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Artificial Intelligence (AI) based Nutrition Advisorusing an App

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***Abstract*—There is a growing awareness of a good lifestyle among people today. People tend to follow different diets and exercise. However, consulting a nutritionist is not for everyone. Diet Advisor is an artificial intelligence application about human nutrition. Act as a nutritionist, just like a real nutritionist. This system is very similar to that of a nutritionist. Individuals , due to busy schedules, people in the modern period are unable to focus on their welfare. As a result, a diet should be suggested to manage health. A balanced diet is required to grow. A machine with intelligence who specialises in health is called an AI nutritionist. supplies providing its consumers with a suitable diet plan based on some evaluation parameters. This AI powered technology could really create a nutrition plan that emphasises a balanced, healthy diet. Fruits, vegetables, grains, skim milk and other low-fat dairy products, beans, lean protein sources like chicken and tuna, and lentils are examples of nutritious foods. Mealsthat have been suggested by experts. However, since each user appears to have a distinctive eating intake varying medical problems, a nutritionist generates an eating plan tailored to each individual. The web-based virtual nutritionist is an artificialintelligence-powered human implementation focused on diet. It functions as a nutrition advisor, much like an actual health professional. Participants who want a nutrition plan must give different information, like their height, BMI, and work schedules. The system saves all of the subscriber's data and uses it to send the nutrition plan to the subscriber. As a result, the subscriber can receive the necessary diet with just one click and avoid having to see a nutritionist, which makes the process quicker.**

***Index Terms*—AI (Artificial Intelligence),Diet Plan, Counselor, BMI (Body Mass Index),Dietitian, AI technology, Diet Evaluation, Intelligent Health Management, Smart Diet Plan**

I. Introduction

As individuals everywhere lead by example in a healthy lifestyle, their diet plays a major role. Healthy eating is important for good health and nutrition. A healthy lifestyle can be achieved by maintaining a healthy diet and considering meeting all the essential nutrients the body needs.

Advances in digital tools and artificial intelligence can help individuals more easily track nutrient intakes and identify nutritional gaps. However, the influence of these nutrients on health outcomes can vary widely among individuals depending upon life stage, genetics and microbial composition.

The Body Mass Index, or BMI, is calculated through the combination of a person's height and weight. BMI is derived by dividing a person's weight (in kilograms) by their height(in meters) squared. .

There are many benefits to planning ahead in a diet that not only saves time but also improves a person's health. A proper diet helps to maintain a healthy weight. To lose weight, or just to improve one's diet, dieting is a simple step to help in achieving one's health goals.

Calories are a measure of a diet's energy content. Walking, thinking, and breathing all consume calories. A person's calorie need is generally determined by their gender, age, and level of physical activity. A person may require two thousand calories a day on average to maintain his weight. Furthermore, guys require more calories than women. Also, people who engaged in a lot of physical activity require more calories compared to people who do not. So the practice of consulting a dietitian is growing.

Not everyone can get access to a dietician or can afford the fees. Therefore, the system of AI- Based Dieticians is proposed. This enables the users to access diet plans specific to their body traits free of cost and at any time withouthaving to visit with a dietician. This study inquires about the users regarding their gender, chronological age, body mass index, allergies, and personal preferences are all factors to consider. and process the inputs given by the user using several machine learning models and choose the most accurate one to show the diet plan customised for the person.

To provide the user with the diet plan, the system collects and processes all of the user's data. Consequently, the user can time is also saved by being able to quickly and easily obtain the necessary food plan without having to see a dietician. The system provides more accurate results by accepting the user's input and processing it in accordance with some metrics that are previously known to the programme. Based on these metrics, a diet plan is developed and the user is prompted to accept the diet plan. The system may also offer an alternative diet plan if it is rejected.

II. Literature Survey

Romeshwar Sookrah [1] this DASH diet advising approach has been suggested. It applies techniques like content-based filtering and machine learning algorithms to hypertension patients based on parameters including age, food preferences, allergens, degree of alcohol consumption, smoking, blood pressure, and nutritional intake. Dietary Approaches to Stop Hypertension (DASH) is a diet regimen that is used to decrease or control high blood pressure. The DASH diet emphasises foods high in potassium, magnesium, and calcium—nutrients that lower blood pressure—while being low in sodium.Menus on the DASH diet include plenty of vegetables, fruits, and dairy products, as well as grains, fish, chicken, and nuts. Limits the amount of red meat, sweets, and sugary drinks served.

