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Fitness Advisor System Using Data Mining

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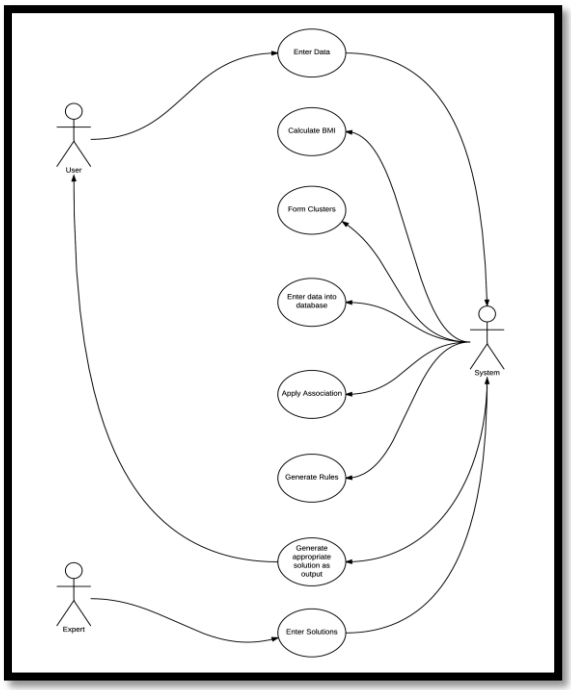
Abstract: There are a lot of health related problems today that have a direct or an indirect connection to the respective person's body weight. Efficient diagnosis of the same and spreading proper awareness about the health hazards associated with body weight is the need of the hour. “Fitness Advisor” is a desktop application that advises the user according to his/her problem. The system uses data mining as a tool to bridge the gap between the diagnosis/solution and the user. The system uses a combination of clustering and association algorithms to efficiently direct the respective user to the best possible solution.

Keywords: Fitness, Advice, Clustering, Association, Data Mining, Health.

I. INTRODUCTION

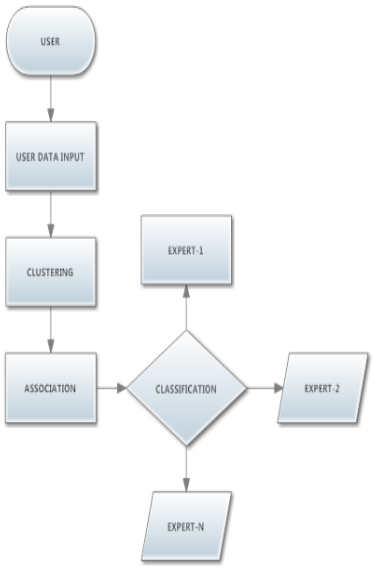
If you are obese you are at higher risk of developing serious health problems, including heart disease, high blood pressure and breathing problem. That is why reaching and maintaining healthy weight is very important for overall health and can help you prevent and control many disease and conditions. However there are also many with the opposite problem of being too skinny. This is a concern, because being underweight can be just as bad for your health as being obese, finding the right balance is something that acts as an inspiration for this system.

II. SYSTEM DESIGN



III. WORKING

The proposed system considers various important aspects of the user's lifestyle and makes sure that these factors are incorporated while the system works on a solution for the user.



The factors that the system considers are as follows:
1. Height
2. Weight
3. Body Type
4. Sex
5. Smoking
6. Drinking
7. Health Condition
8. Physical Activity
9. Sleeping hours

The proposed system efficiently uses a combination of clustering, association and classification algorithms to effectively deliver the best possible expert advice to the user's problem. The working of the proposed system can be divided into four phases.In the first phase, the user is asked to enter certain data(like height, weight, age, sex, body type etc) which will be used by the proposed system to direct the user to the most optimal solution to his/her problem[3]. The proposed system considers various important aspects of the user's lifestyle and makes sure that these factors are incorporated in the decision making.

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These factors have been selected based on the research done and keeping accuracy in mind.BMI is calculated based on height and weight entered by the user. Once the data entering is complete, the user submits it. In the second phase, the entered data is grouped into different clusters based on the data entered using a k-means algorithm. Clusters are decided based on the BMI and they are- Underweight, Normal, Overweight, Obese.In the third phase, using association rules on the clusters, patterns are observed[3]. Apriori algorithm is used for generating association rules. Important patterns are observed and data trimming is done in this phase.

