

Customized Nutrition Recommendation with Personalized Health Profile

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Abstract: There are different methods which are responsible for generating the feedback for the user with the help of number and rating value. A store can sell the different kinds of items and then once the transactions of items are completed they form a stream of analysis data. The transaction data can be used to improve the sales of the store and the store do not concentrate on nutrition value to be provided by the user. In this work, an application is created with various food categories. For each category list of Food Items are shown to the end consumers from which a purchase can be made or food item description can be viewed. The purchase transaction can be made successful if the authorization cycle completes and consumer has sufficient monetary volume. In order to make suggestions to the end user, the training data is required which can be collected using a HTTP hit and then feed-backs are collected from multiple independent sources like amazons, flip-kart and mouth shut. The first step is to convert the feedback into a clean stream with removal of unwanted words, after that token queue is created, find the unique words from each feedback and then measure the count to form the frequency, from the frequency matrix a reduced matrix is created by reducing the redundancy by making use of features of the food items and removing the remaining tokens, classification of Food Item is done using single dimension k means algorithm. Each Food Item can have class label like sugar, salt, fat, energy and fat. Each of the consumer are asked series of questions and based on answers provided by the end users a nutrition score is provided which can provide a profile for the end user. The suggestions are given to the end users by making use of genetic algorithm. The user can do chatting in the application either it can be generic questions and then artificial intelligence can provide an automated answer. The chat values are Tokenization and then relationship vector is generated between the consumer and disease kind. Once the disease kind is finalized then symptoms based questions are asked in a series format and answer analysis is done to know the level of disease kind which can be Level 1, Level 2 or Level 3. If Level 1 or Level 2 doctor based suggestions are provided otherwise along with suggestions links are provided related to hospital or clinic. Custom recommendations are provided based on either user kind can be BP patient, Sugar Patient or Old Age.

Keywords: Food Label, Suggestions, Genetic Algorithm, Custom Recommendations, Food Item Classification and Nutrition Template

I. INTRODUCTION

In the current era the numbers of product selling sites are increasing in an exponential fashion. Each company concentrates on improving the revenue in terms of providing the loyalty points as well as providing discounts on various food items. But the current ecommerce based companies do not study the food likeness of the users or either they don't provide food item recommendations based on likeness and health based nutrition. Different kind of tests are performed on the consumers by labs and different diets are given to the end users based on nutrition value[1]. Different Food Items have different kind of features like protein, vitamin or any other kind. There are many unhealthy habits due to which users will face the lot of health related problem like obesity, BP and sugar related issues. Based on the age of the user different kind of Food Items list is obtained and provided for customers to purchase [2].Set of entities obtained by the user are taken into consideration for having a rating matrix which can help in providing recommendations. Each entity has attributes like interest in product, location and different brands. Three different steps are done for providing suggestions like recommendations based on rating provided by consumers; second step is to combine food items into specific groups [3]. The main reason for unhealthy weight is resistance of the users for insulin, hypertension and it can lead to disease level two of diabetes. Many other diet related diseases exists due to unhealthy food items. Static set of Food Items are designed and provided to consumers based on different disease kind [4].The method first generates a behavior analysis pattern for the end user based on the pages visited by the user as well as navigation pattern, after that a model matrix is generated based on highest page frequency and maximum navigation pattern frequency, the score value for each of the products across N users are taken and then finally list of suggestions are provided to the end user based on page frequency, pattern score and rating value but the work does not take into consideration the food likeness as well as health profile for the end user [5]. The food items reviews are present in a huge number over the web and this data must be collected from multiple sources. The data must be converted into a structured format once its done it the data analysis must be performed to check the food item falls under which kind of category, The users like different kind of food items, based on the food likeness of the end users the food items must be grouped. In a day to day life the users can face multiple problems and this must be discussed in an automated fashion and then symptom based questions can be asked to the end users, based on the answers provided by the end user then health analysis must be performed and feedback must be generated.

II. BACKGROUND

In order to have a good health and nice body a good diet is required. Due to unhealthy food items lot of users lead to various diseases as well as sickness. A therapy is designed which can help in preventing the diabetics disease, finding the level of diabetic and creating preventive strategy for diabetics. The kind of food the diabetic patients should have and replace for the existing food items with diabetic preventive food items [6]. Whenever people go out for shopping or work they tend to visit restaurant or make use of online booking applications. All users receive same kind of food item recommendations and do not take into consideration the personal features of users like weight, kind of health issues, the food likeness. The suggestion system which can compute the nutrition value of food and then provide a list of food items based on descending order nutrition value helps users to avoid certain kind of diseases [7].There are various number of entities which makes the selection of food items difficult for the end users and it is a time sensitive task. A menu which is digital in nature can provide in-depth information about the food item kinds and will help the customer to make good decisions and then also can help in providing Food Item Recommendations for the end users [8]. Each IT parks as well as individual companies have their own canteen and the same food is served over the whole year, hence most of the employees are frustrated and tend to visit the outside restaurant. Hence a personalized meal menu designed by the employee themselves helps the restaurant serve the users with higher customer satisfaction and also maintain a log of food habits of the user so that accordingly the menu as well as the raw material can be adjusted [9].

III. PROPOSED SYSTEM

The various modules present in the entire work can be described using the following diagram

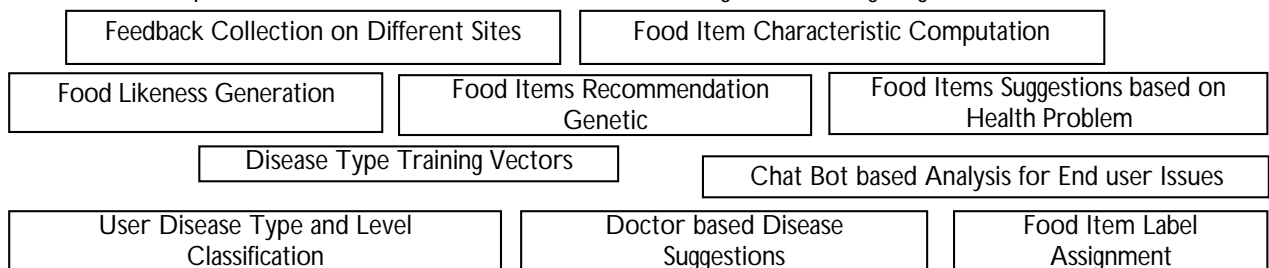


Fig 1: Overall Description for the Work

A. Feedback Collection from Different Sites

The Feedback Collection will hit the various websites which collect reviews related to food products by making use of the Web Crawler which is developed with the help of JSoup Parser as well as Xpath Language and then it is converted into a matrix format which will contain { Feed Back Id, Food Item Name, Food Item Feedback, Food Item Type } Feed Back Id is the unique id associated with the feedback, Food Item Name is the name of the Food Item, Food Item Feedback is the feedback of the food item provided by the end user and then Food Item Type are different categories of the Food Items.

