

# MyDietDiary: Diet Recommendation System

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**Abstract—** The Objective of our Project is to design, increase and examine a recommender machine capable of verifying nutritional intake, the use of a proven Food Frequency Questionnaire (FFQ), and recommend legitimate customized nutrients recommendation for adults. It is investigating a powerful manner of supplying customized online nutritional pointers to growth weight loss programs, nice at populace degree and of thinking about a man or woman user's preferences, populace statistics and experts' know-how within the recommendation.

**Keywords—** machine Learning Algorithm, k-means, random forest, Diet Recommendation.

## I. INTRODUCTION

One of the most important elements for a wholesome lifestyle is every day food plan and food, specifically, for the human beings laid low with a few minor or most important sicknesses. eHealth projects and studies efforts to provide diverse pervasive packages for newbie stop customers to enhance their fitness. Various research depict that beside the point and insufficient consumption of food plan is the most important cause for diverse fitness troubles and sicknesses. The essential consciousness of these paintings is to offer nutritional help to exceptional those who are laid low with not unusual place illnesses

or perhaps no sicknesses. The advice method has essentially 3 levels which are Information Collection Phase, Learning Phase and Recommendation Phase. The records are first off gathering approximately a selected hassle and the diverse answers associated with that hassle are categorized. After the gathering of records Learning Phase comes wherein diverse conclusions are constituted of that records that is accumulated and in closing segment i.e. Recommendation Phase an output is given wherein diverse pointers are made. In our device because it's far from a food plan advice device so the pointers might be approximately the weight loss plan like what all belongings you need to eat, what's your BMI (Body Mass Index) which states whether or not you're wholesome, overweight, or under-weight.



Fig 1: Diet Items

## II. RELATED WORK

### A. Problem Statement

People make selections associated with meals each day. They all reflect on consideration on what to eat, where to eat, how much dietary price this meal has, can this make me lose weight, can this meal make me wholesome and different questions. Recommendation structures assist the consumer to make rapid selections in those complicated statistics spaces. Most interest is being paid to weight-reduction plan control structures that have been changing conventional paper-and-pen methods. These structures consist of informative content material and services, which convince customers to modify their behavior. The center task of this study is to layout an internet machine that may mechanically offer nutrients recommendation, a good way to be powerful in converting people's diets. Besides factoring in an individual's nutritional consumption relative to popular endorsed nutritional guidelines, it's far essential that the intervention takes into consideration non-public statistics, populace facts and customers' possibilities in defining recommendation/feedback. In different words, the machine could want to not forget participants' interactions and suggest distinctive paths for growing their weight-reduction plan quality. One of the primary variations with a nutrients recommender system is that there is no modern-day openly-available dataset with people's case histories and the corresponding proposed weight-reduction plan adjustments from nutrients specialists that would be used for training. Furthermore, otherwise from many not unusual place recommender structures, the meals gadgets that customers like and eat the maximum aren't always the healthiest. In different words, the recommender machine ought to recollect elements aside from customers' possibilities and previous consumption.

### B. Literature Survey

According to first paper[1], Researched on Recommender System for Personalized Nutrition Advice. The preferred suggestions for addressing noncommunicable diseases, that are liable for thirds of deaths globally, are specifically associated with life- style changes, which include food plan and bodily activity. He went via a few demanding situations like encouraging healthful diets inclusive of amassing correct facts approximately nutritional

consumption and turning in interventions that may impact behaviour. He designed, evolved and evaluated a recommender machine capable of examine nutritional consumption, the use of a established Food Frequency Questionnaire (FFQ), and suggest legitimate customized vitamins recommendation for adults.

According to second paper[2], They proposed a wholesome weight loss plan advice machine primarily based totally on statistics mining, which could song your fitness conditions, running way of life and advise the kinds of meals that enhance your fitness and keep away from the kinds of meals that boom hazard for illnesses. The weight loss plan recommender machine specializes in each character primarily based totally on their ingesting habits. Recommender Systems (RSs) are software program gear and strategies that offer hints for gadgets to be of use to a user. Also studied the weight loss plan to diabetic sufferers. Based at the sugar rating of diabetic sufferers they advise a right weight loss plan to diabetic sufferers.

