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Research paper

Personalised Fitness Program using K-means Clustering

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Abstract

As the adoption rate of smart phone's and tablets have skyrocketed, it has become easier for people to access information on these devices. This software program aims to help keep track and pursue the fitness goals of the person using it by specifically making diet and workout plans for him/her according to his/her body type.

Keywords: Software, Smartphone, Fitness, Nutrition

1. Introduction

This research work aims to provide the general public a well-integrated platform to satisfy their fitness needs. It thrives to be a fully furnished one stop shop for all thing's fitness; i.e. It Uses already existing concepts within the fitness software category and combine them into one product. The concepts being: activity tracking app, diet and nutrition apps, workout or exercise apps. The project uses data mining methodologies tried and tested before for finding and gather the knowledge necessary for the specific user's needs and goals. Pre-collected data or data sets pertaining to nutrition facts for food items, exercise routines for strength and fat loss purposes; and also, disease related solutions are crawled through by the program for better and accurate results.

2. Used Methodology

2.1. K-means Clustering

From the BMI & FFMI calculated from users inputs arbitrary centroids are taken \(i.e. 3).Each for obese, skinny fat and skinny individuals. Distance between the the points are calculated over 200 times and the closest ones are clustered according to their group.

- BMI was calculated using the formula: BMI = *BMI* = W^2(kg)/H^2(cm)
- FFMI or fat free mass index (i.e.) amount of body mass excluding fat tissue to lean mass ratio) Was calculated using formula=Lean Mass {L} (Body mass including organs, bones and muscle tissue and excluding fat tissue) = W x (1.0 –Percentage of body fat/ 100))
- FFMI = (L / 2.25) / ((H ft x 12 + in) x 0.0254)^2 x 2.2
- Adjusted FFMI = FFMI + (6.098 x (1.8 - ((H in ft x 12 + in) x 0.0254)))

Keywords: H=Height L=Lean body mass W=Weight

3. Testing Analysis

3.1. User Training

Step 1 – Setup Your Testing Zone	Selenium installed
Step 2 – Identify Your Target Audience	people around the globe manly students and youth generation
Step 3 – Identify Problems and Hypothesize Fixes	Database rendering issues, values not calculated correctly, backend scripting not working properly
Step 4 – Create a List of 5 – 10 Tasks	
Step 5 – Write a Script for Everything	PHP test case created using pre-existing values
Step 6 – Find People to Test On	Roy
Step 7 – Welcome the User and Explain Things	User was explained about the application functionality and was asked to provide the required information in order to execute the web application
Step 8 – Get Them Talking and Relaxed	Meanwhile he was asked about his experience while he was using the web application
Step 9 – Ask Them to Perform The Tasks	User was explained about the application functionality and was asked to provide the required information in order to execute the web application
Step 10 – Analyze Your Results and Repeat	After the analysis the function point value was calculated was172.3

3.2. Defect Analysis

ID	HS001
Project	Personalized fitness program

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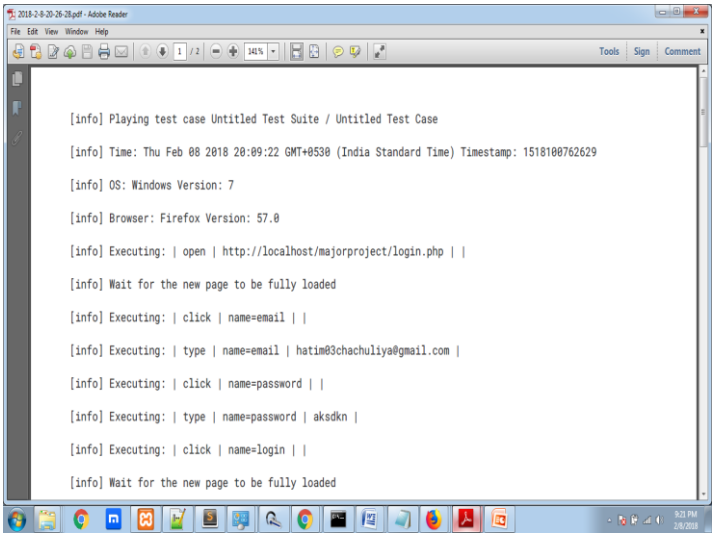
Product	FitbyBit
Release Version	1.0
Module	Calculation of FFMI.
Detected Build Version	1.1
Summary	FFMI calculation value coming wrong
Description	As per the required input gathered from the user the FFMI value of the users was being calculated as wrong
Steps to Replicate	Re-designing the algorithm to get the correct values
Actual Result	18
Expected Results	20
Defect Severity	Major
Defect Priority	Urgent
Reported By	Roy (user)
Assigned To	Mriganav Deka
Status	Completed
Fixed Build Version	1.2.1

ID	HS002
Project	Personalised fitness program
Product	FitbyBit
Release Version	1.2
Module	Database details display Anaomaly
Detected Build Version	1.1
Summary	
Description	As per the required input gathered from the user the basic health elements of the users were not being displayed
Steps to Replicate	Rewriting the SQL query to display the correct user specific data
Actual Result	BMI: ,FFMI : ,TDE:
Expected Results	BMI:24 ,FFMI :24 ,TDE:34
Defect Severity	Major
Defect Priority	Urgent
Reported By	Roy (user)
Assigned To	Hatim Chachuliya
Status	Completed
Fixed Build Version	1.2.2