Feedback Collection for Food Item

Input: Food Item Type, Food Item Name, Web URL and Xpath

Output: Feedback Collection in Format {Feed Back Id, Feed Back Description, Food Item Type, Food Item Name} Description

1. Hit the Web URL
2. Convert the entire Website data into a Document Object Model Tree
3. Form the xpath which contains the review text
4. Find the number of nodes in the DOM tree matching the Xpath
5. For $i=1:Nnodes$
 - a. Navigate to the i^{th} node
 - b. Extract the Text
 - c. Form the element { Feed Back Id, Feed Back Description, Food Item Type, Food Item Name }
6. Once the Feed Backs are obtained save them into the application to form Feedback Collection Matrix

Fig 2 Show the process involved Feedback Collection for Food Items.

Cleaning of Food Item Feed Back

Input: Feedback Collection in Format {Feed Back Id, Feed Back Description, Food Item Type, Food Item Name}, Unwanted Words

Output: Clean Feedback Collection in Format {Feed Back Id, Clean Feed Back Description, Food Item Type, Food Item Name } Description

1. Count the number of rows in the Feedback matrix N count
2. Start from the 1st Feedback till N count perform the following
 - a. Obtain the Feedback text for their Feedback
 - b. Make use of Split method like space to convert the Feedback text into a FIFO queue
 - c. Measure the count of number of elements of FIFO Queue
 - d. Count the number of elements of Queue N fifo
 - e. Start from 1st element till the number of elements of queue
 - A. Obtain the element
 - B. Check whether element is present in the set of Un Wanted Words If yes skip it otherwise go to Step
 - C. Save the Word from FIIFO queue into a Clean Queue
 - F. Now take the elements of Clean Queue and save it in the format {Feed Back Id, Clean Feed Back Description, Food Item Type, Food Item Name}
 - G. Repeat process until all the Feedback have been scanned and cleaned

Fig 3: Cleaning Food Item Feed back

Stream of Words for Feed Back

Input: Clean Feedback Collection in Format { Feed Back Id-Unique ID for Feed Back, Clean Feed Back Description-Clean description without unwanted words, Food Item Type- Category for Food Item, Food Item Name -Name of Food Item}

Output: Stream Word Vector with the following { Stream Word Id-Unique Id for the Word in a Feedback, Stream Word- Word related to the Feedback, Feed Back Id - Unique Id for the Feedback, Food Item Name - Name of Food Item, Food Item Type -Type of Food Item} Description

1. Count the number of rows in the Clean Feedback matrix N clean
2. Start from the 1st Feedback till N clean perform the following
 - a. Obtain the Clean Feedback text for the i^{th} Feed back
 - b. Make use of Split method like space to convert the Feedback text into a FIFO queue
 - c. Measure the count of number of elements of FIFO Queue
 - d. Count the number of elements of Queue N fifo
 - e. Start from 1st element till the number of elements of queue
 - A. Obtain the element
 - B. Form the element {Stream Word Id, Stream Word, Feed Back Id, Food Item Name, Food Item Type}
4. Now all the elements are stored in the Stream Word Matrix

Fig 4: Stream of Words for Feed Back

As shown in the Figure 2 first the Web Site is downloaded by making a HTTP call to the Web Page using the Jsoup Parser and then convert into nodes using Jsoup Parser. From each node collect the text.

B. Food Item Characteristic Computation

The Food Item Characteristic Computation will take the feedback text from the list of feed backs obtained in Figure 2. The first step performed in the food item characteristic is to remove the unwanted words and obtain a clean text using a cleaning process described in Figure 3. After that the clean feedback is then converted into a stream of words associated with Feed Back Id as described in Figure 4. The next step is to reduce the amount of words by removing all words except the food characteristic words as described in Figure 5. The next step is to club all the feed backs into a single product based system with varying characteristic as described in Figure 6. Figure 3 shows the cleaning of Food Item Feedback as shown in the fig all the feedback elements are taken and then unwanted words are removed from feedback to form a Clean Feed Back Description. Note unwanted words are the words which have no meaning or stop words. Figure 4 shows the creation of stream word matrix which follows the same process as that of Cleaning of Food Item Feedback except that the Clean FIFO Queue the elements are taken and stored as a unique word identifier. Figure 5 shows the Word Stream Count Matrix in which the repeated words are clubbed for each Feedback and assigned the number known as weight

Word Stream Count Matrix

Input: Stream Word Vector with the following

{ Stream Word Id, Stream Word, Feed Back Id, Food Item Name, Food Item Type}

Output: Word Count Stream Matrix with the following details

{ Word Count Stream Id, Word, Weight, Food Item Name, Food Item Type}

Description

1. Find unique Feedback Ids from the Feedback Word Stream matrix
2. Measure the count of number of unique Feedback Ids N unique
3. Fork=1:Nunique
 - A. Obtain the Unique words from the Stream Word Matrix
 - B. Measure the count of words N word
 - C. Start from 1st word till the number of words N word
 - a. Obtain the word
 - b. Measure number of times word is present in the Feedback and call this value as weight
 - c. Store in the format { Stream Word Id, Stream Word, Feed Back Id, Food Item Name, Food Item Type}
 - D. Once all words are scanned do k=k+1
4. Save the Word Stream Count Matrix

Stream Word Id	Stream Word	Weight	Feedback Id	Food Item Type	Food Item Name
Unique id for word	Word	Count of word in Feedback	Unique Id for Feedback	Type of Food Item	Name of Food Item

Output: Characteristic Label Matrix for Food Items

Food Characteristic Word	Total Weight	Food Item type	Food Item Name
Unique id for word	Count of word in Feed back	Type of Food Item	Name of Food Item

Description

1. Find the Unique Food Items present in the Word Stream count Matrix
 2. Measure the count of number of unique Food Items N food
 3. Fork = 1:N food
 - a) Obtain the unique Food Item
 - b) Find the list of unique feed backs related to k th Food Item{fb1,fb2, fbn}
- Obtain the Count of each characteristic word across all the Feedback of Food Item and form the matrix as below

Food Characteristic	Total Weight
Fc1	$N_f \sum_{i=1}^{N_{fb1}} W_{fc1}(i)$ iffc1iniotherwise0
Fc2	$N_f \sum_{i=1}^{N_{fb2}} W_{fc2}(i)$ iffc2iniotherwise0
Fc3	$N_f \sum_{i=1}^{N_{fb3}} W_{fc3}(i)$ iffc3iniotherwise0
Fc4	$N_f \sum_{i=1}^{N_{fb4}} W_{fc4}(i)$ iffc4iniotherwise0

d) Find the worded matrix

Food Label Characteristic	Total Weight	Food Item Name
Fc1	TwFc1	FoodItem1
Fc2	TwFc2	FoodItem1
Fc3	TwFc3	FoodItem1
Fc4	TwFc4	FoodItem1

Fig 5: Word Stream Count Matrix

Food Label Characteristic based tokens must be separated and then form the Food Item Label Assignment Matrix. The entire process can be summarized in the Figure 6

Food Characteristic Computation Food Item

Input: Word Stream Count Matrix and Food characteristic elements {fc1,fc2,fc3,fc4,fc5}

Stream Word Id	Stream Word	Weight	Feedback Id	Food Item Type	Food Item Name
Unique id for word	Word	Count of Word in Feed back	Unique Id for Feed back	Type of Food Item	Name of Food Item

Fig 6: Food Characteristic Computation Food Item

As shown in the Figure6 the unique Food Items are found and for each food items across the feedback the total weight of specific characteristic of food item is found out.

