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Food Nutrition and Healthy diet During Covid-19 Using AI/ ML

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Abstract: ***The COVID-19 outbreak has negatively affected the day-to-day life of people. Food nutrition and a healthy diet are even more essential since a well-balanced diet rich in nutrients supports a healthy immune system. In our approach, we take the symptoms of covid-19 and classify them using a DNN classifier, resulting in the conclusion that dietary nutrition and a balanced diet are important during covid-19. Following the categorization, a Decision Tree is utilized to decide on the patient's replies and provide the decision and answers. A Decision Tree is simple to learn since it can think like a human while making a decision.***
Keywords: DNN Classifier, Decision Tree, Food Nutrition and Diet.

I. INTRODUCTION

During the COVID-19 outbreak, it is essential to have a healthy diet. Our body's capacity to resist, fight, and heal from illnesses is determined by what we eat. Even if no foods or dietary supplements may prevent or treat COVID-19 sickness, maintaining a healthy diet is critical for maintaining the immune system.

A good diet is essential for good health, especially when the immune system is under attack. Access to fresh foods may be limited, limiting the possibility of maintaining a healthy and diverse diet. It may also lead to an increase in the intake of highly processed meals that are heavy in fats, carbohydrates, and salt. Nonetheless, a diet that promotes excellent health may be maintained even with few and limited foods.

A well-balanced diet boosts the body's ability to fight illness. In addition to the dietary guidelines to ensure, food safety practices and suitable food practices are required.

A balanced and nutritious diet can help to build a strong immune system that can withstand the virus's attack. A set amount of a certain vitamin saturates cells, preventing any nutritional shortage. People who consume a well-balanced diet have stronger immune systems and are less likely to get chronic illnesses and infections. The major goal of this system is to promote good eating habits that help people maintain their physical health in covid-19

The COVID-19 pandemic has caused havoc in our daily lives. We're socially withdrawing, keeping at home, and unable to eat out. It's easy to fall into bad eating habits during this time at home, but sticking to a healthy diet doesn't have to be a pain with a little planning and preparation.

Nutrition is important at any time, but it's more important during a pandemic since a well-balanced diet of healthful foods aids in immune system health. It is necessary to eat the right foods in the right amounts. COVID-19 epidemic has altered a lot in the everyday lives of people. Maintaining a healthy lifestyle has become increasingly important during these challenging circumstances. While no meals or nutritional supplements will prevent COVID-19 infection, consuming a good diet can help our immune systems battle the disease. Using the DNN algorithm, we provide a way for obtaining exact food nutrients and a nutritious diet during Covid-19.

II. LITERATURE SURVEY

Rita Maria Colaco et. al [1] When a nutritious diet is followed regularly, the immune system's ability to combat this illness improves. People need to know the value of having a well-balanced diet. They can use a combination of appropriate diet information and statistical machine learning algorithms to assess what kind of diet a person requires. They can use techniques like Random Forest, KNN, logistic regression, and Support Vector Machines to predict the kind of diet and the chance of recovery. All diet-related information should be included in the dataset required for analysis. To produce a prediction based on the dataset, the Decision Tree approach is employed.

Nafiseh Jafar et.al [2] A survey of about 16000 Iranian households was done online using an author's-report questionnaire survey (who were the residents of 1000 urban and rural areas of Iran). As a result of the procedure, over 1 M recordings of data and over 1G records of automatically inferred information were stored.

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On the premise of this data, a series of machine learning experiments were conducted to examine the link between nutrition and the risk of contracting COVID-19. Based on the excellent accuracy of the scores, the findings suggest that foods and water sources containing certain natural bioactive and photochemical agents may help to lower the risk of apparent COVID-19 infection.

Chung-Cheng Yang et.al [3] Since the commencement of the pandemic, the rapid spread of COVID-19 around the world has been one of the principal sources of concern in virtually every country, and authorities have taken several steps to limit or minimize the disease's spread. As a significant social element, COVID-19 has had a significant impact on consumers' food consumption habits and healthy eating habits/behaviors. The authors' principal objective in this experiment was to examine the potential consequences of changes in the food consumption patterns during the pandemic.