Gergely Kov´asnai at [2] discussed creating an expert system for nutrition advice using a casebased approach. Based on this technique, an expert system will be built that will be used in a health record management system. Ripple down rules are the basis of the strategy.(RDR), but patient attributes and rule actions also require a unique representation. Case-based learning (CBL) is an established method used in all fields where students apply their learning to circumstances in the real world, which develops higher levels of awareness.

Wahidah Husain in [3] proposed the data mining techniques are used in a personalised nutrition suggestion system for cancer patients. The system focuses on calculating the patient's daily nutritional requirements for their diet values corresponding to their personal health state. As a result, the system recommends a daily food plan for each patient, which includes a variety of dishes to try for breakfast, lunch, and dinner.

Ashvini Kale in [4] presented an analysis of Algorithms for automated menu planning for youngsters. It is a dietary management system meal recommendation system that uses ID3 for the Indian food database. For the Indian cuisine database, the proposed system of meal suggestion for children is based on criteria such as food preferences, food availability, medical information, disease information, personal information, and a child's level of activity. This tip assists the database in selectingthe meal so that deficiencies do not occur anytime soon andthe child receives a balanced nutrition plan.

Case-based Reasoning (CBR) is a problem-solving data mining strategy. Instead of relying just on general information of The source of the problem, CBR employs information of conditions of real problems that they have already faced, known as cases, rather than relying solely on generic information of the relationship between adjectives and conclusions.[5].

Jen-Hao Hsiao at [6] has discussed the feedback for the diet plan from the users.The user in this situation has the option of modify the menu according to his/her desire, Based on the changed constraints, the Meal Planner recalculates a Pareto optimal solution. As a result, this interactive diet planning system is expected to give the user with a more customised meal plan.

III. Methods

System provides a nutrition plan based on the information given by the user. All of this information is requested and processed by the system in order to present the user with a nutrition plan.

Fig 1.Stock illustration of a diet plan for health and nutrition - a pie chart for weight loss and gain.

How we are achieving the prediction process?

We are using clustering for this diet application. For this we are taking calories dataset and combine it with veg food and nonveg food and also, we have to classify calories of veg food and calories data set and non veg food with calories data set form the cluster on the basis of calories are required for the human body on the basis of BMI and calories calculation. i.e. BMI will be calculated by its universal formula which needs height and weight. Calories play a vital role in our growth and energy. A good diet can help you manipulate calorie intake based on your requirements. Calories required for body will be decided on the basis of BMI and goal of person, weight gain or weight loss condition and working type of person. On the basis of calories required and food preference like veg, non veg we are form a cluster by using this application predicting result.

The app is created using flask framework by python to build an app. The proposed application will provide the user with a user-friendly User-Interface where they can create an account,

manage their account and get the diet by the click of just one button.

Dataset : Calories in Food

Calories are a unit of measurement to show how much energy you will get from a serving of food. Therefore, to lose weight, it's best to limit any calorie-dense foods – anything where you get a lot for a little – so you can eat enough food to really feel full. But when restricting food intake, it's important not to follow too extreme of an eating plan. Before they get stored as fat, the calories in food are converted into fuel for everything from organ and brain functions to walking around and even just sitting upright. The number of calories your body needs for minimal functions – that is, simply lying in bed all day – is called basal metabolic rate (BMR). That's the starting point to calculate how many food and drink calories you can consume in a day. Then, how much you move and how vigorously determines if you have room in your healthy diet for more calories. Very active individuals should use the nutrition database to locate foods with a lot of energy, as indicated in the calorie chart by a high number per serving. Those whose lifestyles involve minimal activity, such as commuting to an office job by car, should look at nutrition facts to plan meals that have larger portions with fewer calories; same goes for anyone following a weight loss diet.

3.1 BMI - A person's body mass index, or BMI, is determined using the individual's weight and height. BMI is given as the weight of a person(in kgs) divided by the height of a person(in meters) squared. BMI classification on the basis of conditions The adult body mass index and categorization as obese (body mass index 30+), overweight (body mass index 25-30), normal (body mass index 18.5-25), or underweight (body mass index 18.5). body mass index. Proactive nutrition has many benefits that not only save time but also improve a person's health.Proper nutrition helps maintain a healthy weight. Whether you want to lose weight or just improve your diet, dieting is a simple step to help you reach your goals.