C. Food Item Label Assignment

Food Item Label Assignment will take the food characteristic matrix and find the maximum value of total weight across all characteristic and then assign a Food Label based on maximum weight value. If the total weight is high and is same for multiple Food characteristic then a Food Item is assigned multiple Labels

D. Food Likeness Generation

The Food Likeness for the end consumer is generated by asking a series of questions related to various characteristic of food and then a score is generated for each characteristic of the food by performing the answer analysis and finding the total score under each food character and then user is assigned Food Likeness Label based on highest value of food character. The Food Likeness Generation can be summarized as below in Figure 7

Food Character	Total Score
Fc1	S1
Fc2	S2
Fc3	S3
Fc4	S4

Fig 7: Food Likeness Generation

Food Likeness Generation

Input: List of Questions and Answers Provided by User Output: Food Likeness Category Process

1. User is asked series of questions under each food characteristic {fc1,fc2,fc3,fc4} Each question has four answers and internal rating associated with it
2. From each of the answers the rating is extracted and then total score is computed for each fc A matrix is generated in the following format Where, S1 is total score by summing the rating of answers provided by user for Food characteristic group fc1 in a 3. Similar fashion the process is repeated for all the categories
3. Find the maximum value of {S1,S2,S3,S4}
4. If the maximum value is S2 then Food Likeness category associated with the user is Fc2 If there are more than one Score which is highest then Food Likeness assigned to the user can be multiple

E. Food Item Recommendations Genetic

This module will take into consideration the likeness of the user which can be either of Fc1, Fc2, Fc3 or Fc4 or it can be multiple as well. The Food Items are filtered based on category of user and then total weight of the Food Items for the category are found and then genetic theorem is applied to recommend a list of Food Items for the end user. The Food Item Recommendations using Genetic is summarized in Figure 8

F. Food Items Suggestions based on Health Problem

Food Items Suggestions are provided based on the health issues by taking the selection like having BP, having Sugar and Old Age. Based on the selection different Food Items are provided to the end consumers. For Instance when user selects having BP the food items are recommended based on lowest value of salt. If the consumers have selected sugar then food items are recommended based on lowest value of sugar.

G. Disease Type Training Vectors

This disease type training vectors are provided as an input for the machine learning algorithms and then each vector is created by using web crawler on the health care sites like healthline.com and others.

H. Chat Bot based Analysis for End user Issues

The chat based analysis is done by making use of the steps as below

- a) The entire sequence of data is taken into consideration and then converted into feeding elements of FIFO Queue From the FIFO Queue the words are removed which are unwanted

Food Item Recommendations Genetic

Input: Food Label Assignment Matrix, Food Likeness Categories

Output: List of Recommended Food Items Process

1. Form the population set by making use of Food Item Label Assignment Score
2. The population is then evaluated by finding the maximum value of Food Label Score and then divided it by the maximum value of score
3. The selection of food items is done by filtering the food items related to category of Food likeness of the user
4. For each of the Food Label Assignment Matrix convert the total weight into a sequence of binary digits
5. The binary digits are divided into blocks of data and then new sets are formed using the concept of cross over
6. From the sets of blocks the block with maximum one is chosen
7. By making use of mutation one of 0 digit is converted into 1
8. The value is converted back to decimal score known as mutation score
9. The fitness factor is computed for the Food Items by taking the difference between mutation score and score

Fig 8: Food Item Recommendation Genetic

Figure 8 shows the genetic based suggestions system in which first population set is created, followed by cross over, mutation and then food items suggestions are provided by the list

- b) The chat text provided by the end user will then be added as an input along with trained vectors for Naive Bayes algorithm and generic Artificial Engine.
- c) If the chat matches with the trained vector in generic data then an answer is provided.
- d) If the chat does not match the generic questions vector a Naive Bayes algorithm is executed and then classification score is generated for different disease kinds.
- e) Find the maximum disease type and then assign a class label related to disease type.
- f) If the value of probability is less than zero then a generic answer is provided otherwise if any of disease type probability is high then respective symptom based questions are asked to the user along with optional answers
- g) The answers provided by the end user will be analyzed and then different levels of disease type are obtained which can fall under $\{1 \text{ to } MS/3\}$, $(M/3-1) \text{ to } (M/2)$ and then last trend is $>(MS/2)$

I. Doctor based Disease Suggestions

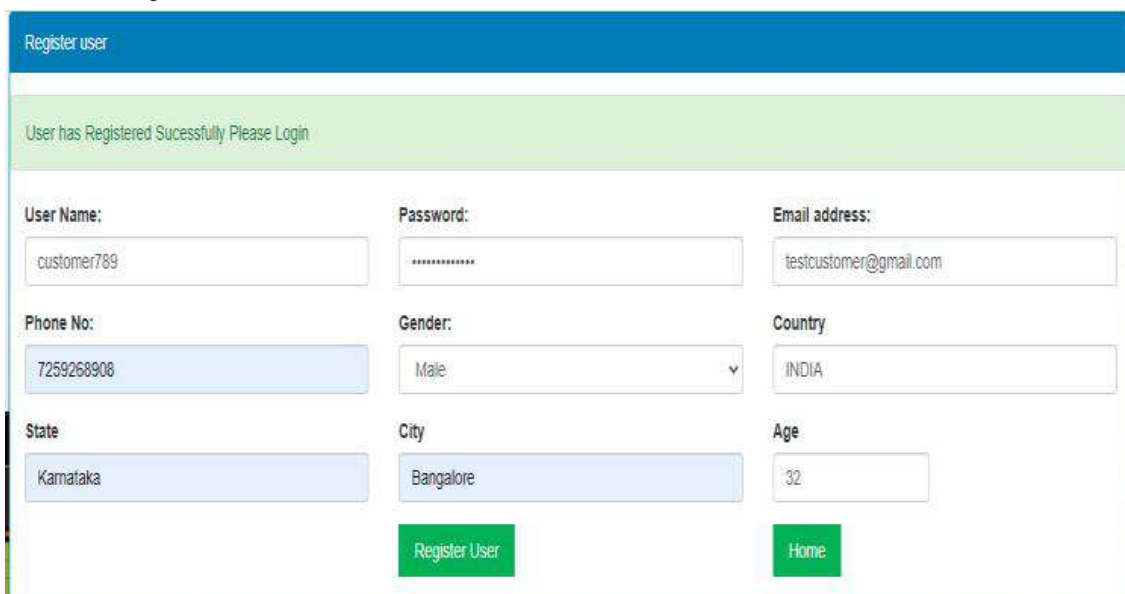
The doctor based disease suggestions are configured by the expert doctors on each disease type. For each disease type different level based suggestions are also provided by the doctor. For Level 1 of disease type different tablets are provided, For Level 2 of disease type a different set of tablets are provided and then Level 3 of disease type have different kind of feedback suggestions.