According to third paper[3], They studied the fitness control of Taiwan human beings who've abnormal lifestyles, long-time period dangerous diets, disturbing work, and persistent sicknesses along with diabetes, hypertension, and excessive cholesterol. They use an ontology, selection trees, and Jena to assemble the advice system. The nutritional tips outcomes are evaluated via way of means of dietitians, and the verification accuracy is 100%.

According to fourth paper[4], The important goal is the International Expert Consultation on Sustainable Healthy Diets characterizes wholesome diets and their implications for meals machine sustainability. They think about World Health Organization (WHO) tips for eating regimen recommendation. Also researched approximately plant meals and animal meals and Implied shifts towards plant ingredients and far far from animal ingredients (excepting fish and seafood).

According to fifth paper[5], In this the writer has specially centred at the diabetes sufferers. The Diabetes sufferers require nutritional variety inside meals businesses that may have an effect on the diabetic sufferers. In this study, the writer proposed the Food

Recommendation System (FRS) through the usage of meals clustering evaluation for diabetic sufferers. Their device will advise the right substituted meals within the context of vitamins and meals characteristics. They used Self-Organizing Map (SOM) and K-implication clustering for meals clustering evaluation that is primarily based totally on the similarity of 8 considerable vitamins for diabetic sufferers.

According to sixth paper[6], In this article, the authors spotlight the problem of choice of right eating regimen that have to satisfy patients' vitamins requirements. To deal with this issue, they gift a cloud primarily based totally meals advice system, known as Diet-Right, for nutritional guidelines primarily based totally on users' pathological reports. The version makes use of an ant colony set of rules to generate an most effective meals listing and recommends appropriate ingredients in step with the values of pathological reports. The experimental consequences display that in comparison to unmarried node execution, the convergence time of parallel execution on cloud is about 12 instances lower.

According to seventh paper[7], The proposed gadget presents individualized meals advice lists on the eating desk, and is primarily based totally nutritional recommendation within the ordinary Korean scientific text. The Author's proposed gadget gets a person's profile, physiological signals, and environmental data across the eating desk in actual time. To perform their gadget, they gift a way for person distinct analysis, and additionally describe time-department layered context integration which integrates the more than one contexts acquired from the sensors. Thus, our gadget recommends suitable meals for every individual's fitness on the desk in actual time.

According to eighth paper[8], According to the author, the studies paper proposes healthful meals behaviour and consuming styles in order that each person can recognize the quantity of energy burned, the consumption of macronutrients and so forth the usage of information mining tools. This device is used for coming across hidden styles and consumer consuming behaviour from specific kinds of information sources. This gadget will assist in monitoring and enhancing the character's fitness and the form of meals which they are able to keep away from main to the threat of illness. A balanced food regimen method that the

consumption of every vital nutrient meets its good enough call for and real caloric consumption balances with energy burned. Additionally, creating a variety of alternatives from diverse kinds of meals is likewise vital to lessen the threat of growing persistent diseases. This food regimen recommender gadget makes a speciality of each character primarily based totally on their consuming behaviour and frame statistics.

### III. PROPOSED MODEL

#### A. Dataset

The dataset consist of 120 food items with their nutritious values like calories fats proteins etc. The dataset has all the items used in breakfast, lunch and dinner and it is automatically dividing the food items into different category by our model.

#### B. Implementation

The proposed machine of meals advice for a specific purchaser is primarily based totally on elements such as caloric facts for a meals object, private facts, the pastime degree of every character, for a given meals database. This advice enables you to choose the meals from the database such that the vitamins deficiencies will now no longer arise within the close to destiny and right healthy diet weight-reduction plan may be given to every character at the same time as pleasant the everyday calorie intake. The principal goal of the offered paintings is to assemble the selection tree till the proper category is reached to choose the right meals object primarily based totally on meals availability, Category of consumer (Fat, healthful, lean etc.), Likeness Factor, consumer health goals, Overall content material of Nutrients in that meals, selection policies and constraints on it are described to layout a healthful healthy diet weight-reduction plan for every character.

