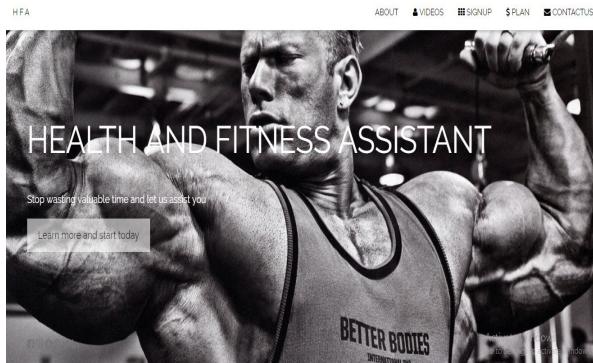


Fig1 : front page

B. Additional Focus :

In this application, it also focuses on the major diseases found nowadays in most of the people. Like for example, Heart diseases, Asthma , High Blood Pressure , Low Blood Pressure and Arthritis . Depending upon the type of disease, particular training and diet is provided to the user.

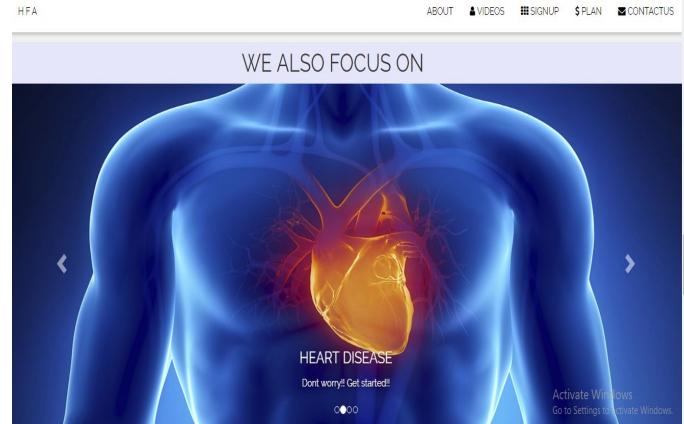


Fig 2 :Diseases

C. User categorisation :

This website application, discusses how users are categorized into three categories : normal weight, overweight and obese. Each category focuses on a particular goal involving a proper diet and a workout plan. Users also have an option to watch and learn videos.

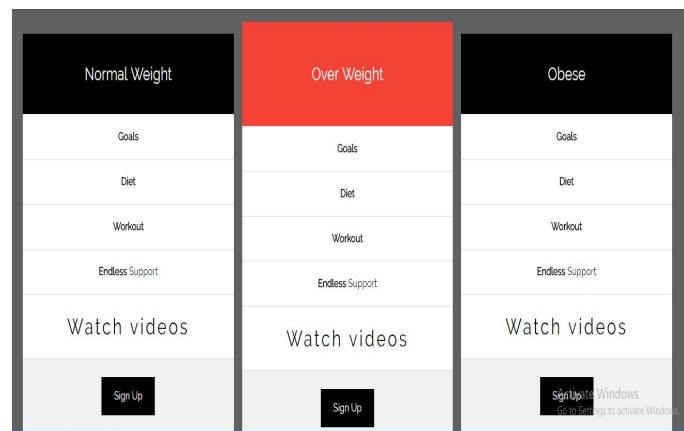


Fig 3: user category

D. Login/ Signup Page :

On this page , the user can login to its existing account or just signup if he/she doesn't have an account, which will redirect to the another page that helps the user to create its new account.Also,the user can browse the application without logging in.



Fig 4: login/signup page

E. Type of Exercises :

Users when logged in, have to fill in information about their current exercise, these exercises are classified into three sections. The sections include: core exercises, lower body exercises and upper body exercises. Each section involves various exercises that the user fills in.

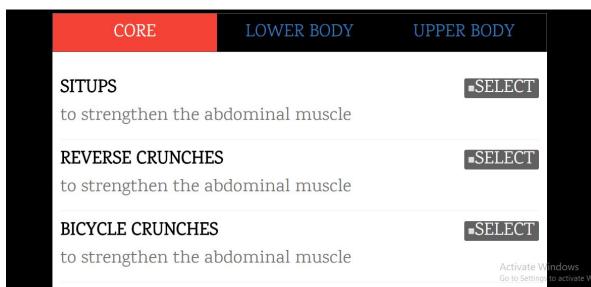


Fig 5:Type of exercise

F. Diet Plan :

After logging in , the user has to enter his/her current diet plan,which helps the system to generate their training