J. User Disease Type and Level Classification

For the Level1 and Level 2 only suggestions are provided in that chat and then if the level is Level 3 different hospital and clinics are provided to the end users.

IV. RESULTS AND DISCUSSION

This section provided the results related to various modules in the proposed system. In the first phase the users are provided with the registration screen



The screenshot shows a registration form titled "Register user". At the top, a green message box states "User has Registered Successfully Please Login". The form contains the following fields and values:

- User Name: customer789
- Password: [masked]
- Email address: testcustomer@gmail.com
- Phone No: 7259268908
- Gender: Male
- Country: INDIA
- State: Karnataka
- City: Bangalore
- Age: 32

At the bottom of the form, there are two buttons: "Register User" and "Home".

Fig 9: Sign Up for the Consumers

Figure 9 shows the screen in which the various authentication entities are provided with input like basic authentication data along with other demographic data with age and then user will click on Register User and then if the user name is not unique then user is not allowed to register otherwise registration fails.

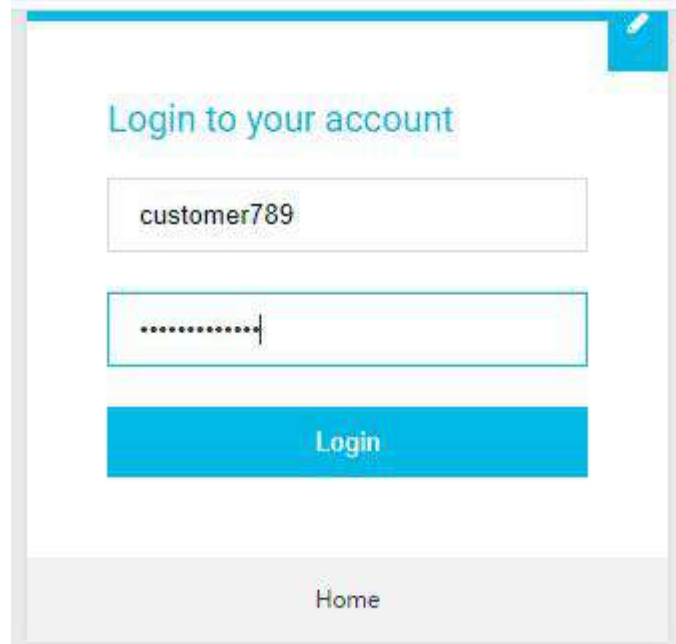


Fig 10: Authentication Module

Figure 10 shows the authentication module in which end user can have a success authentication or failure authentication. If the authentication is successful and if the type is customer then welcome page of customer is show with different category of food items.

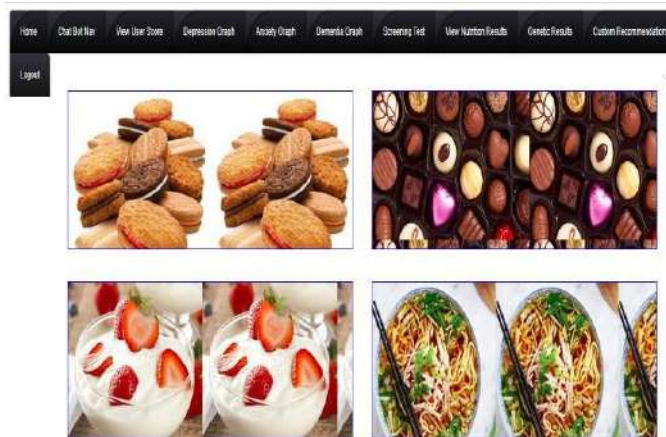


Fig 11: Customer Welcome Page

Figure 11 shows the customer welcome page. As shown in the welcome page there is different category images are provided to the end user.



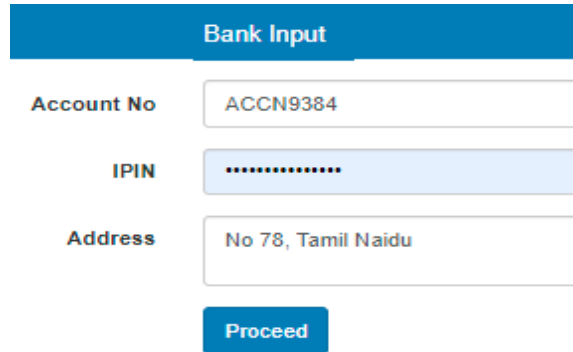
Diary Milk 4 – Pack of 10, Price :1000.00

KitKat 4 – Pack of 10,Price:500.00

Silk 4 – Pack of 10, Price :600.00

Fig 12: Food Item List

Figure 12 shows the Food Item List when the category of chocolate. As shown in the Figure there are three kinds of Food Items with each chocolate having its own price? Image name and button.



Bank Input

Account No: ACCN9384

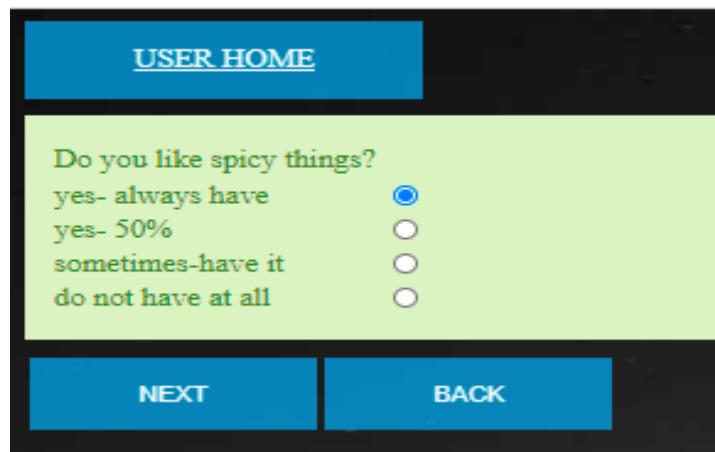
IPIN:

Address: No 78, Tamil Naidu

Proceed

Fig 13: Bank Authorization Input

Figure 13 shows the bank authorization input in which the end user will have account number, IPIN and then delivery address is provided. If sufficient amount of balance is present and sufficient authentication is present then transaction is successful otherwise transaction fails.



USER HOME

Do you like spicy things?

yes- always have

yes- 50%

sometimes-have it

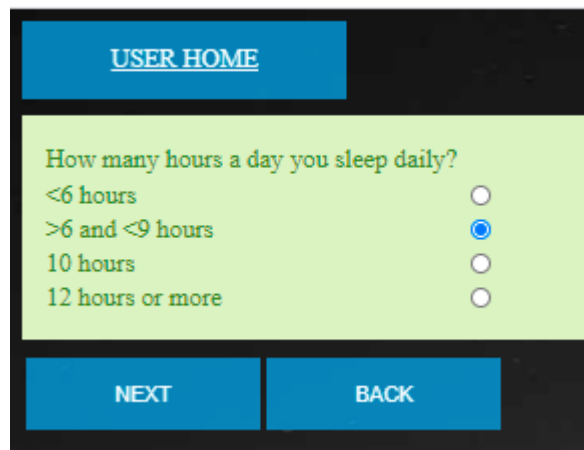
do not have at all

NEXT **BACK**

Fig 14: Question Information

Figure 14 shows the question information asked for the consumer in order to generated the food likeness score

The Analysis is Done Please Click View Nutrition Template Menu for your Profile



USER HOME

How many hours a day you sleep daily?