People login into the machine and without delay input their fitness-associated facts and running life-style that is without delay saved into the database. This fact is received to music people's fitness situations on a normal basis. This fitness and life-style-associated facts received thru the software program is the first-hand fabric for this machine e.g. the height, weight, diseases,

hypersensitivity situations, bodily pastime of users, their behavior etc. The facts concerning meals objects and its dietary cost is accumulated from the dataset furnished with the aid of using USDA agricultural studies carrier meals datasets. Generally, the facts acquisition module selectively obtains facts from the out of doors net environment, in phrases of capability to offer fabric and sources for the latter facts mining.

The tips with the aid of using our recommender device might enhance your natural method shape and raise your fitness standards. On the other hand, we generally tend to conjointly listen to music users' man or woman preferences. This technique would possibly endorse the associated weight-reduction plan to satisfy the personalized desires with the aid of using the exploitation of affiliation rule mining. So it would provide a better carrier and know-how to users.

The System works in a Machine Learning Environment, in which it calculates the consumer statistics and for that reason offers the encouraging Diet plan to paintings on. Accordingly, we teach the ML version with distinct inputs to get the favored consequences for the consumer. We use in particular 2 Algorithms right here which are:

1. K-Means
2. Random Forest

According to the selection which consumer takes in a healthful food plan, weight advantage or weight reduction the version as according to the information and class decided on will generate a diet regime for the consumer.

The proposed System Architecture goes to be like Users will input the essential records like their age, gender, weight etc. at the website.

3. The records will then undergo the ML version withinside the following manner:

- 3.1 K-Means is used for clustering to cluster the meals in keeping with energy.
- 3.2 Random Forest Classifier is used to categorize the meals objects and are expecting the meals objects primarily based totally on input.

2.3. After reading all of the information the machine will reply through displaying customers' BMI and their cutting-edge state (Overweight, Underweight, Healthy).

2.4. The System will then advise food plan to the customers into 3 categories (breakfast, lunch, dinner) primarily based totally on input.

2.5. The Users can pick out from a couple of encouraged objects and make their diet regime.

2.6. After choosing meals objects the machine will calculate the meals energy and display customers' contrast among what number of energy they selected towards how much they want to eat daily.

2.7. Accordingly then the Users will make their diet regime.

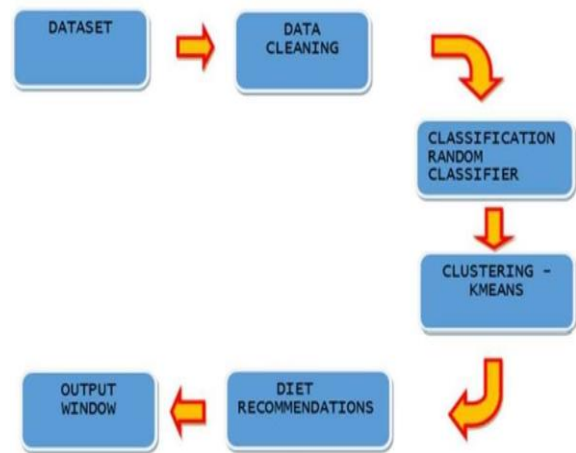


Fig 2: Modular Diagram of model

#### IV. RESULT AND DISCUSSION

Moving on to the experimental results of our model. We have mainly used the K-means algorithm for clustering the food items according to the requirement and we have used the Random forest algorithm for dividing the clusters into breakfast, lunch, and dinner.

The first feature of our model is Body Fat Calculator. This feature displays the percent of fat in your body by taking the input as height, weight, age, and gender.



