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## Improved Predictive Learning Approaches in Medicinal Services for Customized Diet Suggestion Framework

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### ABSTRACT

In this cutting-edge world many human beings are struggling from extraordinary kinds of ailments and illnesses. A learn about through WHO reviews that insufficient and imbalanced consumption of meals motives round 9% of coronary heart assault deaths, about 11% of ischemic coronary heart ailment deaths, and 14% of gastrointestinal most cancers deaths worldwide. Moreover, round 0.25 billion teens are struggling from extraordinary sorts of nutrient deficiency specifically from Vitamin-A to Vitamin-K deficiency, 0.2 billion human beings are struggling from Iron deficiency (Anemia), and 0.7 billion human beings are struggling from Iodine deficiency. The primary goal of this undertaking is to propose a food regimen to one-of-a-kind folks the use of the datasets that are organized based totally on the aggregate of a number nutritional vitamins and their deficiency and meals to be endorsed based totally on which diet is deficient. In this mission a couple of classifier algorithms are used (KNN, Decision tree, Random forest, Logistic regression, Voting classifier). Ensembled algorithm is used to mix more than one algorithms and instruct a new algorithm. Accuracy of every algorithm is calculated and the high-quality algorithm is used for prediction purposes. Prediction is proven the use of flask net utility which will observe deficiency of diet and endorse kind of meals to be taken on a range of combos

**Keywords :** *Vitamin, Deficiency, Diet, Decision tree, Random forest*

### 1. INTRODUCTION

In this venture its personal records set is organized based totally on a range of excessive and low values of nutritional vitamins from (vitamin a,b,c,d,e,k ) and points are divided from ordinary and ordinary stipulations of nutritional vitamins and labels are divided into 0 and 1 as regular and abnormal. Another

dataset is organized based totally on an aggregate of quite a number nutritional vitamins and their deficiency and meals to be endorsed based totally on which nutrition is deficient. In this venture a couple of classifier algorithms are used ( knn, selection tree, random forest, logistic regression, vote casting classifier ) ensembled algorithm is used to

mix a couple of algorithms and teach a new algorithm. Accuracy of every algorithm is calculated and the nice algorithm is used for prediction purposes. Prediction is proven the use of flask internet software which will observe deficiency of nutritional vitamins and endorse sorts of meals to be taken on a number combinations.

The suggestion method has essentially three ranges that are Information Collection Phase, Learning Phase and Recommendation Phase. The data is first off amassed about a precise trouble and the more than a few options associated to that hassle are categorized. After the series of records the Learning Phase comes in which more than a few conclusions are made out of that records which is gathered and in the ultimate segment i.e., Recommendation Phase an output is given in which a number of hints are made.

Balanced diet is an essential factor of a wholesome way of life for people. Along with a balanced diet, everyday bodily workout is fundamental for a wholesome life. Nowadays vitamin and fitness are regularly overlooked. The majority of humans go through from diabetes, coronary heart disease, cancer, stroke etc. The ailments are nearly at once associated to unhealthy ingesting habits. So, our physique wishes vitamins to continue to be healthy, and meals elements necessary vitamins that quit us from getting sick. A healthy, balanced weight-reduction plan will normally encompass vitamins, minerals, protein, wholesome fats,

proteins, carbohydrates, and fiber. A healthful meals pyramid is a mixture of plant foods, reasonable quantities of animal products. Which consists of vegetables, grains, fruits, oils and sweets, dairy, meat and beans. Generally, a individual stays unaware of fundamental reasons at the back of deficiency or extra of quite a number integral substances, such as calcium, proteins, and vitamins, and how to normalize such materials via a balanced diet. With the gain of technology, the humans can stay a healthier lifestyle. The fast-food consumption charge is alarmingly excessive and this hence has led to the consumption of unhealthy food. This leads to more than a few nutrition deficiency problems such as E, A, B, C, D, K make bigger in blood strain etc. Hence it has emerged as very quintessential for human beings to have an exact balanced dietary wholesome diet. But in this quickly paced era no longer every person has the time and money. By getting important points of consumer existing vitamin values this utility can automate the technique of detection of diet deficiency and meals suggestion device the usage of laptop learning. Aim is to create our personal diet deficiency records set for A,B,C,D,E,K and create meals advice dataset and teach each dataset with 5 computer gaining knowledge of algorithms and locate accuracy of every algorithm and use fine accuracy mannequin in a internet utility the place nutrition deficiency and meals suggestion is estimated based totally on given enter values.