<6 hours

>6 and <9 hours

10 hours

12 hours or more

NEXT **BACK**

Fig 15: End Question Information

Figure 15 shows the end question information provided to the customer and once the last question is answered by user then an alert is provided "The Analysis is done. Please Click View Nutrition Template Menu for your Profile"

Maintain a healthy diet. Eating a healthy diet is important for many reasons, but a diet such as the Mediterranean diet — rich in fruits, vegetables, whole grains and omega-3 fatty acids, commonly found in certain fish and nuts — might promote health and lower your risk of developing dementia. <https://healthcareassociates.com/7-foods-that-can-fight-dementia-and-alzheimers-disease/> Lower your blood pressure. High blood pressure might lead to a higher risk of some types of dementia. More research is needed to determine whether treating high blood pressure may reduce the risk of dementia.

Fig 16: Chat Bot Health Care

Figure 16 shows the Chat Bot Health Care. In the chat bot system first your types "Hi", the chat bot based system provides and automated reply with a value of "How are you? Are you feeling depressed". A symptom question is asked after classification of question along with answer and then suggestions and links are provided to the end user.

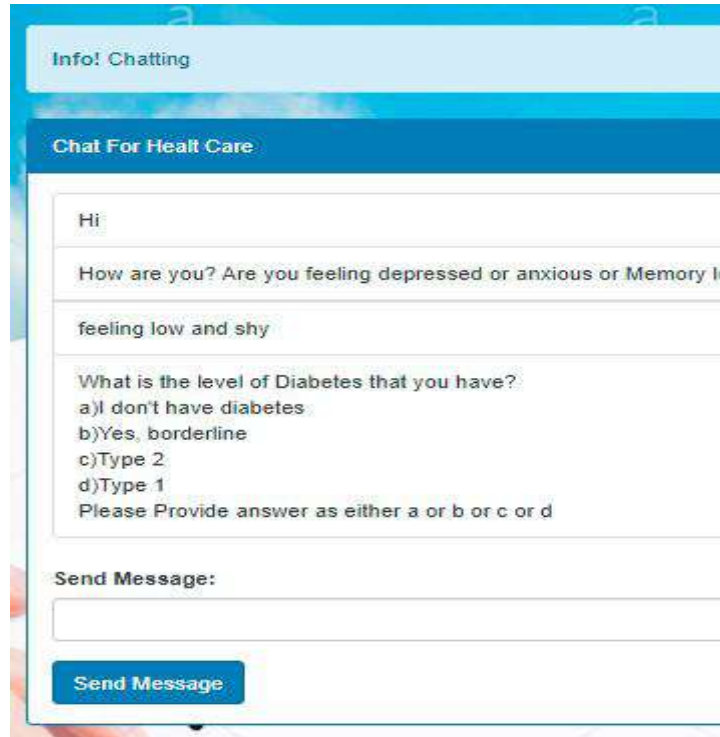


Fig 17: Suggestions for Consumer

Figure 17 shows the suggestions for consumer with hospital link and description

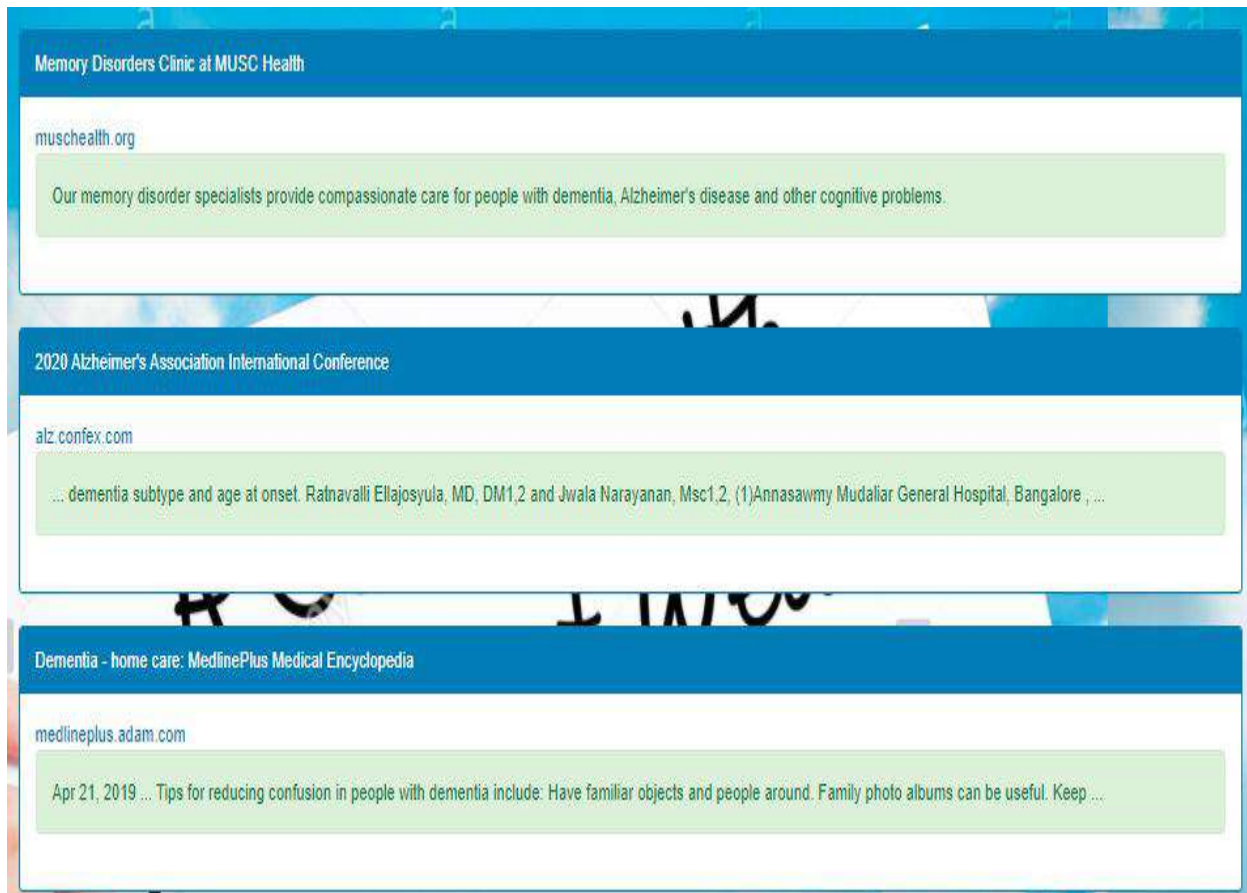


Fig 18: Food Item Genetic Recommendations

Figure 18 shows the Food Item genetic recommendation in which multiple products are shown keeping in mind for food likeness and then list of food items are listed.