Valentin Nastasescuet. al [4] The SARS-CoV-2 epidemic has caused significant changes in cultural life, cuisine, and interpersonal relationships around the globe. The purpose of this research is to see how Romanians' lifestyles and diets have changed the following year since the COVID-19 outbreak began. A 58-item survey version (attempting to address social and demographic and anthropometric data, current eating habits, and lifestyle adjustments) was sent via institutional email lists and social media. A record of 2040 people took part in the poll, 1464 of them were women, 576 of which were men. There were 1598 respondents and 442 respondents from urban areas and rural areas respectively. The analysis of the obtained data revealed considerable changes in respondents' behavior as a result of the pandemic condition, including mental-emotional shifts in certain cases. A rise of up to 20% in the number of persons suffering from anxiety, sadness, and uneasiness was observed. The bulk of respondents (almost 57%) was between the ages of 18 and 30 and were either students (43.50%) or workers heading to work (33.20 percent).

Claire Theobald. al [5] This author's post provides an overview of the British Nutrition Foundation's Healthy Eating Week, which will be held in 2020. The report includes an overview of the Week, and also assets established, operations finished by attendees, the outcomes of two questionnaires on the effect of the COVID-19 global epidemic on child's and adult people's healthy eating and exercise, and physical activity levels inside the UK, as well as an assessment of week, and also details for plans.

Lucile Mart yet. al [6] Between March 17th and May 10th, 2020, a statewide lockdown was implemented in France to halt the spread of COVID-19. Food consumption patterns were likely affected as a result of the disruption in people's daily routines. During and after the lockdown, they looked at how changes in food selection motives are associated with variations in nutritional quality. A sample group of 938 French people replied to online surveys on the Qualtrics portal at the end of April 2020. Participants were questioned about their food choices and intake in the month leading up to the lockdown and throughout the first month of the lockdown. On a scale of 1 to 4, the most important food choice factors were health, convenience, sensory appeal, natural content, ethical concern, weight control, mood, familiarity, and cost. Stefanie Vandevijvereet, ingtefanie Vandevijvereet, ingtefanie Vandevijvere [7] Between March and May 2020, three cross-sectional online health surveys were performed. After adjusting for gender, household composition, educational attainment, and household income, multinomial logistic regression models were used to determine associations between self-reported changes in fruit, as dependent variables, vegetable, soft drink, and sweet and salty snack intake or weight, and food insecurity indicators as independent factors. The setting is Belgium.

R. Ramachandran et.al [8] To establish the impact of COVID-19 lockdown on eating patterns, food intake, and weight in different nations, a statistical analysis was done. The major goal of this study was to undertake statistical analysis to determine the influence of the pandemic on human food patterns. Data from a data repository called Kaggle was used to create retrospective research containing dietary status, nutrient, and calorie variables. It was feasible to infer changes in food patterns between nations of similarity by statistically analyzing the data with RStudio. During the COVID-19 pandemic, fat consumption varies depending on the availability of meat or vegetables, placing the human population in danger of infection owing to decreased consumption-based immunity, according to statistical analysis.

Yuecheng Wongaet. al [9] According to the authors' research, a well-balanced diet rich in numerous nutrients, particularly micronutrients, has a critical role in recovering from and avoiding COVID-19-related health problems. Obesity reduction may minimize the risk of COVID-19 infection by reducing the number of angiotensin-converting enzyme 2 receptors in the body, while also increasing the effectiveness of immunization. The relevance of numerous food bioactive, as well as dietary supplements (balanced diet) rich in various micronutrients, against COVID-19 and its linked abnormalities, is highlighted in this author's review. Furthermore, based on the dietary/supplementation recommendations provided by many popular nutritional, dietary, or health organizations, this contribution assists non-specialists in understanding the value of various functional foods/nutraceuticals. To summarize, this contribution, a healthy lifestyle, and a well-balanced diet have a significant impact on the immune system. Obesity reduction becomes a crucial aspect of the COVID-19 infection. The most essential goal is to identify a possible and effective dietary bioactive that may be used as a supporting or supplemental therapy (prophylactic) to reduce COVID-19-related risk and morbidity.