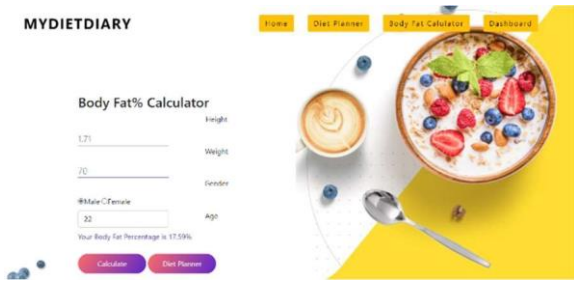


Fig 3: Body Fat Calculator

There few test cases in our model overweight whose BMI index is from 24 to 30, severely overweight is a person whose BMI is 30 or above, healthy person has a BMI index between 18 to 24, an underweight person is someone whose BMI index is between 16 to 18 and anyone whose BMI is below 16 is considered as severely underweight.

So our model gives the recommendation according to the above cases. For example, if a person is underweight then the system recommends:-

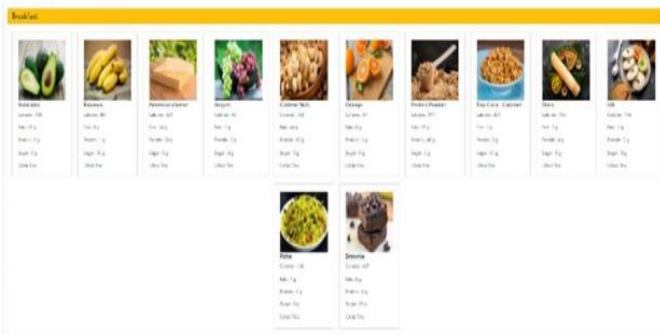


Fig 4: Represents the food items a person can have in his breakfast.



Fig 5: List of food items is recommended for lunch.

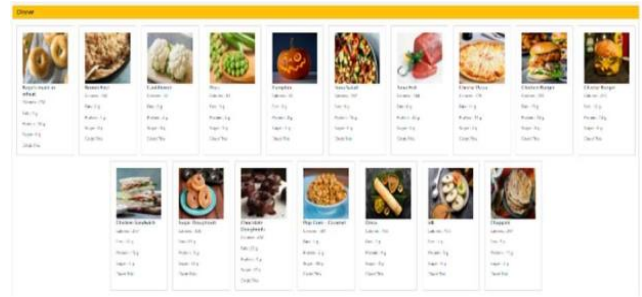


Fig 6: List of items recommended to a person for his/her dinner.

From the list given to the user, he/she has to select the food items according to their wish and click on the recommendation button that will update you with the total calories intake by total goal calories.



Fig 7: Calories updated and the total goal given

Now moving to the next feature of our model is the dashboard where the user has to keep track of the daily intake of calories, fats, proteins, and carbohydrates. All these items are displayed in a graphical manner which makes it very attractive for the user to see the changes he/she is experiencing.

After successfully registering for the dashboard the user has to log in using the username and password to access the dashboard.

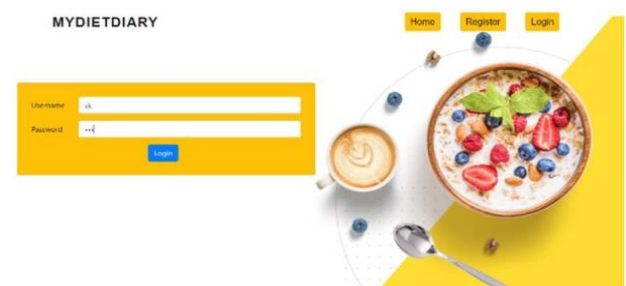
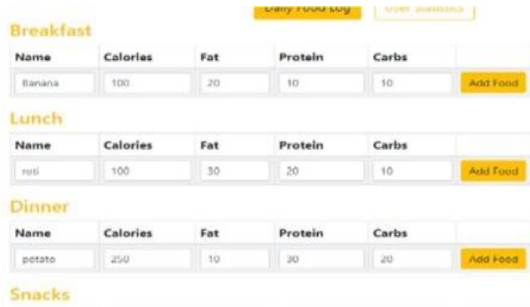


Fig 8: The Login page

As soon as the user logs in he will be directed to his/her personal dashboard where he/she has to give the input of food items he has eaten for breakfast, lunch, dinner, snacks, and cheat meals. Along with the food items they have to enter the details that food items like calories, fat, proteins, and carbohydrates.