3.3. Cost Analysis

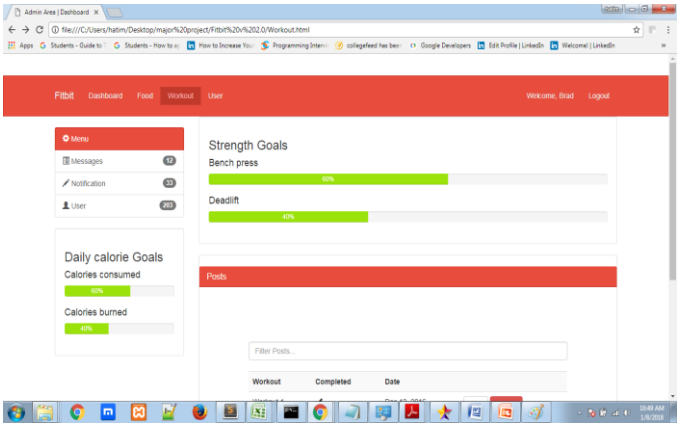
- Average cost of installing the server : 50,000 – 60,000 Rupees
- Average cost of installing client system (personal computer) : 15,000 – 20,000 Rupees
- Average man power require for server maintainance : 4 engineer/admin per server
- Average server maintainance cost : 80,000 -95,000 rupees per month
- Average cloud server maintainnce cost : 20,000 – 21,000 per month
- Average salary for engineers and admin : 22,000 -26,000 Rupees

3.4. Integration Testing

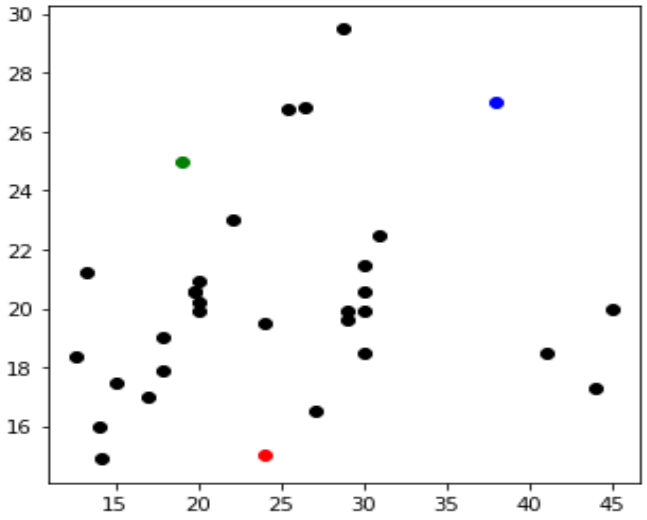


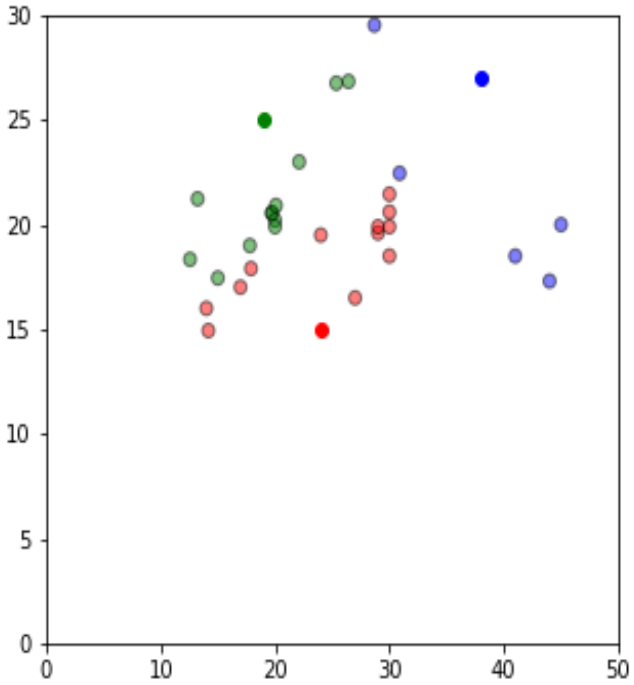
4. Result and Conclusion

4.1. User Interface and User result



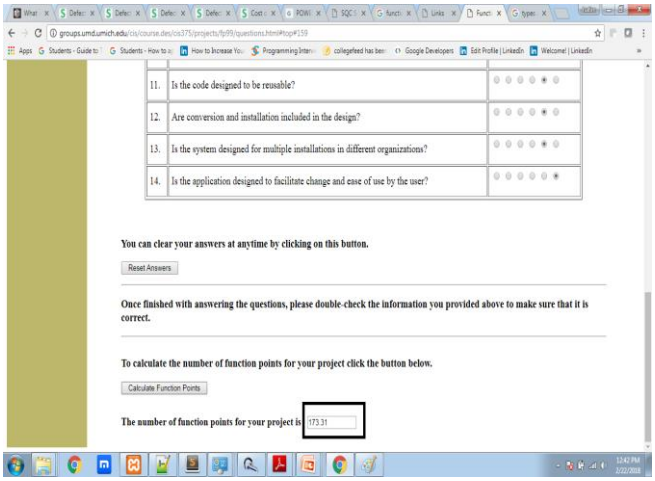
4.2. Clustering Result





bmi	ffmi	distance_from_1	distance_from_2	distance_from_3
26.423570	26.845057	12.090454	7.649420	11.577467
19.721037	20.555450	7.012314	4.502657	19.381763
17.900000	17.900000	6.754258	7.184706	22.063998
19.721037	20.555450	7.012314	4.502657	19.381763
16.975309	17.010955	7.306862	8.241614	23.276999

4.3. Funtion Point analysis



RESULT : Function point analysis value obtain is 173.31 units

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