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Michelle M. Litton. al [10] The coronavirus disease 2019 (COVID-19) pandemic has had a significant impact on food shopping habits, and the resulting economic downturn has exacerbated food insecurity. Food insecurity is linked to a poor diet, particularly a lack of influenza fruits and vegetables, therefore people who are food insecure may well be disproportionately impacted by the pandemic's unfavorable diet-related health effects. During the COVID-19 pandemic, they conducted an online poll of adult inhabitants of the US state of Michigan in June 2020 to investigate the connection between food and nutrition security on fruit and vegetable intake. 36.2 % of the 484 persons who participated in the survey acknowledged food insecurity. People who were food insecure consumed fewer fruits and vegetables than those not, and they were more likely to indicate that they had reduced their intake of all vegetables and fruit since the epidemic began. Those who reduced their fresh fruit and vegetable purchases cited poor quality, limited availability, high pricing, fewer trips to the market, and concerns about contamination as explanations. These findings highlight the necessity of adequate food assistance during the COVID-19 pandemic and future pandemics, as well as public health message that promotes healthy eating.

III.PROBLEM STATEMENT

Several health-related issues exist throughout the Covid-19 period. Healthy diets are vital for maintaining immune systems, even if no foods or dietary supplements may prevent or treat COVID-19 illness. Obesity, heart disease, diabetes, and some types of cancer can all be avoided by eating a healthy diet. During Covid-19, we proposed a solution that leverages AI/ML to deliver food nutrition and a balanced diet to solve all of these difficulties.

IV.PROPOSED SYSTEM

In our proposed system we use the DNN algorithm as well as the Design Tree for the accurate result.

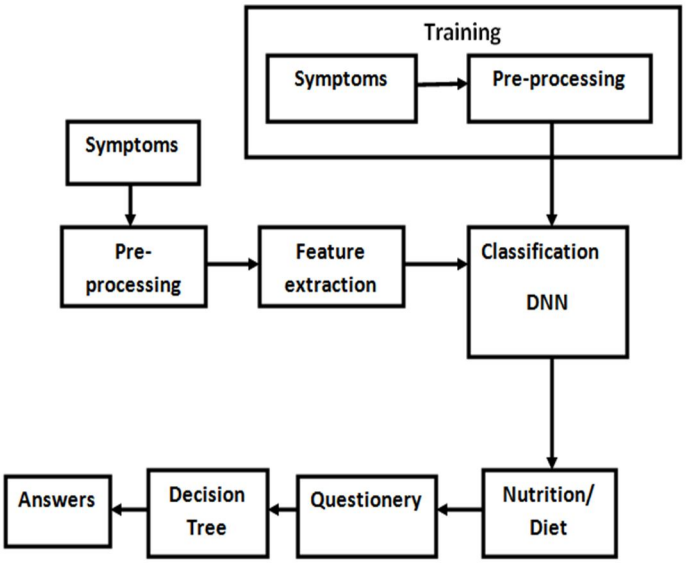

Figure 1: Architecture of the proposed system

We can observe from the above that the system's input is the symptoms of covid-19 times. After the system gets the data, it does preprocess and feature extraction on the symptoms.

After the system gets input the classification of DNN is done and after completing the test the classification of DNN the system gets the Food Nutrition a and healthy diet. Then the patient follows this diet or not. The patient login the sectimeimto e squestionaryionery on the patient How are you feeling now?