Buy



Buy

Yo Gourmet, YOGURT4 – Pack of 5, Price: 800.00

EPIGAMIA Greek Yougurt, Yougurt 14, Pack of 5, Price: 500.00



Buy



Buy

EPIGAMIA Greek Yougurt, Yougurt 14, Pack of 5, Price: 500.00

Diary Milk 4, Pack of 10, Price : 1000.00

Figure 19 shows the custom recommendations in which the end user will select “Do you have BP” then list of Food Items are provided.



Fig 19: Custom Recommendations

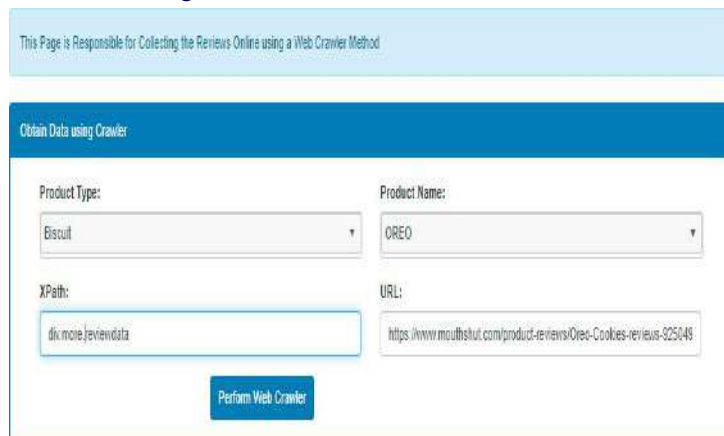


Fig 20: Score of Chat Botto Classify Disease Kind

Figure 20 shows the score of chat bot as a value of 48 score and then with the disease type as “Dementia”.

Test Case Score				
User Id	Session Id	Level	Disease Type	Score
customer101	754F43C2-837C0135E8A48E35A...	level2	dementia	48

Fig 21: Food Item Feed Back Collection Input

Figure 21 shows the input which the admin will select the Product Type, Product Name, provide xpath for feedback and then URL for the website and then clicks on Perform Web Crawler in order to get the data

Reviews Collected using Web Crawler			
Review ID	Product Type	Product Name	Review Details
1	Biscuit	MARIEGOLD	Marie Gold from Britannia is the best classic biscuit to munch anytime in day! Lots of other brands have come up wit
2	Biscuit	MARIEGOLD	while the cardboard corrugated box used for shipment of items is of very poor quality and the smell of the box is not
3	Biscuit	OREO	What can you say about Oreo Cookies, they are the best comfort food ever. I have always thought chocolate should
4	Biscuit	OREO	I ordered 2pkgs of these! I won't order any in the future. One pkg wasn't resealable, they were broken and not as fu
5	Biscuit	SUNFEAST	nice biscuit
6	Biscuit	SUNFEAST	I donno how this product cross over security check. When open this Biscuit package. There is full of Ants. Poor Pan
7	Biscuit	PARLEG	Eating since childhood
8	Biscuit	PARLEG	Expected crispy packet of biscuits. But the biscuit was soft. Was not good. Thought it was old too
9	Biscuit	MARIELIGHT	Packaging was good?, Good in taste ?
10	Biscuit	MARIELIGHT	Attn: Mr Aurko Dasgupta -ITC cc: Customer Care Manager-ITC Limited(SunFeast Biscuits Divn) Customer Service M
11	Chocolate	DIARYMILK	silk is always best and it gets even better with this value pack
12	Chocolate	DIARYMILK	when i checked the dates ... then i realize that i am eating expired choklets. don't buy it . i have ordered the 2 pack
13	Chocolate	KITKAT	Good test.
14	Chocolate	KITKAT	chocolates are good but the price gets high due to delivery charges.. but okay to send your long distance loved ones
15	Chocolate	SILK	Not for everybody , I liked it and most of friends too but some of em dont so.. its not for everybody. But for me it w
16	Chocolate	SILK	Product is very poor and near expiry product... its not good for health
17	Chocolate	KINDERJOY	As usual delicious and yummy.
18	Chocolate	KINDERJOY	On the cover mentioned avengers toys but got small and useless toys... Very discouraging....did nt expect
19	Yogurt	Yo Gourmet	Verified Purchase
20	Yogurt	Yo Gourmet	2 cups of dry soya beans, put in cool water for 2 hours. Bring to boil for 10 minutes. Leave overnight. De-hull the ski

Fig 22: Feedback Collected for Food Items

Figure 22 shows the Feedback Collected for Food Items in which Food Item ID, Food Item Type, Food Item Name and then feedback is also shown to the end user.

Clean Reviews			
Review ID	Product Type	Product Name	Review Details
1	Biscuit	MARIEGOLD	marie gold britannia classic biscuit munch anytime day lots brands biscuits i
2	Biscuit	MARIEGOLD	cardboard corrugated box shipment items poor quality smell box bearable a
3	Biscuit	OREO	oreo cookies comfort food thought chocolate food group s oreo cookies list
4	Biscuit	OREO	ordered pkgs won t order future pkg was n t resealable broken grocery store
5	Biscuit	SUNFEAST	nice biscuit
6	Biscuit	SUNFEAST	donno product cross security check open biscuit package ants poor pantry r
7	Biscuit	PARLEG	eating childhood
8	Biscuit	PARLEG	expected crispy packet biscuits biscuit soft good thought
9	Biscuit	MARIELIGHT	packaging good good taste
10	Biscuit	MARIELIGHT	attn mr aurko dasgupta itc cc customer care manager itc limited sunfeast b
11	Chocolate	DIARYMILK	silk pack
12	Chocolate	DIARYMILK	checked dates realize eating expired choklets don t buy ordered pack chokl
13	Chocolate	KITKAT	good test
14	Chocolate	KITKAT	chocolates good price high delivery charges send long distance loved
15	Chocolate	SILK	friends em dont chocolate eaten birth v
16	Chocolate	SILK	product poor expiry product good health
17	Chocolate	KINDERJOY	usual delicious yummy
18	Chocolate	KINDERJOY	cover mentioned avengers toys small useless toys discouraging nt expect
19	Yogurt	Yo Gourmet	verified purchase
20	Yogurt	Yo Gourmet	cups dry soya beans cool water hours bring boil minutes leave overnight hu

