NUTRITION WEB APPLICATION USING ARTIFICIAL INTELLIGENCE

Naveena V,
Student, Knowledge Institute of Technology, Salem.

Sabarish E,
Student, Knowledge Institute of Technology, Salem.

Senthiraja R,
Student, Knowledge Institute of Technology, Salem.

Venkatesh kumar B,
Student, Knowledge Institute of Technology, Salem.

Jeeva M,
Guide, Assistant Professor, Knowledge Institute of Technology, Salem.

Abstract – A problem that humans face on a daily basis is how to make a conscious decision regarding our daily food consumption that is nutritious and healthy. By having a tool that helps facilitate the decision-making process of what type of food to eat by showing useful nutritional information to us immediately would greatly improve our lives. By critically analyzing prominent research papers that relate to deep learning techniques to classify food and their nutrients composition, we decided upon the suitable Deep Learning algorithm to classify food nutrients composition as well as the appropriate image dataset to be used. Therefore in this paper we propose the classification of food nutrients composition utilizing deep learning techniques. The proposed framework uses convolution neural networks (CNN) as a basis of recognizing images of food and classifying the food into their corresponding nutrients composition such as fats, carbohydrates, proteins and more the chosen dataset shall be used to train the model where patterns and characteristics of the food images are distinguished over multiple passes of the neural network.

Keywords – Convolution Neural Networks, Image prediction, Nutrition Content.

1. INTRODUCTION

The objective is to predict the food using image processing, and to design an incremental model to recognize the fruits, foods and vegetables based on size, shape and color. This just focuses the image of particular fruit, food or vegetable and then identifies and also it will show the nutrition details. This just focuses the image of particular fruit, food or vegetable and then identifies and also it will show the nutrition details.

Nutritional analysis is the process of determining the nutritional content of food. The model is trained using the classification algorithm convolution neural networks.

1.1. PURPOSE

The main aim of the purpose is to building a model which is used for classifying the fruit depends on the different characteristics like color, shape, texture etc. Here the user can capture the images of different fruits and then the image will be sent the trained model. The model analyses the image and detect the nutrition based on the fruits like (Sugar, Fiber, Protein, Calories, etc.). So at this point this Nutri Fact website makethem to create awareness and make the sense of giving the correct nutrition chart. So that they will be eating only up to the level.
2. PROBLEM STATEMENT

Food is essential for human life and has been the concern of many healthcare conventions. Nowadays new dietary assessment and nutrition analysis tools enable more opportunities to help people understand their daily eating habits, exploring nutrition patterns and maintain a healthy diet. Nutritional analysis is the process of determining the nutritional content of food. It is a vital part of analytical chemistry that provides information about the chemical composition, processing, quality control and contamination of food. So to predict the consumption of nourishment in order to make them healthy and stable using nutrition analysis tools.

3. PROPOSED SOLUTION

To determine the calorie consumption for the individual based on their health aspects. To provide them with regular remainder on nutrition requirement for the customer/individual. To provide the amount of consumption of vegetables and fruits based on the calorie value predicted using the model.

Novelty - Easier prediction of calorie utilization, improve customer satisfaction and improve customer value.

Social Impact - Regular suggestion on fitness maintenance and healthy diet suggestion.

Business Model - Regular suggestion on fitness maintenance and healthy diet suggestion. Key Activities are done as prediction, suggestion for calorie consumption and healthy life suggestion. Customer Relationship includes cloud based service and 24/7 email support. Channels are email, mobile, helpline and health care.

Scalability - Every Customer must get Healthy Life and Proper Diet Maintenance based on the Healthy Measure and Calorie prediction. Also suggest the feedback to maximize the Application usage.

4. DATA FLOW DIAGRAM (DFD)

The application gets input from the user like images fruit, vegetables, foods, height, weight, age. Then with the help of these inputs, the model predicts the given image nutrition content levels and calculate human body calorie levels.

5. SOLUTION ARCHITECTURE
6. TECHNICAL ARCHITECTURE

![Figure 6.1 Technical Architecture]

7. FEATURES

7.1 FEATURE 1 – PREDICTING FRUITS AND VEGETABLES

In this feature, going to detect fruits and vegetables with the given datasets. When the image is predicted as particular fruit or vegetables then the nutrient contents available in fruits and vegetables are shown below.

![Figure 7.1.1 Image prediction]

7.2 FEATURE 2 – CALCULATING CALORIES

The Calorie Calculator can be used to estimate the number of calories a person needs to consume each day. This calculator can also provide some simple guidelines for gaining or losing weight. In this module, calories will be calculated by giving some information like height, weight, etc.....
7.3 FEATURE 3 – PREDICTING FOODS
In this module, food will be predicted and the nutrients present in the food will be shown below. Initially it will predict the image correctly with the given dataset by identifying the shape, color, size, etc…

7.4 FEATURE 4 - GIVING BEST HOSPITALS DETAILS IN THE DISTRICT
For some districts the specialized and famous hospital details will be given as a suggestion. This will helpful for the users to know about the hospital which are famous recently. The details will be given based upon the users reviews and ratings given to the hospitals.
8. ALGORITHM USED

8.1 CONVOLUTION NURAL NETWORK

A Convolution Neural Network (CNN) is a type of Deep Learning neural network architecture commonly used in Computer Vision. Computer vision is a field of Artificial Intelligence that enables a computer understand and interpret the image or visual data.

The goal of CNN is to reduce the images so that it would be easier to process without losing features that are valuable for accurate prediction.

```
from tensorflow.keras.models import load_model
model = load_model('food.h5')
```

Figure 8.1 Model Training

9. PERFORMANCE METRICS

Performance metrics measure the behavior, activities, and performance of a business. It measures the data that is required within a range that is in the form of data. This measures the performance which is the key target to check.

The CNN is a classification problem in which the data is identified based on the category or classes of the data. The given dataset is used by the model for training. The model learns from the dataset and then it to different classifiers.

An important evaluation metric for the classification problem is the confusion matrix which is in the form of a table that contains the binary classifiers of the outcome from model prediction. Which describes the performance of the model trained.

<table>
<thead>
<tr>
<th>S.N</th>
<th>Parameter</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Metrics</td>
<td>Classification Model:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Confusion Matrix – [115,15,15,92]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accuracy Score - 88.34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Classification Report – 89.85</td>
</tr>
<tr>
<td>2</td>
<td>Tune the Model</td>
<td>Hyperparameter Tuning - 90.50</td>
</tr>
</tbody>
</table>

Table 9.1 Performance Metrics

10. CONCLUSION

We would like conclude that this will be helpful for the homemaker and for the people who maintains fitness in daily life. This is in understandable form to all people so anyone can use this web app. It is very simple and easy to use. Users will definitely enjoy this application and know more interesting facts about foods taken in day-to-day life. Calorie calculator helps us to know the calories easily.

In our application, the user will given the image they will predict the image and give the nutrition details about that fruits, vegetables also they will give the details about foods it is very useful for user based on that they take food.

The application also provides additional information about specialized and famous hospitals in some districts. We can calculate the calories easily by giving some information, based on the calorie the suggestions will be given.
11. FUTURE ENHANCEMENT

While concluding the project the future enhancement part is more important it is why because in future, we can develop this project with more additional features more reliability and security. Here we would like to enhance infuture with the additional features of adding more sample fruits, vegetables and foods. With the reviews given by the users for this web app, additional features will be added.

12. SAMPLE OUTPUT

![Image prediction](image1.png)

**Figure 12.1 Image prediction**

![Calorie Calculator](image2.png)

**Figure 12.2 Calorie Calculator**
REFERENCES