## 2. LITERATURE SURVEY

Raciel yera toledo proposed a meals recommender machine thinking about dietary data and person preferences. The meal sketch for the consumer encouraged the use of users' preferences. This device manages each consumer preferences and dietary information. Vijay Jaiswal proposing a wholesome meals habits, consuming patterns and energy burned rely can be consumption of vitamins and so on the use of the records mining tools. In this device the hidden patterns and patron meals taking habits are determined from specific information sources. In this device choice tree getting to know algorithm, Random Tree algorithms are used on distinct datasets. H. Jiang proposed a machine to calculate the everyday calorie demand. The Knapsack algorithm is used for endorsed weight-reduction plan combos of users. Different from different diabetic weight loss plan suggestion systems, this machine can rank the encouraged weight-reduction plan mixtures the use of TOPSIS algorithm in accordance to user's meals nutrition. Jung-Hyun Lee proposed a personalized eating regimen advice carrier managing coronary heart diseases. This carrier presents clients personalized customary information, household records of diseases, seasonal meals intakes. Rung-Ching Chen developed a recipe ontology that defines some frequent ailments restoration with a range of meals hints and an inference engine for patron fitness situation and a recipe ontology can be used for appropriate recipe suggestions on

food priorities. FidelsonTanzil makes use of ABC algorithm to extract facts from database in accordance to user's requirements. K MEAN and SOM algorithms are used on datasets. Mohd Afisi projected ABC algorithm in Data Mining and examined in contrast to six normal classification algorithms efficaciously and ABC proved as an appropriate algorithm for recommendation. Xiaoyan Gao proposed the meals advice trouble on person preference recipe advice factors. By the use of a neural network-based answer on Ordered weight loss plan Recommendation.

The authors INGMAR WEBER and PALAKORN ACHANANUPARP [1] made an strive to achieve insights from laptop leaned - food regimen success prediction which would assist human beings attempting to continue to be match and wholesome via maintaining a song on their dietary intake. The authors used public meals diaries of greater than 4,000 long-term lively MyFitnessPal customers to find out about the traits of an unsuccessful diet. Concretely, authors skilled a computer studying mannequin to predict persistently being over or beneath self-set day by day calorie desires and then seem to be at which aspects make a contribution to the model's prediction, the place lookup used to be founded round "quantified self " data. The authors discovered that classification overall performance was once ample and the token-based mannequin carried out higher than the category-based mannequin and used such

records feasibly for greater in-depth information mining.

NANDISH SHAH and ISHANI SHAH [2] introduced a suggestion of wholesome meals habits and ingesting machine based totally on net information mining, to find out hidden patterns and enterprise techniques from their patron and net data, which would song ingesting habits and endorse the kinds of meals that will enhance the fitness and keep away from the sorts of meals that elevate the hazard of illness. The authors used facts mining algorithms like classification, clustering, affiliation rules, etc. in the records mining procedure to extract beneficial facts about people's consuming habit. The nutritive shape of every variety of meals used to be analysed and the fat, energy, nutrition proportion in the recipe used to be calculated. Then they used the classification mining algorithm to system the composition facts and supply out the end result whether or not the food plan is healthful or not. As a result, customized tips had been counselled for every person.

### 3.PROPOSED SYSTEM

The System works in a Machine Learning Environment, we use a couple of computers getting to know algorithms to take a look at accuracy of diet deficiency and meals suggestion and the satisfactory mannequin is used for prediction in flask internet application. When a consumer enters diet values, the algorithm will predict deficiency in nutritional vitamins and advise meals

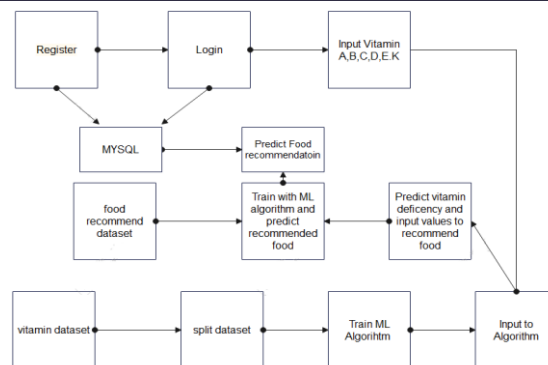


Figure-1: System Architecture

### 3.1 MODELS

#### 3.1.1 DATASET:

In this project we are using vitamin dataset and food recommendation dataset which is prepared based on min and max vitamin values from the test results and features are min and max values of vitamin a, b, c, d, e, k values and labels are deficiency and non-deficiency.

#### 3.1.2 PRE PROCESSING:

Features are extracted from the data set and stored in a variable as an xtrain variable and labels are stored in y train variable. Data is pre processed by standard scalar function and new features and labels are generated.