**Breakfast**

Name	Calories	Fat	Protein	Carbs	
Banana	100	20	10	10	Add Food

**Lunch**

Name	Calories	Fat	Protein	Carbs	
roti	100	30	20	10	Add Food

**Dinner**

Name	Calories	Fat	Protein	Carbs	
potato	250	10	30	20	Add Food

**Snacks**

Fig 9: The input of food items and details

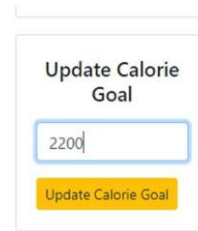
As soon as the food items are added a pie chart is displayed which shows the complete fat, proteins and carbohydrates intake in all the categories (breakfast, lunch, dinner, snacks, and cheat meals).



Fig 10: Pie chart displayed after inputs

This pie chart is updated every time a food item in any of the categories listed above. This could be used to keep daily track of nutrients.

Apart from pie chart the user can also update his daily calories goal by just entering the new calorie amount in the input area given on dashboard.



Update Calorie Goal

2200

Update Calorie Goal

Fig 11: Calorie Goal Update

The daily input of calories by the goal calories is displayed on the top right corner of the website.



Fig 12: Daily Total Calories

The line graph of date vs total calories is also shown to keep the track of calories intake on daily basis.

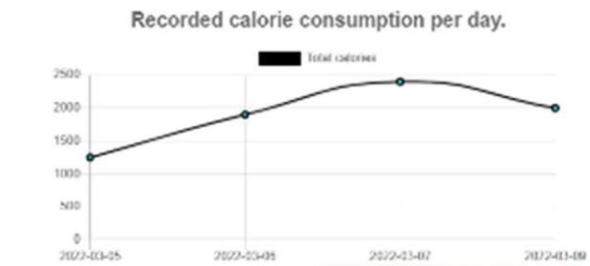


Fig 13: Line graph for calories consumption

Finally the last feature is the user can keep the track of their weight change by just entering their recent weight and the date vs weight graph shows the changes in the user's body weight.

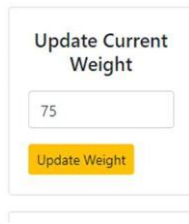


Fig 14: Current Weight Input

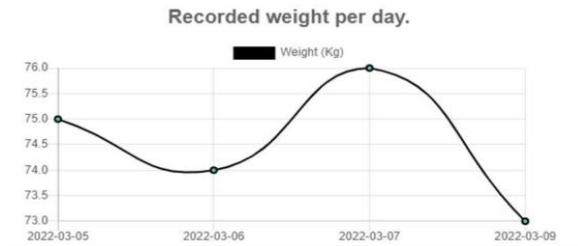


Fig 15: Weight per day line graph

So these are all the features and working analyses of our model where the user will not only be able to get diet recommendations but can also keep the track of their daily intake using our dashboard.

## V. CONCLUSION

This venture will inspect a powerful manner of offering automatic personalized online nutritional pointers that allows you to grow the weight loss program best of the populace and methods of thinking about consumer's possibilities all through the net advice. This proposed gadget goals to grow effectiveness and acceptability the use of the subsequent dimensions: nutritional intake, consumer possibilities, different users' responses, populace statistics and vitamins experts' knowledge. The proposed framework is designed to decorate this interplay via means of studying consumers to get admission to behaviors at the gadget. In addition to the content material evaluation statistics is likewise retrieved in keeping with every individual's possibilities and via means of advice from different users. We think that there's an internet software in which humans should input their fitness statistics over the internet.

## VI. FUTURE SCOPE

In the future, a set of rules may be generated to indicate a healthy eating plan primarily based totally on superior nutrients degrees consisting of sodium content material, phosphorus, fiber content material, manganese content material, etc. Along with the meals objects counseled for every meal the machine also can be designed to generate and offer recipes with the intention to consist of all of the meals objects counseled within the meal plan. More flexibility may be furnished to customers to feature their personal meals objects as in step with their desire in addition to the capability to feature cheat food into the healthy eating plan also can be introduced.

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