In the fourth phase, these patterns are then directed to the best expert advice for the said pattern using a classification based on association rules. Classification is done using frequently repeated patterns obtained from the previous phase. The final output of the system is experts advice in terms of diet and exercise.

IV. ALGORITHMS

K- means in Fitness Advisor System:
The system uses k-means algorithm to place the user in one of four clusters:

1. Underweight
2. Normal
3. Overweight
4. Obese

The centroid of the above mentioned clusters is calculated as C_1, C_2, C_3 and C_4 respectively. The distance between the user's BMI and each of the centroid is calculated. The cluster which is closest to the user is identified and then the user is placed in the duly identified cluster.

Apriori in Fitness Advisor System:
The system uses the Apriori algorithm to identify the association rules. It is also used for feature reduction. After using the Apriori algorithm the following rules were identified:

1) SMOKING=No DRINKING=No 22 ==> SEX= Female 22 conf:(1)
2) BMI=Normal SEX=Male21 ==> HEALTH CONDITION=Normal 21 conf:(1)
3) BMI=Normal BODY TYPE=Mesomorph 20 ==> HEALTH CONDITION=Normal 20 conf:(1)
4) SMOKING=Medium HEALTH CONDITION=Normal 16 ==> SEX=Male 16 conf: (1)
5) BMI=Normal 34 ==> HEALTH CONDITION= Normal 33 conf:(0.97)
6) SEX=Female DRINKING=No 23 ==> SMOKING= No 22 conf:(0.96)
7) SMOKING=Medium 20 ==> SEX=Male 19 conf:(0.95)
8) BMI=Normal SMOKING=No 19 ==> HEALTH CONDITION=Normal 18 conf:(0.95)
9) BMI=Overweight SEX=Female 18 ==> SMOKING= No 17 conf: (0.94)
10) SMOKING=No DRINKING=Low 17 ==> HEALTH CONDITION=Normal 16 conf:(0.94)

After observing the rules the system uses feature reduction in order to effectively reduce the data.The factors that the system considers at the start are as follows:

1. Height
2. Weight
3. Body Type
4. Sex
5. Smoking
6. Drinking
7. Health Condition
8. Physical Activity
9. Sleeping hours

After feature reduction the columns are clubbed as follows:

Attribute	Habit	Lifestyle
Sex and BMI	Smoking and Drinking	Body type and Health Condition

V. RESULTS

1) FRONT END:

The front end is shown in Figure , where user enters their details correctly to get the advice and after submission of data the user is grouped into appropriate cluster.

2) DATA ENTRY

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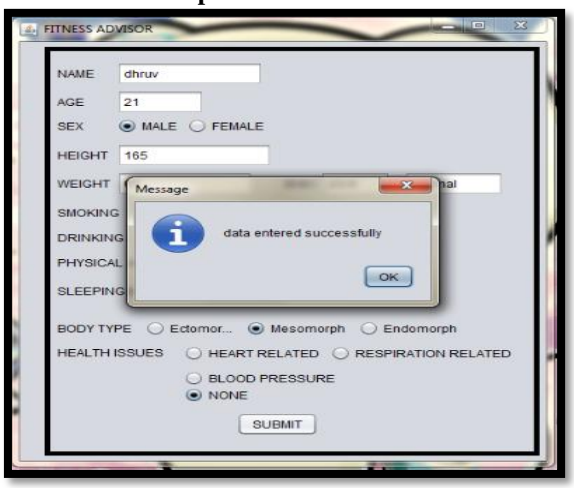
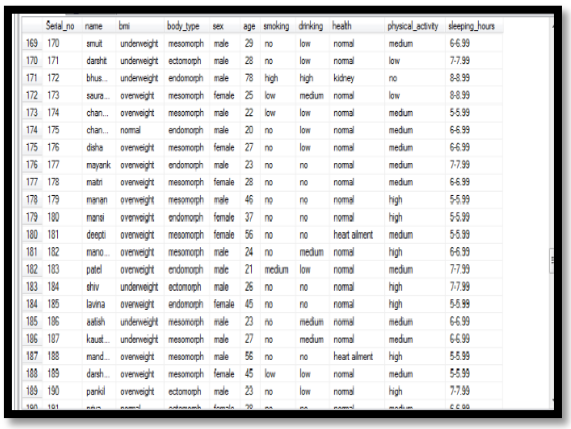
The user enters data considering various parameters listed in the front end. Figure shows data entered by user.