#### 3.1.3 METHODOLOGY:

As seen from the above figure, we can see how the data is divided into different sets and then trained for different models. • The dataset was first divided into a training set (80%) and pre-training set(20%). • The pre-training set was divided into pre-train(80%) and pre-test(20%) • Now, the training set is further divided into train(80%) and validation set(20%). This train set is again divided into

train(80%) and test set(20%). So, now I have train validation and test sets separate which are nonoverlapping. • The pretrain set was used to find the best models for the given dataset. We took the best 4 models using the pretest set. Their performance was compared based on their mean absolute errors. • Once the best 4 models were obtained, hyperparameters for these models were tuned and the best parameter was selected.

### 3.2 MODULES IMPLEMENTATION

#### Data collection:

- In this project we are using vitamin dataset and food recommendation dataset which is prepared based on min and max vitamin values from the test results and features are min and max values of vitamin a, b, c, d, e, k values and labels are deficiency and non-deficiency.
- Based on the vitamin deficiency food data set is prepared with various combinations. In this feature are vitamin deficient values and labels are types of food.

#### Data preprocessing:

- Features are extracted from the data set and stored in a variable as xtrain variable and labels are stored in y train variable. Data is preprocessed by standard scalar function and new features and labels are generated.

#### Testing training:

- In this stage data is sent to the testing and training function and divided into four parts x test train, and y test train. Train

variables are used for passing to algorithms whereas test variables are used for calculating accuracy of the algorithm.

#### Initializing Multiple Algorithms and training with Logistic regression:

- In this stage machine learning algorithms are initialized and train values are given to the algorithm by this information algorithm will know what are features and what are labels. Then data is modelled and stored as a pickle file in the system which can be used for prediction.
- Data set is trained with multiple algorithms and accuracy of each model is calculated and best model is used for prediction

#### Predict data:

- In this stage new data is taken as input and trained models are loaded using pickle and then values are pre processed and passed to predict function to find out the result which is shown on web application.

### 4.RESULTS AND DISCUSSION

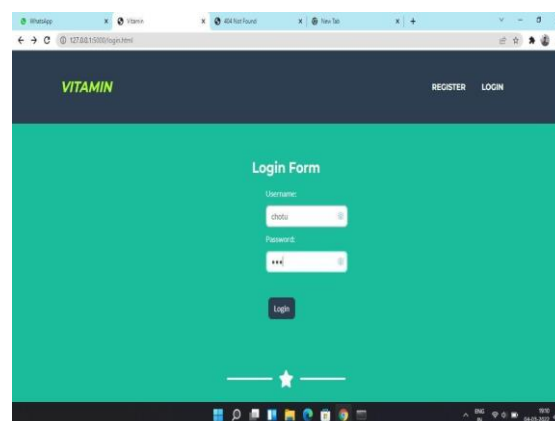


Figure-2: In the above screen shot user can login by using user name and password

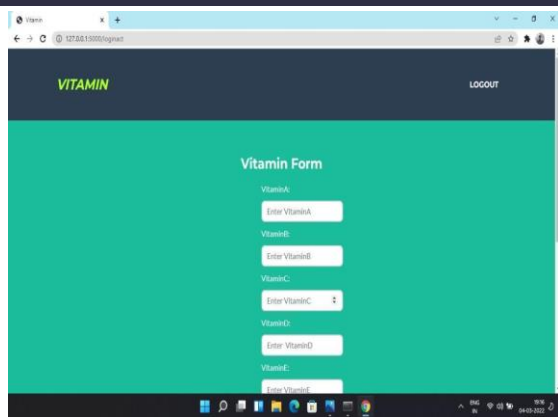


Figure-3:in the above screen user entering vitamin values

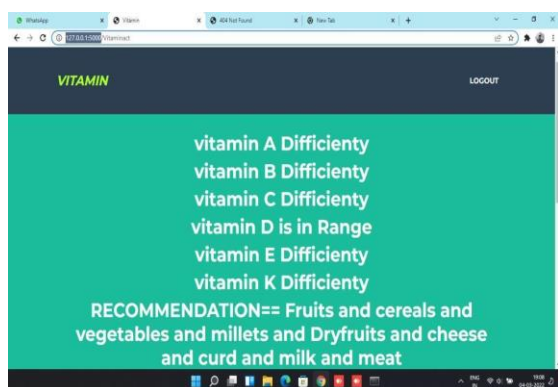


Figure-4: Result Page

## 5. CONCLUSION

We have created an internet site which recommends the meals gadgets and predicts diet deficiency in which we have carried out prediction by using taking enter as nutritional vitamins and their deficiency. For education of the system, the preliminary method includes the dataset education of meals gadgets relying upon the nutrition deficiency. The prediction of more than a few meals pointers relying

upon which are fundamental for the kind of diet deficient. After the clustering is performed, the usage of Random Forest classifier, the nearest meals gadgets are estimated which fantastic perfect for the excellent diet. Our food plan advice gadget approves customers to essentially get the favored wholesome weight-reduction plan on the foundation of diet deficiency.

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