FOOD CALORIE PREDICTION USING MACHINE LEARNING TECHNIQUES

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ABSTRACT

Now a days, people are having very busy schedules due to changes in their lifestyle and work commitments. People are not concentrating in their food habits; hence it leads to obesity. Obesity is becoming a common problem in today's modern life. So, we need a system which can make changes to the food choices of people and provides them with an instruction that leads to effective results of maintaining their body. In this system, the Food image dataset as well as '.csv' file dataset was taken as input. The input data was taken from the dataset repository. First, we have to select one input image from our dataset. After that,we have to resize the input image as well as grayscale conversion. Next, we have to implement the data splitting. Then we can implement the machine and deep learning algorithms such as SVM and CNN for predicting the different nutrition values for particular predicted input image. Finally, the experimental results shows that the performance metrics such as accuracy, precision, F1score, Recall.

INTRODUCTION

Food borne illnesses are a preventable and underreported public health problem. These illnesses are a burden on public health and contribute significantly to the cost of health care. For example, children younger than age 4, people older than age 50 and those with reduced immunity are at greater risk for hospitalizations and death from intestinal pathogens that are commonly transmitted through foods. Food plays a key role in human life and even in global economy. There is a strong correlation between eating choices and people culture, economic situation, and health status. Healthy food promises healthier and longer lives and less costly health care, as well as more stronger food industry. To survive in the world human Body needs food to make a living and great practice diet plan .In the current Days innovations and enhancement allows people and humans to judge their balanced diet and it also increases to become a good healthy and fit body and these things are only possible when a human observing their nutritional status. Many Research institutes have already implemented several machine Learning models and visions that may help human body to monitor their balanced diet status. Healthy eating, which includes counting calories and vitamins, is an increasing number of turning into greater essential for most consumers anywhere inside the globe. According to Canadian obesity community, approximately one in five men or women and one in 10 young ones in the World are residing with several health-related issues like obesity.This ensures that approximate of six millions of people are tormented by these problems, some being sugar, coronary heart failure, persistent lungs sickness, or several types of cancer as well. Currently, there are two types of most used methods to manually assess dietary intake including diet records, 24-hour recall. By applying 24-hour recall, subjects are asked to report all food/meals consumed in the past 24 hours, which can be done via telephone call or face-

to-face interview. Although we already have these gold-standard methods for reporting diet information, at least one drawback exists that we cannot ignore - such methods still suffer from bias since the subject is required to estimate their dietary intake by themselves. Once a Food is processed it is subjected to a variable temperature-humidity-time distribution pattern which can cause further losses. If a truthful nutrition label is to be put on the Food package knowledge of this distribution function is important in assessing the further loss that occurs. More important however, is some knowledge of the kinetics of the degradation of the particular nutrient being considered.

The main objective of our project is:

To classify or predict the Food image effectively.To implement the machine and deep learning algorithm for predicting the nutrition values like calories, fats and so on.To enhance the overall performance for classification algorithms.

LITERATURE SURVEY

Weighing in on Fast food Consumption: The Effects of Meal and Calorie Disclosures on Consumer Fast food Evaluations, 2019

Author: ANDREA HEINTZ TANGARI, SCOT BURTON, ELIZABETH HOWLETT, YOON-NA CHO, AND ANASTASIA THYROFF

Methodology:

An analysis of consumers' Weblogs and two experiments address: (1) the differences in evaluations of menu items when consumers are versus are not provided with meal calorie information, and (2) their perception of calorie levels of different types of meals. Consumers provided their calorie estimates for specific meals offered by four different fast Food restaurants, and an experiment assessed effects on consumer evaluations for calorie disclosures for actual items from two of these restaurants. Results show the complex relationship between consumer perceptions regarding the restaurants, the meals and the Food items that can influence consumers' calorie estimates and evaluations of meals in restaurants.