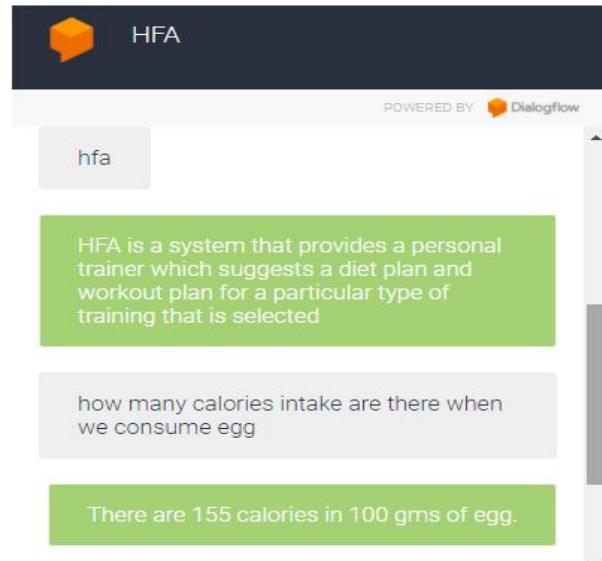


Fig 6: Diet plan

G. Workout Plans :

Once the “Enter your Personal Details” part is done, the system generates a particular plan based on random forest algorithm for the user based on their goal and previously entered diet plan. After specific amount of days, the exercises get changed, which gets closer to achieve their goal.



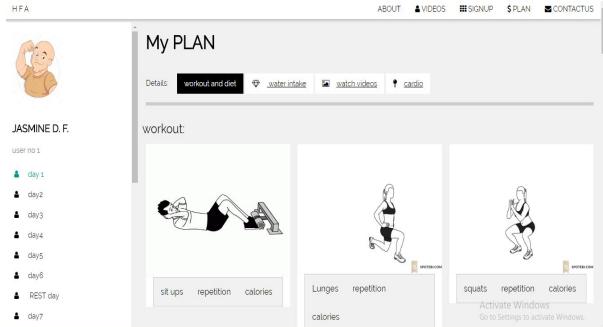


Fig 7:Workoutplan

H. Chatbot :

Fig 8:Chatbot

The following things can be used for user's interaction with the help of a chatbot:

A chatbot is an computer application which conducts a conversation through the means of audio and text.Chatbots uses natural language processing systems, and they scan for main words within the input, then pull a output with the most similar pattern, from the database.Chatbox give their users a more convenient way to ask FAQs from them.Through this HFA Bots, users can ask health related questions and receive immediate responses. These responses are either original or based on responses to similar questions in the database.The impersonal nature of a bot could act as a benefit in certain situations, where an actual gym-trainer is not needed.Chatbots ease the access to healthcare and industry has favourable chances to serve their users with personalised health tips.

The Chatbots guide the users and help users to set goals.But unlike messaging apps, this one wouldn't have a real person on the other end since all messages are automated.The chatbot tells the user about the set of repetitions to do for a particular age.The chatbot did not only help users to count the calories burnt after doing an exercise but users were also able to use the bot for counting the calories in a food item.

III. Methodology

Our system processes inputs provided by the user in the way given below. Fig 9 shows how data flows through various modules to produce desired plan.

Inputs page - Inputs page - User provides his/her details by filling out the form shown in fig. 5 and fig. 6 . Inputs given by the user consists of various parameters like age, sex, height, weight, disease, food consume by the user and current workout routine followed by the user. These data is then sent to tables in database .

Database - In database values are stored in various different tables to facilitate fast query processing.

test.py - In this python file data from various tables is retrieved and stored in more than one dataframe. Then these data frames are merged and is then send to random forest algorithm in the same order that of dataset, after which a customized plan is generated and is send to redirect.php.

Redirect.php - In this php file test.py file is executed using shell_exec command. Output of this test.py is stored in variable and is concatenated with .php extension. And then it is redirected to the page consisting of corresponding appropriate diet and workout plan given by test.py file.

IV. Advantages:

It takes users health records into consideration while providing the plans for the users.

This project has no involvement of a dietician or a trainer and is free to use for users of all age groups.

It gives answers to users regarding queries and the type of exercises to be performed by providing various videos given in the system.

The exercises does not require any kind of gym equipments, it is totally based on home workout routine.

These exercises are completely related to body weight workout and the diet plan included are well balanced with the complete nutritional aspects required for each user.

V. CONCLUSION:

In this paper, we discussed the “Health and Fitness Assistant”

a website application, which is established on a home based workout schedule. The main purpose of this paper is to make users get acquainted to various exercises and diet. This application was developed using machine learning algorithm called random forest. This application explains the benefits of using a web application as a workout trainer.

FUTURE SCOPE:

Health and Fitness Assistant web-app would provide various gaming challenges, multiple users can come and play. Also this application will reward the users on winning the games. This web-app will give points on completing the target workout plan which can be used as token or coupons for services such as spa or other goodies. The gym trainer and the user, in future, can have a video call , regarding the exercises and the diet plan. After entering the height and weight, the user’s 3D model would be created which would analyze the user’s postures of exercises.