3.2 Allergies - An unpleasant or damaging immune system reaction following the consumption of a certain food. Food allergies have no recognised cause. Allergies experienced as a child may resolve in maturity in some situations. A response can cause stomach issues, hives, or enlarged airways. Severe responses are potentially fatal. Antihistamines are used to treat minor allergic responses. If the reaction is severe, an injection of epinephrine and emergency department care are recommended.

3.3 Preferences in Food - People's evaluations of foods are expressed in their eating preferences. Food preferences encompass both the quantity and quality of foods. They are both liked and despised.It has been researched the association between food preferences and a variety of demographic parameters such as race, gender, region, age, taste physiology, and numerous medical conditions. Variations in food preferences have been connected to age, gender, race, and other characteristics. According to one of the earliest hypotheses on obesity, overweight people have different taste preferences from those who are not obese. However, it has been established that this is untrue. Culture is one of the key factors that distinguishes food choices. According to Elizabeth Rozin, the main reason why people have various food tastes is because different cuisines have different flavour philosophies.

Flavor principles are the distinct flavour ingredients found in foods from many civilizations. Greek cuisine, for instance, The use of olive oil and lemon distinguishes northern French food, while the use of olive oil and herbs distinguishes southern French cuisine. The usage of soy sauce is a distinctive feature of Japanese cuisine. By including these traditional flavors, it is possible to help consumers recognise items that are socially and culturally acceptable and to help them get over their aversion to trying new cuisines.

3.4 Working types - When you stand, you burn between 100 and 200 calories every hour. Everything is determined by your gender, age, height, and weight. Sitting, on the other hand, only burns 60 to 130 calories every hour. Consider how quickly that adds up! By standing for only three hours instead of sitting, you might burn anywhere between 120 and 210 more calories. While this will not help you shed a lot of weight, it will help you maintain your present weight and avoid some health risks.

IV. Experimental Setup

4.1 Calories Chart - Calories are a unit of measurement for the energy contained in food and beverages. Our bodies store extra calorie consumption through food and drink results in increased body fat we consume more food and drink than we burn off. If this continues, we may begin to acquire weight. An average male requires approximately 2,600 calories (10,500 kJ) each day to maintain a healthy body weight. Depending on a number of factors, such as size and age, how many calories people burn when participating in a particular physical activity varies. You'll burn more calories when you exercise more strenuously. For instance, walking quickly burns more calories than walking slowly. If you're gaining weight, it's possible that you've been frequently consuming more calories than you've been burning off through food and drink. You must expend more energy than you take in over the long term in order to lose weight.

4.2 Diet Plan - Diets aren't only about dropping weight. While changing your diet can be one of the best ways to lose weight, it can also serve as a springboard for bettering your habits, emphasising your health more, and leading an active lifestyle. This diet's focus on unprocessed foods veggies and fruits has been connected to a reduced risk of various

chronic diseases and a longer life span. Additionally, studies demonstrate that the Mediterranean diet protects against several malignancies.Numerous studies suggest that the diet's plant-based, high unsaturated fat eating pattern can help with despite the fact that it was designed to decrease the risk of heart disease.

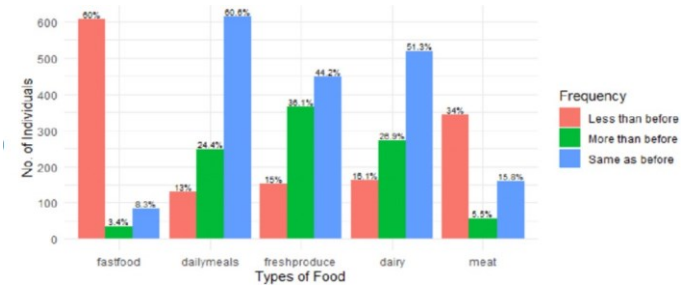

Fig 2. The bar plot shows how people's eating habits have changed.

4.3 Workout Plan - One of the most important things you can do to improve your health is to exercise regularly. Being physically active can strengthen your bones, lower your risk of disease, help you control your weight, and improve your mental health. strengthen your muscles and increase your capacity for daily tasks.