Patients answer that questions that may be Yes or No. And Decision Tree applies to the answers to that question If the papatient'snswer is Yes then fine, the system senses message that you follow the following diet. And if the patient's answer is No then the system sends the message that you have not taken any diet that the system gives by DNN. You will follow this diet as well as if the patient takes the diet but does not feel well then the system gets another diet for that patient.

V. ALGORITHM

A. DNN Algorithm

DNN Algorithm is used for the classification of the symptoms in the system that gives very accurate results compared with another system.

Deep learning (also known as deep structured learning) is a type of machine learning technology that uses artificial neural networks to learn representations. There are three types of learning: supervised, semi-supervised, and unsupervised.

Deep learning, Machine learning, voice recognition, natural language, translation software, computational biology, medicinal chemistry, image restoration, climate research, material inspection, and board game programs have all used deep learning models, fully connected channels, reinforcement learning, recurrent neural network (RNN), and convolutional neural network (CNN), with outcomes that are similar to, if not greater than, traditional architectures. better approaches to, traditional approaches.

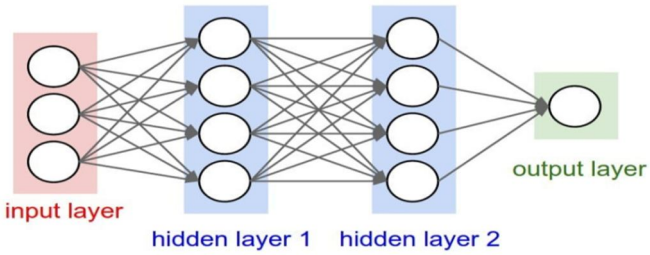

Fig 2: Deep Learning

A deep neural network (DNN) is a type of machine learning algorithm that seeks to emulate the brain's information processing. It is comparable to an artificial neural network. Between the input and output layers, DNN shaves more than one hidden layer (l). An artificial neural network (ANN) having numerous layers between the input and output layers is known as a deep neural network (DNN). Neural networks come in a variety of shapes and sizes, but they always include the same basic components: neurons, synapses, weights, biases, and functions.

B. Decision Tree

Decision Tree is used to decide on the answers on the patient and gives the decision and answers on that. A Decision Tree is simple to grasp because it can think like a human while making a decision.

The Decision Tree is a supervised learning approach that may be used to solve classification and regression problems, however, it is most typically used to solve classification problems. In this tree-structured classifier, internal nodes contain dataset properties, branches represent decision rules, and each leaf node delivers the conclusion.

The Decision Node and the Leaf Node are the two nodes of a Decision tree. Leaf nodes are the output of those decisions and do not contain any more branches, whereas Decision nodes are used to make any decision and have several branches.

The decisions or tests are made based on the characteristics of the given dataset.

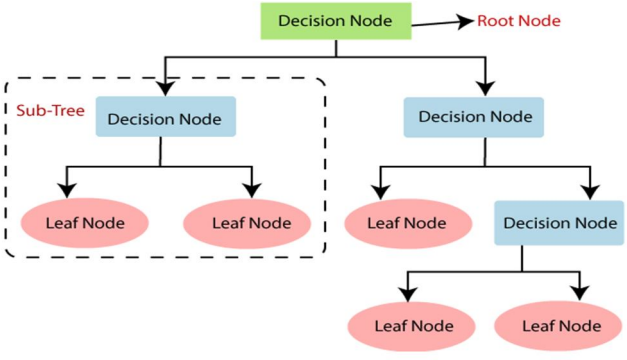

Fig 3: Decision Tree

Decision Trees are meant to mimic human decision-making abilities, making them simple to understand.

The logic behind the decision tree is straightforward to understand since it has a tree-like structure. As a result, our system employs a Decision Tree.

VI. CONCLUSION

For the categorization of symptoms in our system, we employed the DNN method. The DNN algorithm produces an accurate classification result, as well as appropriate food nutrition and a healthy diet for the patient. Following the DNN method, the Decision Tree is employed in this system to make decisions on the patient's replies and provide decisions and answers. A Decision Tree is simple to understand since it can think like a human while making a decision. Whether compared to other systems, our method generates a reliable result.