References:

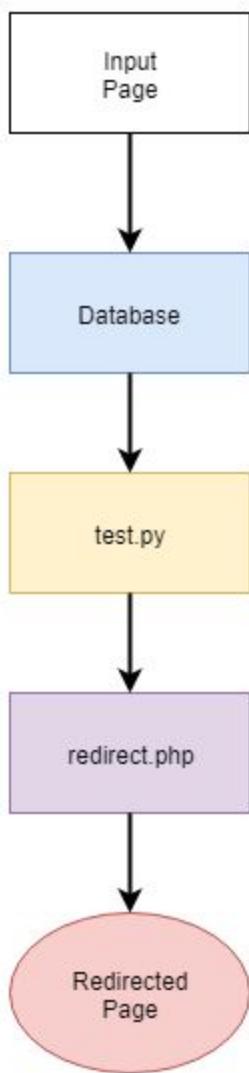


Figure 9 :Overall flow

[1] Iman Khaghani-Far; Svetlana Nikitina; Marcos Báez; Ekaterina A. Taran: “Fitness Applications for Home-Based Training “ Fabio Casati IEEE Pervasive Computing Year: 2016, Volume: 15, Issue: 4 Pages: 56 - 65

[2] Sarawut Bussaddee; Sittipong Suwannatria; Arnon Chonrawut; Ek Thamwiwatthana; Kitsuchart Pasupa: “Inside Me: A proposal for healthcare mobile application” 2016 Fifth ICT International Student Project Conference (ICT-ISPC)Year: 2016 Pages: 85 - 88

[3] Ruth White; William S. Harwin; William Holderbaum; Laura Johnson 2015 “Investigating Eating Behaviours Using Topic Models” IEEE 14th International Conference on Machine Learning and Applications (ICMLA) Year: 2015 Pages: 265 - 270

[4] Marji; Dian Eka Ratnawati 2016 : “System For Human Diet Planning” International Conference on

Advanced Computer Science and Information Systems (ICACSI) Year: 2016 Pages: 283 - 287

[5] Stefan Scerri; Lalit Garg; Christian Scerri; Ramandeep Garg 2014 :“Human-computer interaction Patterns within the Mobile Nutrition Landscape” International Conference on Future Internet of Things and Cloud Year: 2014 Pages: 437 - 441

[6] Haitao; Shi Qing 2010 “Development and Application of Teenager Physical Fitness and Mental Health Detection System :“Second International Conference on Multimedia and Information Technology Year: 2010, Volume: 1 Pages: 144 - 147.

[7] Edith Talina Luhanga; Akpa Akpro Elder Hippocrate; Hirohiko Suwa; Yutaka Arakawa; Keiichi Yasumoto “Identifying and Evaluating User Requirements for Smartphone Group Fitness Applications”Year: 2018, Volume: 6 Pages: 3256 - 3269

[8] Chaitanya Suvarna; Abhishek Sali; Sakina Salmani “Efficient heart disease prediction system using optimization technique” 2017 International Conference on Computing Methodologies and Communication (ICCMC) Pages: 374 - 379

[9] Kento Morita; Atsuki Tashita; Manabu Nii; Syoji Kobashi 2017”Computer-aided diagnosis system for Rheumatoid Arthritis using machine learning” International Conference on Machine Learning and Cybernetics (ICMLC) Year: 2017, Volume: 2 Pages: 357 - 360

[10] Sivaramakrishnan R Guruvayur; R. Suchithra “A detailed study on machine learning techniques for data mining.”2017 International Conference on Trends in Electronics and Informatics (ICEI) Year: 2017 Pages: 1187 - 1192

[11] P. S. Madanayake; W. A. D. K. Wickramasinghe; H. P. Liyanarachchi; H. M. D. M. Herath; A. Karunasena; T. D. Perera“Fitness Mate: Intelligent workout assistant using motion detection” 2016 IEEE International Conference on Information and Automation for Sustainability (ICIAfS) Year: 2016 Pages: 1 - 5

[12] Anilkumar Kothalil Gopalakrishnan 2017 “Recommended weight prediction system based on

BMI, BMR, food calorie and a neural network.” International Conference on Intelligent Informatics and Biomedical Sciences (ICIIBMS) Year: 2017 Pages: 15 - 22

Plagiarism Scan Report

Summary	
Report Generated Date	21 Apr, 2018
Plagiarism Status	100% Unique
Total Words	924
Total Characters	5596
Any Ignore Url Used	

Content Checked For Plagiarism:

Abstract— People have become more cautious about their health as well as fitness, trying to know all the areas where they can learn to be better by the help of a personal trainer or by themselves. As a result there is increase in the daily use of workout, fitness, diet related search over the internet. One such website application that falls into this category is the “Health and Fitness Assistant” which is easy to use user friendly assistant for men as well as women. This application focuses on five main diseases suffered by majority of the population. Proper knowledge about the food intake and the exercises to be carried out is a major aspect of this application. The paper discusses the advantages of having a chatbot in the health application. Discussion about generation gap can create change in the daily workout routine of individuals. Study on this application helps us understand various goals and different targets people have and how to reach to that goal. Each user can have their own plans based on the input they provide to the application. Users can learn their exercises by watching videos provided by this application and can gain information about the calories burnt on each exercise. This project was developed using html, css, bootstrap, php, python, api.ai and machine learning algorithm called Random Forest.

Keywords—diet, workout, exercise, random forest, chatbot, videos, diseases

Introduction:

The use of social networks, internet, applications are increasing on a daily basis. People have become more advanced in learning and thinking. As a result, majority of the crowd are completely or partially dependent over the internet, spending most of their time on social networking sites or the internet. Hence, they become lazy, less active, lethargic as well as obese. Many people have allergies as well as irritations from various substances like smoke, pollen grains, smell of flowers, dust particles etc these are the people suffering from chronic disease called asthma. Cardiovascular diseases also called as heart diseases are often found in people over the age of 30, these people may suffer from chest pain, nausea, short breath taking etc. High blood pressure is a type of disease that is found in people who undergo hypertension. There are many cases where people are not aware that they are suffering from high blood pressure. People may suffer from nose bleeding, dizziness, etc. Whereas low blood pressure causes stroke, can relate to heart disease and can also cause kidney failure. Arthritis refers to pain in the joint causing joint stiffness, joint pains, as well as numbness.

This paper highlights the Health and Fitness assistant website application which focuses on heart, high and low blood pressure, asthma and arthritis, making this website accessible even to those people who are suffering from these diseases. This web application acts as a personal trainer or a fitness guide which provides a proper, easy to follow workout routine and a healthy diet plan.

Problem Statement:

To create a web application with a simple user interface where each user using the application fills his details which consists of his current diet and his current workout routine. According to the details filled by the user a workout and a diet plan is provided to the user. The user can also learn his exercises by videos provided by this web application.

Objective:

- 1] To create a home based system that acts a personal trainer also as a dietician which provides a correct diet and workout plan for every user.
- 2] To focus on number of diseases the user suffers and to separate users into two main categories that is vegetarian and non-vegetarian.
- 3] To create a platform where users can learn various exercises on their own together with some tips and steps to be followed.
- 4] To provide information to the users about the number of repetitions carried out for each exercise and provide information regarding the calories burnt.

Proposed Module:

A. Home Feed :

This Home feed acts as the user friendly front page which describes the entire website application. The users using this application have to sign up or login to get access to the plans provided by this fitness assistant. Non logged in users can only get direct information about guide to various videos regarding the exercises.

Fig1 : front page

B. Additional Focus :

In this application, it also focuses on the major diseases found nowadays in most of the people. Like for example, Heart diseases, Asthma , High Blood Pressure , Low Blood Pressure and Arthritis . Depending upon the type of disease, particular training and diet is provided to the user.

Fig 2 :Diseases

C. User categorisation :

This website application, discusses how users are categorized into three categories : normal weight, overweight and obese. Each category focuses on a particular goal involving a proper diet and a workout plan. Users also have an option to watch and learn videos.

Fig 3: user category

D. Login/ Signup Page :

On this page , the user can login to its existing account or just signup if he/she doesn't have an account, which will redirect to the another page that helps the user to create its new account.Also,the user can browse the application without logging in.

Fig 4: login/signup page

E. Type of Exercises :

Users when logged in, have to fill in information about their current exercise, these exercises are classified into three sections. The sections include: core exercises, lower body exercises and upper body exercises. Each section involves various exercises that the user fills in.

Plagiarism Scan Report

Summary	
Report Generated Date	21 Apr, 2018
Plagiarism Status	100% Unique
Total Words	785
Total Characters	4692
Any Ignore Url Used	

Content Checked For Plagiarism:

Fig 5:Type of exercise

F. Diet Plan :

After logging in , the user has to enter his/her current diet plan,which helps the system to generate their training schedule for achieving their desired body-type goal.

Fig 6: Diet plan

G. Workout Plans :

Once the “Enter your Personal Details” part is done, the system generates a particular plan based on random forest algorithm for the user based on their goal and previously entered diet plan. After specific amount of days, the exercises get changed, which gets closer to achieve their goal.

Fig 7:Workoutplan

H. Chatbot :

Fig 8:Chatbot

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