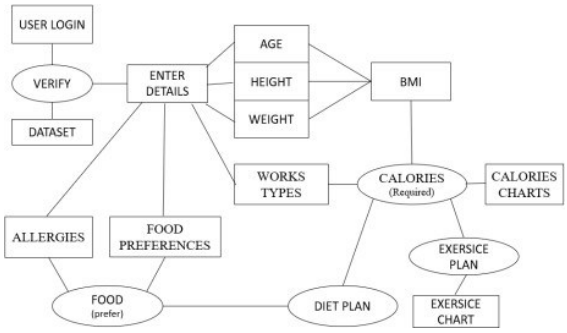

Fig 3. The Architecture of Proposed System

4.4 Water Intake - Getting enough water every day is important for your health. Dehydration can impair your ability to make you not able to concentrate straight, change your mood, or make you hot, may lead to kidney stones and constipation. Drinking enough water can help you stay healthier. This works up to 15.5 ounces (3.7 litres) of liquid every day for men. The recommended daily fluid intake for women is 11.5 ounces (2.7 litres).

4.5 Sleeping Time - While you sleep, your body is trying to preserve your physical health and support your maximum mental function. For young people and adolescents, sleep is necessary for growth and development. Lack of sleep over time can increase the risk for severe (chronic) medical conditions.Your age is one of several variables that affect how much sleep you need. Although each person's needs for sleep are different, take into account these general recommendations for each age group.

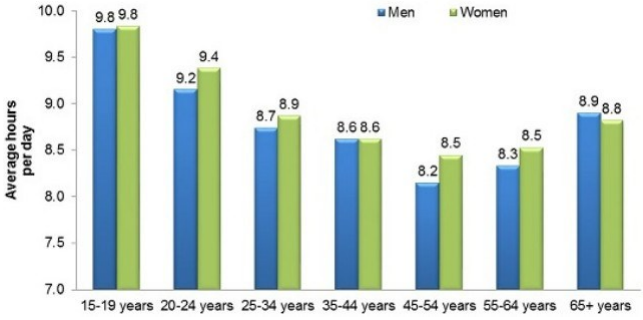

Fig 4. Bar Graph of Sleeping Time in Men and Women Age Wise

V. Result and Discussion

5.1 Appendices and Acknowledgements - AI Diet Advisor is an artificial intelligence application about human nutrition. Act as a nutritionist, just like a real nutritionist. This system is very similar to that of a nutritionist. Anyone wanting to know their eating plan should provide their nutritionist with information such as: The human body type, weight, height, and information on working hours. A nutrition is also provided by this system based on the information uploaded by the user. The system requests all of this data from the user, analyses it, and then provides the user with a dietary plan. Because of this, the user can acquire the diet plan they want with just one click, saving time and avoiding the need to contact a nutritionist.

5.2 Computer Code - Diet Adviser is machine learning model that is developed to predict steering Diet using Artificial Intelligence.

1) Data Collection: First and most important thing to data collection for training our model to measure the calories of food and diet plans.

2) Date Preparation: After collecting data we have clean and filter our data for making better model and better prediction.

3)Data Analysis: Analyzing our dataset for slitting into training and testing data.

4) Data Division: Our data have been divided into training and testing data.

5) Educating Data: We use 80 percentage of dataset for training our model.

6) Testing of Data: We use 20 percentage of dataset for testing our model.

7) Output of Analysis: We have analyzed our output from the given dataset with testing dataset.

Expexted Output -

1. Every time a customer clicks on the domain, they are directed to the homepage, which is the primary page of our website. It includes all the data as well as links to other pages. The homepage also has a direct link to the chatbot.

2. If an account does not already exist, the user may establish one on the sign-up page. Each user has a unique credential that the database stores.

3. The one who has already created his/her account can directly login to account.

4. The prediction form allows the user to enter the details and explains if the individual is fit or not.

5. The Body Mass Index (BMI) is a standard calculation that a user can use to determine the state of his or her health. For the majority of people, a healthy BMI is between 18.5 and 24.9. For children and teenagers between the ages of 2 and 18, the BMI calculation takes into account their age, gender, height, and weight. If your BMI is less than 18.5, you are considered to be underweight.

6. On the basis of inputs given by user in the prediction form, A machine learning model will accurately predict the outcome. whether the user is fit or unfit.

7. And Suggest Diet plan and all other necessary things accordingly.

VI. Conclusion

Unhealthy eating patterns are the root cause for many diseases and health problems. Therefore, our system thus proposes an artificial intelligence-based dietician which recommends a user specific diet plan. The system considers the input provided by the user such as age, gender, height, weight, and allergies to formulate suggestions using machine learning methods. The technology can be utilised in next projects to track and examine users weight all through week.

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