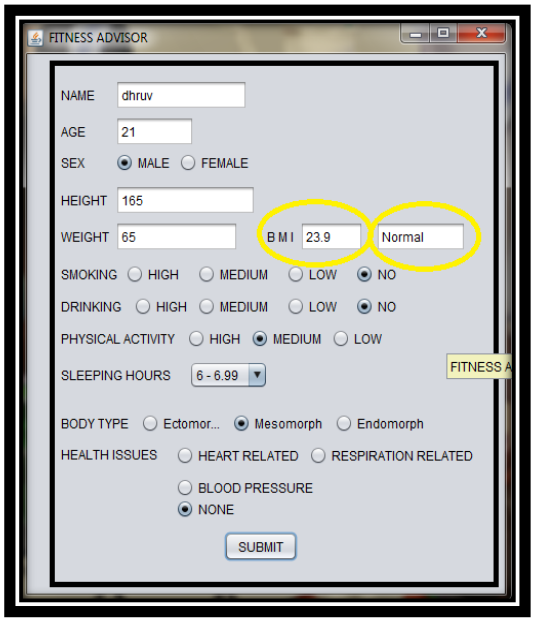
1. Database updation

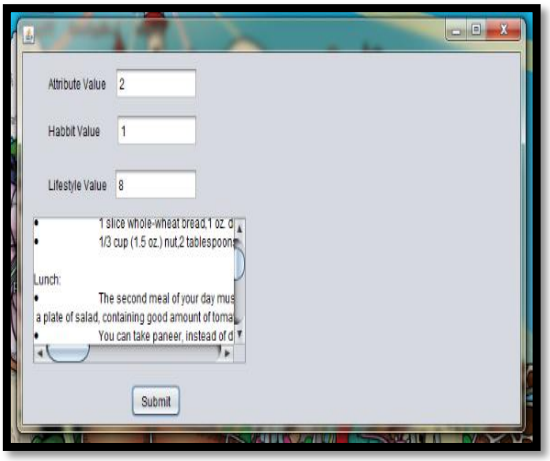


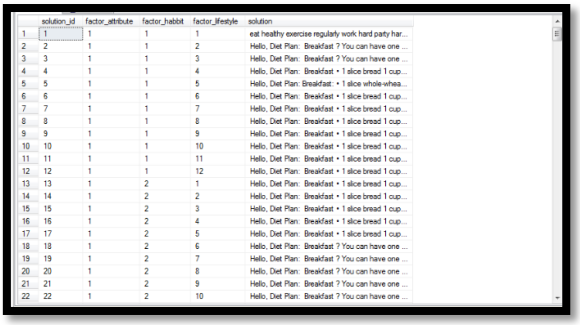


	Serial_no	name	bmi	body_type	sex	age	smoking	drinking	health	physical_activity	sleeping_hours
169	170	smuti	underweight	mesomorph	male	29	no	low	normal	medium	6-6.99
170	171	darshit	underweight	ectomorph	male	28	no	low	normal	low	7-7.99
171	172	bhus...	underweight	endomorph	male	78	high	high	kidney	no	8-8.99
172	173	saura...	overweight	mesomorph	female	25	low	medium	normal	low	8-8.99
173	174	chan...	overweight	mesomorph	male	22	low	low	normal	medium	5-5.99
174	175	chan...	normal	endomorph	male	20	no	low	normal	medium	6-6.99
175	176	disha	overweight	mesomorph	female	27	no	low	normal	medium	6-6.99
176	177	mayank	overweight	endomorph	male	23	no	no	normal	medium	7-7.99
177	178	maitri	overweight	mesomorph	female	28	no	no	normal	medium	6-6.99
178	179	manan	overweight	mesomorph	male	46	no	no	normal	high	5-5.99
179	180	manvi	overweight	endomorph	female	37	no	no	normal	high	5-5.99
180	181	deepti	overweight	mesomorph	female	56	no	no	heart ailment	medium	5-5.99
181	182	mano...	overweight	mesomorph	male	24	no	medium	normal	high	6-6.99
182	183	patel	overweight	endomorph	male	21	medium	low	normal	medium	7-7.99
183	184	dhiv	underweight	ectomorph	male	26	no	no	normal	high	7-7.99
184	185	lavina	overweight	endomorph	female	45	no	no	normal	high	5-5.99
185	186	aalish	underweight	mesomorph	male	23	no	medium	normal	medium	6-6.99
186	187	kaust...	underweight	mesomorph	male	27	no	medium	normal	medium	6-6.99
187	188	mand...	overweight	mesomorph	male	56	no	no	heart ailment	high	5-5.99
188	189	darsh...	overweight	mesomorph	female	45	low	low	normal	medium	5-5.99
189	190	pankil	overweight	ectomorph	male	23	no	low	normal	high	7-7.99