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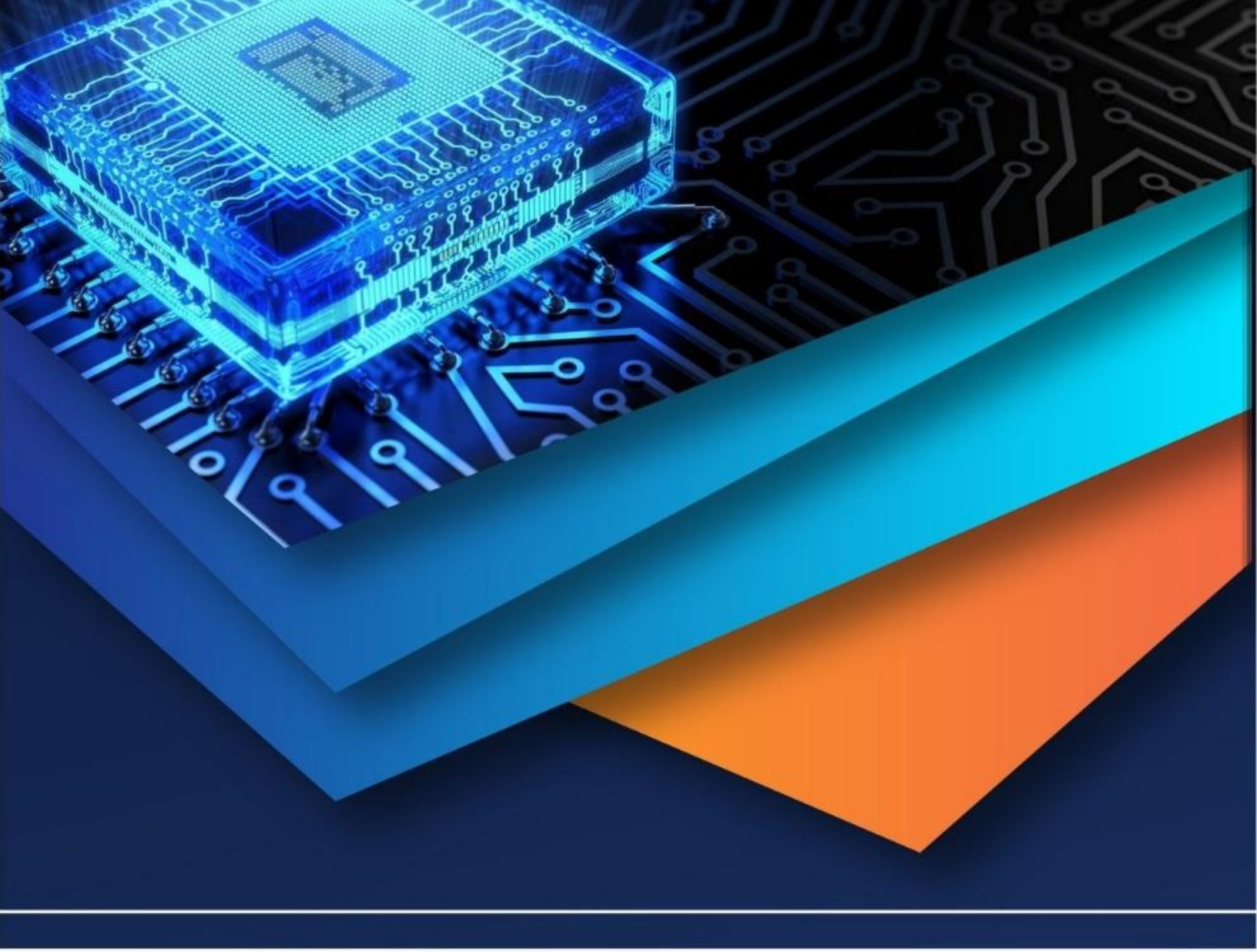

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