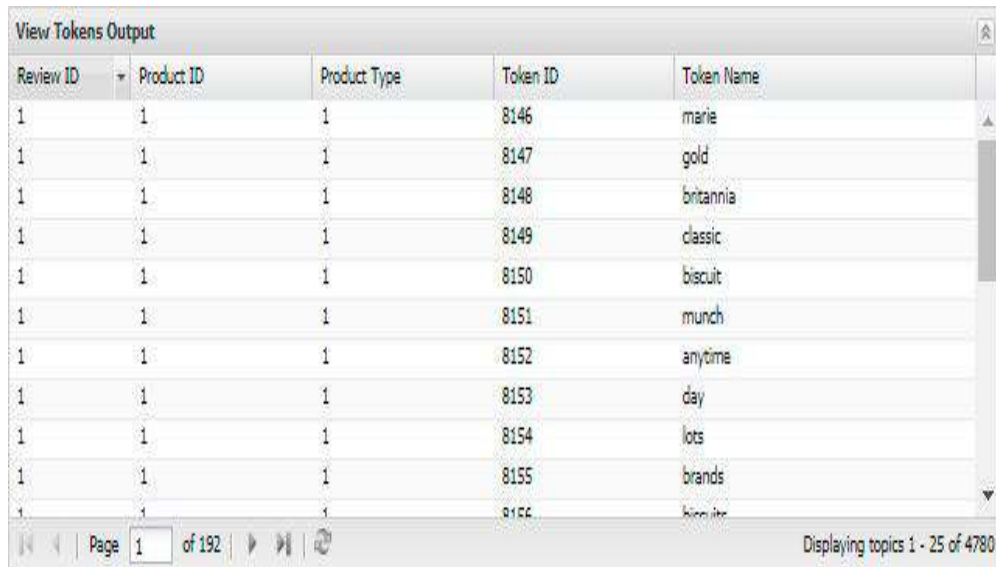
Fig 23: Unwanted Words

Figure 23 shows the unwanted words which has the first column a unique id for unwanted word and then second column is unique word.

191	off
192	often
193	on
194	once
195	one
196	only
197	onto
198	or
199	other
200	others
201	otherwise

Fig 24: Clean Feedback Data

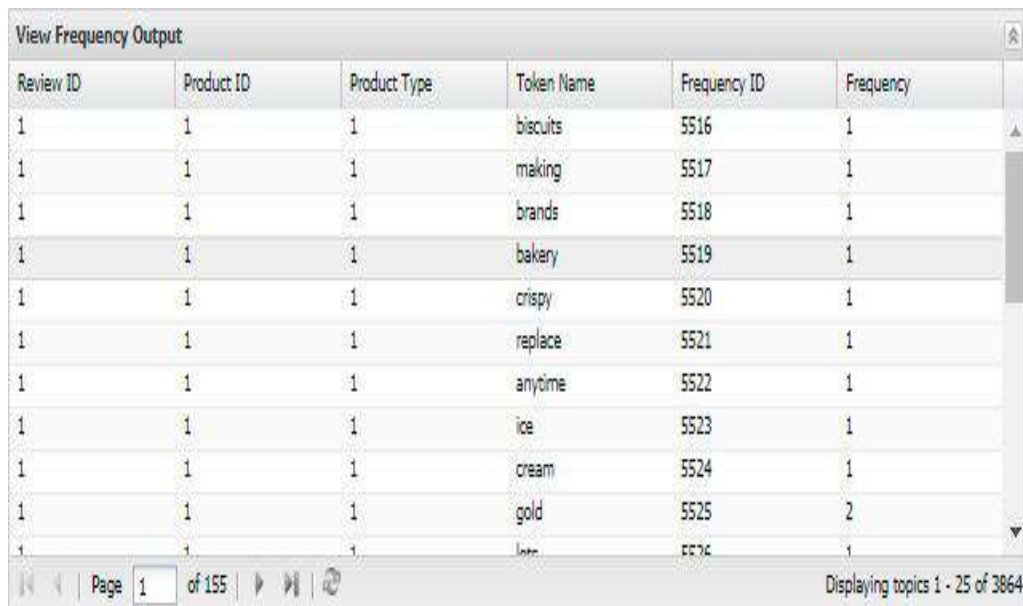
Figure 24 shows the clean feedback data in which the same columns as that of Feedback collection is used except that the feedback details are cleaned feedback without any kind of unwanted words.



Review ID	Product ID	Product Type	Token ID	Token Name
1	1	1	8146	marie
1	1	1	8147	gold
1	1	1	8148	britannia
1	1	1	8149	classic
1	1	1	8150	biscuit
1	1	1	8151	munch
1	1	1	8152	anytime
1	1	1	8153	day
1	1	1	8154	lots
1	1	1	8155	brands

Fig 25: Feedback Tokens

Figure 23 shows the feedback tokens matrix in which there are multiple columns. The first column is the unique Feedback Id, the second column is the Feedback Item Id, Feedback Type which is category of Food Item, Word Stream ID which is unique id for the word and then Token Name is the unique word



Review ID	Product ID	Product Type	Token Name	Frequency ID	Frequency
1	1	1	biscuits	5516	1
1	1	1	making	5517	1
1	1	1	brands	5518	1
1	1	1	bakery	5519	1
1	1	1	crispy	5520	1
1	1	1	replace	5521	1
1	1	1	anytime	5522	1
1	1	1	ice	5523	1
1	1	1	cream	5524	1
1	1	1	gold	5525	2

Fig 26: Word Stream Count Output



Review ID	Product ID	Product Type	Feature Type	Frequency	Product Name	Product Type Name
22	12	3	protein	1	Yo Gourmet	Yogurt
42	14	3	sugar	1	YIPEE	Yogurt
55	1	1	sugar	1	MARIEGOLD	Biscuit
56	1	1	protein	1	MARIEGOLD	Biscuit
57	2	1	fat	1	OREO	Biscuit
57	2	1	sugar	7	OREO	Biscuit
57	2	1	energy	1	OREO	Biscuit
58	2	1	fat	1	OREO	Biscuit
58	2	1	sugar	3	OREO	Biscuit
58	2	1	energy	1	OREO	Biscuit

Fig 25: Food Item Characteristic Matrix

Figure 24 shows the word stream count in which the first column is the unique id for the feedback, Food Item Id is the unique ID associated with the food item, Food Item Type is the unique Id for the Food Item type, Token Name is the word present in the feedback, Frequency ID is the unique id for the word and frequency is the weight of the word in a food item feedback.

Figure 25 shows the Food Item Characteristic matrix. The first column is the Food Item Feedback Id, the second column is the unique Id to represent the Food Item, the third column is the unique id for the Food Item type, Characteristic Type is the unique character of food type, Frequency is the weight of the characteristic in the Feedback, Food Item Name is the name of the food item and then Food Item type is the category of food item. Figure 26 shows the food item feature matrix. In the Food Item ID unique id for the food item, Food Item type is the unique type of the food, characteristic feature for food can be either sugar, salt, energy and protein, Frequency is the weight of the characteristic, Food Item Name is the name of food item and then last column is the Food Item category. Figure 27 shows the classifier output in which we have the class label for the food item, the second column is the unique Food Item Id, the third column is the unique name of Food Item and then type of Food Item is also labeled.