Prediction of nutritional status from food consumption and consumer attitude, 2019 Author: Howard G. Schutz, PMethodology:

In presenting and discussing the results from the analyses, we should keep in mind that the major purposeof the paper is to demonstrate a particular process which can be used in the prediction of nutritional status rather than the delineation of an immutable set of predictors to utilize in such predictions. One should also note certain cautions in the interpretation of such multiple regression data. First, any study which is of a correlational rather than an experimental nature does not clearly demonstrate cause and effect, but rather association and, in this particular case, prediction. Not that prediction in itself is not of value in many instances, but in understanding the theoretical relationships between variables which are used to predict dependent variables, it should be kept in mind that secondary factors may be responsible for the particular correlation which was found.

Accurate prediction of nutritional value of sorghum grain using image analysis, 2019 Author: M.R. Ebadia , M. Sedghib and R .Akbari Moghaddam Kakhki

Methodology:

This study evaluated the application of L (lightness)*a (redness) and *b (blueness) color analysis and chemical compositions to predict the nutritional value of sorghum grain. 2. A total of 12 varieties of sorghum grain were analyzed for L*a*b colors, chemical composition, energy and total and digestible amino acid content. Regression models based on the linear, nonlinear and the interaction effects of inputs were applied to predict the nutritional value of sorghum grains either using L*a*b color or chemical composition, as the model inputs. 3. The results illustrated a significant relationship between a*b and/or chemical compositions with energy content in the samples of sorghum grain. The provided estimation equations presented high goodness of fit in terms of R2 adj ranging from 0.744 to 0.999. 4. Total and digestible amino acids of sorghum grain were estimated based on a*b and chemical compositions data with the goodness of fit ranging

from 0.641 to 0.999 (R2 adj). 5. In conclusion, the L*a*b color analysis may be used for developing equations to predict nutritional value of sorghum grain as an alternative approach to the conventional time-consuming and costly chemical and bioassay methods.

"Machine Learning Based Approach on Food Recognition and Nutrition Estimation" [2] Author: Zhidong Shen , Adnan Shehzad , Si Chen, Hui Sun , Jin Liu

Methodology:

In this paper, we present in full a unique system supported by machine learning that automatically performs precise food classification photos and measuring food qualities. This paper proposes an in- depth learning model that contains convolutional neural network that separates food specific areas in the training component of the model type system. Current systems do not adequately identify and process mixed physical images. They do not involve cooking foods, liquid foods, and composite foods such as salads and sandwiches. In future research, a mixed food image and a cooking-like physical image are processed by combining image segmentation techniques to solve the phenomenon that the image hasoblique edges or each other causes the recognition detection to fail.

"Deep Food: Food Image Analysis and Dietary Assessment via Deep Model" [3]

Author : Landu Jiang (member, IEEE), Bojia Qui, Xue Liu, (Fellow, IEEE), Chenxi Huang. Methodology:

In this paper, we develop an in-depth model of food and food recognition a food review and analysis program from everyday food photos (e.g., taken by a smartphone). Specifically, we propose a three-step algorithm to accept photos of many (food) items by discovery regions to be immersed and use a deep convolutional neural network (CNN) object division. The program first creates a wide range of suggestions for input images using the Regional Proposal Network (RPN) obtained from the Faster R- CNN model. It then identifies each region of suggestions by marking them on feature maps, and they divide themselves into different categories of food, and as placing them within the original images. Finally, the program will analyze the ingredients for healthy eating supports the effects of popularity and creates food calorie counting report, fats, carbohydrates and proteins.

PROPOSED SYSTEM

In this system, the Food image dataset as well as '.csv' file dataset was taken as input. The input data was taken from the dataset repository. First, we have to select one input image from our dataset. Afterthat, we have to resize the input image as well as gray scale conversion. After that, we need to train our all input images. Then, we have to predict the input image is what type of fruit and vegetables. Second, we have to read or load our input dataset ('.csv') . Then, we have to implement the data preprocessing step. In this step, we have to handle the missing values for avoid wrong prediction. If there is present any missing values in our input data, we have to replace the missing values by zero or Nan values. Then, we have to convert the strings into numeric integer value for machine readable. Next, we have to implement the data splitting. Then we can implement the machine and deep learning algorithms such as SVM and CNN for predicting the different nutrition values for particular predicted input image. Finally, the experimental results show that the performance metrics such as accuracy, precision, recall, f1 score.