Once the user enters the data considering listed parameters and clicks SUBMIT button, the data is successfully entered and updated in the database. Figure displays message of successful data entry.



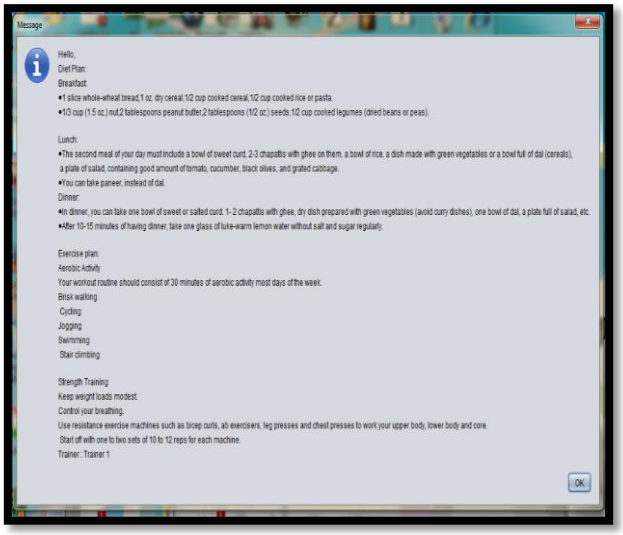




	solution_id	factor_attribute	factor_habbit	factor_lifestyle	solution
1	1	1	1	1	eat healthy exercise regularly work hard party har...
2	2	1	1	2	Hello, Diet Plan: Breakfast ? You can have one ...
3	3	1	1	3	Hello, Diet Plan: Breakfast ? You can have one ...
4	4	1	1	4	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
5	5	1	1	5	Hello, Diet Plan: Breakfast: • 1 slice whole-whea...
6	6	1	1	6	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
7	7	1	1	7	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
8	8	1	1	8	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
9	9	1	1	9	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
10	10	1	1	10	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
11	11	1	1	11	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
12	12	1	1	12	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
13	13	1	2	1	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
14	14	1	2	2	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
15	15	1	2	3	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
16	16	1	2	4	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
17	17	1	2	5	Hello, Diet Plan: Breakfast • 1 slice bread 1 cup...
18	18	1	2	6	Hello, Diet Plan: Breakfast ? You can have one ...
19	19	1	2	7	Hello, Diet Plan: Breakfast ? You can have one ...
20	20	1	2	8	Hello, Diet Plan: Breakfast ? You can have one ...
21	21	1	2	9	Hello, Diet Plan: Breakfast ? You can have one ...
22	22	1	2	10	Hello, Diet Plan: Breakfast ? You can have one ...

The solution provided to user in terms of exercise and diet plan along with assigned trainer can be updated or modified if required. This provision is for future scope. Figure 9.3 shows slot for updating solutions.

2. FINAL OUTPUT



VI. CONCLUSIONS

BMI in itself is not accurate enough for diagnosing the weight related health problems hence factors other than BMI are required for diagnosing user's weight condition and the associated health hazards. System can efficiently work as a cohesive data mining unit as decision making in automated. More the number of experts more is the number of advices. This leads to a number of options

being available for the system to choose from, which in short means better diagnosis and solution. The system can be implemented in a health center and can direct a potential customer to the best possible expert available to tackle his/her problem.

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