Product ID	Product Type	Feature Type	Frequency	Product Name	Product Type Name
1	1	salt	4	MARIEGOLD	Biscuit
1	1	sugar	8	MARIEGOLD	Biscuit
1	1	protein	1	MARIEGOLD	Biscuit
1	1	sugar	8	MARIEGOLD	Biscuit
2	1	salt	6	OREO	Biscuit
2	1	energy	3	OREO	Biscuit
2	1	sugar	20	OREO	Biscuit
2	1	protein	1	OREO	Biscuit
2	1	fat	2	OREO	Biscuit
3	1	sugar	6	SUNFEAST	Biscuit
3	1	energy	1	SUNFEAST	Biscuit
4	1	energy	1	PARLEG	Biscuit
4	1	sugar	9	PARLEG	Biscuit
5	2	sugar	5	DIARYMILK	Chocolate
5	2	fat	1	DIARYMILK	Chocolate
6	2	fat	1	KITKAT	Chocolate
6	2	sugar	5	KITKAT	Chocolate
7	2	sugar	5	SILK	Chocolate
7	2	fat	1	SILK	Chocolate
8	2	fat	2	KINDERJOY	Chocolate
8	2	sugar	12	KINDERJOY	Chocolate
8	2	energy	1	KINDERJOY	Chocolate
9	3	energy	1	EPIGAMIA GREEK YOGURT	Yogurt
9	3	sugar	4	EPIGAMIA GREEK YOGURT	Yogurt
10	3	protein	1	Real Tempeh Starter	Yogurt

Fig 26: Food Item Feature Matrix

User ID	Feature Type	Score
person7890	ENERGY	8
person7890	SUGAR	8
admin123	PROTEIN	5
ramaiah123	ENERGY	8
ramaiah123	SUGAR	8
person4162019	ENERGY	8
person4162019	SUGAR	8
rnsitu1	SALT	8
personcust4589	SALT	8
personcust4589	ENERGY	8
alskukluma...	SALT	8

Fig 27: Food Label Assignment Output

View Classifier Output			
Class Label	Product ID	Product Name	Product Type
salt	1	MARIEGOLD	Biscuit
sugar	2	OREO	Biscuit
sugar	3	SUNFEAST	Biscuit
sugar	4	PARLEG	Biscuit
sugar	5	DIARYMILK	Chocolate
sugar	6	KITKAT	Chocolate
sugar	7	SILK	Chocolate
sugar	8	KINDERJOY	Chocolate
sugar	9	EPIGAMIA GREEK YOGURT	Yogurt
sugar	10	Real Tempeh Starter	Yogurt
sugar	11	Home Brew Ohio	Yogurt
protein	12	Yo Gourmet	Yogurt
sugar	14	YIPEE	Noodle
sugar	17	BOURBON	Biscuit
sugar	18	MARIELIGHT	Biscuit
sugar	21	DARKFANTASY	Biscuit

Fig 28: Food Likeness Score Computation

Figure 28 shows the food likeness score for the customer in whom we have user name, characteristic name and final column is the score of food likeness for the end user.

View Nutrition Output		
User ID	Feature Type	Score
priyanka80	SALT	4
priyanka80	ENERGY	6
priyanka80	PROTEIN	4
priyanka80	FAT	6
priyanka80	SUGAR	4
student123	SALT	3
student123	ENERGY	8
student123	PROTEIN	2
student123	FAT	2
student123	SUGAR	8

Fig 29: Food Label Assignment

Figure 29 shows the Food Label Assignment. The first column is the unique id of the user, the second column is the characteristic type which is food likeness for the user and then final value is the score or weight of Food Likeness.

List of Keywords	
Keyword	Type of Keyword
anxious	anxiety
you re	anxiety
feeling	anxiety
worriad	anxiety
problem	anxiety
work	anxiety
boss	anxiety
butterflies	anxiety
stomach	anxiety
waiting	anxiety
results	anxiety
medical	anxiety
test	anxiety
nervous	anxiety
driving	anxiety
home	anxiety
rush hour	anxiety
traffic	anxiety
cars	anxiety
speed	anxiety
weave	anxiety
lanes in	anxiety

Fig 30: Keyword List for Disease Kind

Figure 30 shows the keyword list for disease kind. The first column is the keyword and second is the type of keyword.

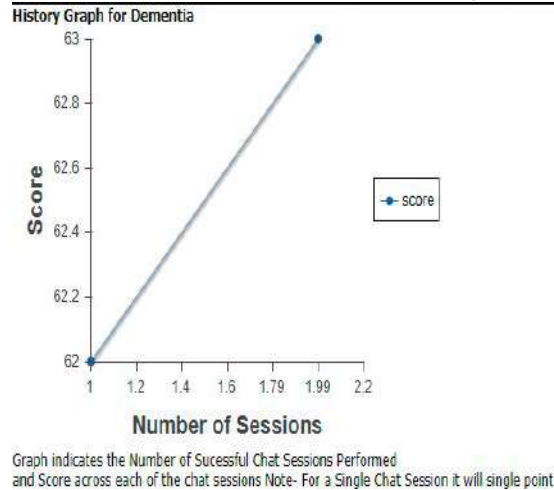


Fig 31: Score Graph Dementia

Figure 31 shows the score graph in which number of sessions in which first session id has a score of 62 and then second session has the value score of 63.

V. CONCLUSION

In this work the feedback is collected from across the websites and then it is converted into a feedback matrix. After that the cleaning of text is done for each of the feedback by removing the unwanted words. The stream of word is obtained by converting the clean text into a word stream matrix. After that the redundancy is removed and each word in the feedback is assigned a weight. In each of the food items there is a look upper formed for certain specific characteristic and then a matrix is constituted which will have Food Item, Weight, Characteristic and then food label assignment is performed based on maximum value of weight. The consumer is asked a series of questions related to various characteristic of food and then health profile for the end user is provided and each user is assigned a single or multiple category of food likeness. The users are recommended list of food items based on genetic algorithm and food likeness. A custom recommendation is also provided based on various criteria like having BP, having Sugar or is of Old Age. The users are allowed to perform a chat with an artificial intelligence system which is trained with generic questions as well as disease based keywords question and then naïve bayes algorithm is used for predicting the disease type. Once the disease type is found then a series of symptom based questions are asked and based on answers provided by the end-user the level of disease if found and then feed-backs are provided for Level 1 or Level 2 and then for Level 3 along with feedbacks real time hospital / clinic links are provided.

Author contribution Statement

Conceptualization: Elakya Kumaran; **Literature Review and Methodology design:** Dr.Karthika K; **Software:** Dr.Karthika K; **Validation:** and Dr.Karthika K; **Formal analysis:** R.Vasugi and Dr.Karthika K ; **Investigation:** Dr.Karthika K ; **Resources:** Dr.Karthika K and R.Vasugi; **Data Curation:** Dr.Karthika K ; **Writing original draft preparation:** Dr.Karthika K; **Writing review and editing:** Dr.Karthika K; **Visualization:** Dr.S.Sathishkumar; **Supervision:** R.Vasugi and Dr.Karthika K; **Project Administration:** Dr.Karthika K, All authors have read and agreed to the published version of the manuscript

Conflict of interest

The authors declare no conflicts of interest.

Data availability statement

Data supporting these findings are available within the article, at <https://doi.org/10.26562/irjcs.2026.v1302.01>, or upon request.

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