The dataset, Food image dataset is implemented as input. The dataset is taken from dataset repository. The input dataset is in the format '. Png , '.jpg .In this step, we have to read or load the input image by using the imread () function .The input image is used to detect or classify the input image .In our process, we have to resize the image and convert the image into gray scale .To resize an image, you call the resize () method on it, passing in a two-integer tuple argument representing the width and height of the resized image .The function doesn't modify the used image; it instead returns another Image with the new dimensions .Convert an Image to Grayscale in Python Using the Conversion Formula and the matplotlib Library .We can also convert an image to grayscale using the standard RGB to grayscale conversion formula that is imgGray = 0.2989 * R + 0.5870 * G + 0.1140 * B. The input data was collected from dataset repository like UCI, Kaggle or Github. In our process, the heart disease dataset is used. The dataset which contains the

information such as fast fruits and vegetables image, calories value, fats, proteins and carbohydrates values.In python, we have to read the dataset by using the panda's packages

.Our dataset, is in the form of '.csv' file extension. In this dataset, the dataset contains the 142 rows and 6 columns .Data pre-processing is the process of removing the unwanted data from the dataset .Pre- processing data transformation operations are used to transform the dataset into a structure suitable for machine learning .This step also includes cleaning the dataset by removing irrelevant or corrupted data that can affect the accuracy of the dataset, which makes it more efficient .Data processing is one of the most common tasks in many ML applications. This technique is used to transform raw data into a useful and efficient format.

ADVANTAGES:

It is efficient for large number of datasets.

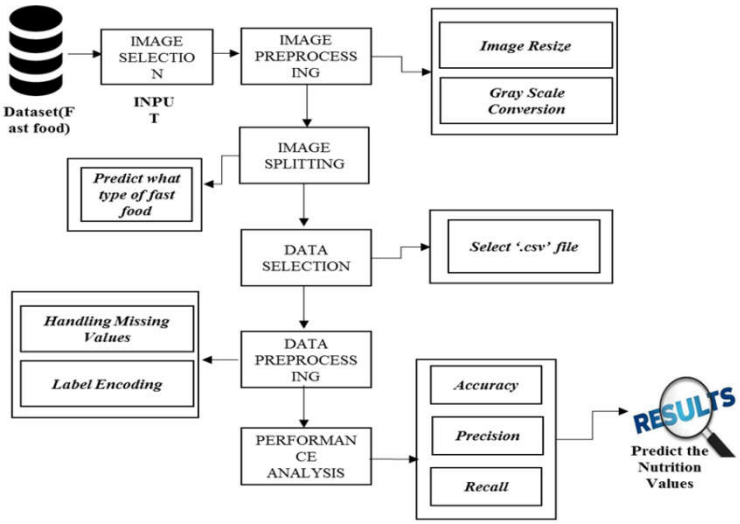
Time consumption is low.

Here, we are implemented both image and data mining process.

Here, we are predicted the nutrition values for given input Food image.

The process is implemented with removing the unwanted data

PROPOSED SYSTEM ARCHITECTURE:



RESULTS AND DISCUSSIONS

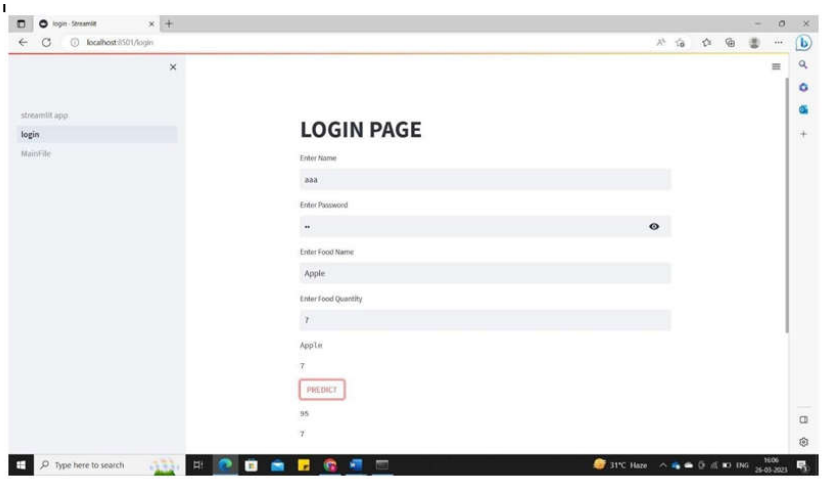


FIGURE 1: Login Page

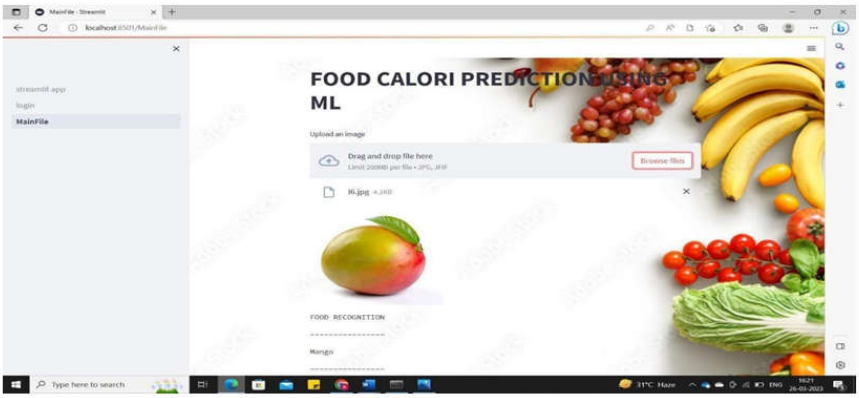


FIGURE 2: Uploading Food image

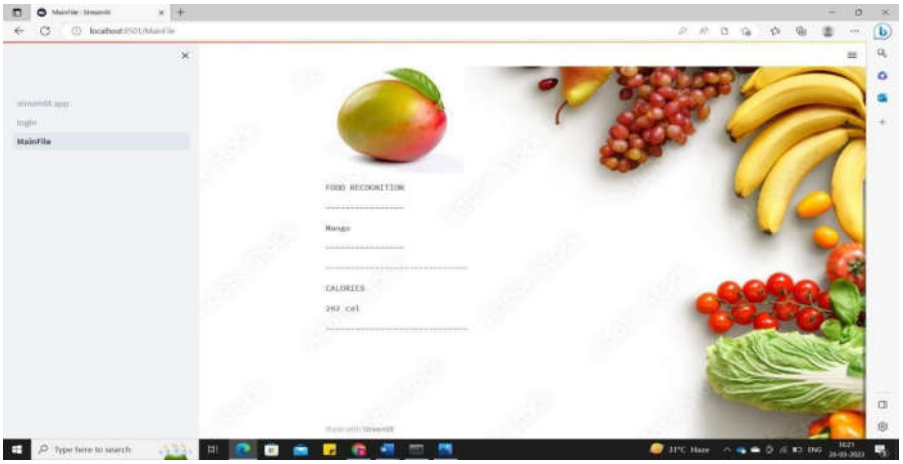


FIGURE 3: Calories prediction by food image

CONCLUSION:

This paper proposed an ML-based model to predict food calories effectively. This system was proposed for efficient calories prediction from our input image using machine learning algorithms such as CNN. We focused on CNN architecture, which has been demonstrated to outperform traditional approaches in terms of performance and generalization capabilities. Experimental results analysis showed that our proposed method is efficient and can achieve better performance results on average when compared with existing system. Hence the proposed approach provides a perception of implementing a more generalized model for nutrition value prediction.

FUTURESCOPE:

Larger and more diverse datasets: Machine learning models depend heavily on the data they are trained on. Therefore, having access to larger and more diverse datasets can help improve the accuracy of food calorie prediction.

Real-time feedback: Real-time feedback can be used to help the model adapt and improve over time. For example, if the model predicts certain calorie content for a food and the user inputs the actual calorie content, the model can use this information to adjust its predictions in the future.

Integration with Food Databases: Calorie prediction models can be integrated with food databases to improve their accuracy. Food databases can provide information on the nutritional content of different foods,

which can be used to improve the accuracy of calorie predictions.

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