AI-powered Nutrition Analyzer for Fitness Enthusiasts

IBM NALAIYA THIRAN PROJECT REPORT

Submitted by

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INTRODUCTION

Finding out a food's nutritional value is done through nutrition analysis. Information about the chemical make-up, processing, quality assurance, and contamination of food is a crucial component of analytical chemistry. Food is a necessity for human life and has been addressed in numerous medical conventions. Modern dietary evaluation and nutrition analysis technologies give consumers more possibilities to explore nutrition patterns, comprehend their daily eating habits, and keep up a balanced diet.

A dataset of fruit photos includes photographs of apples, bananas, oranges, pineapples, and watermelons. Fruit nutrition is determined by analysis. Using convolution neural network, the analysis can be carried out. Convolution layer, pooling layer, flattening layer, and fully linked layer are its four layers.

LITERATURE REVIEW

S.NO	TITLE	AUTHOR	YEAR	ABSTRACT	TECHNOLOGY
1.	AI-powered Nutrition Analyzer for Fitness Enthusiasts	Meng-Lin Chiang, Chia-An Wu, Jian-Kai Feng, Chiung-Yao Fang, Sei-Wang Chen	2019	The proposed system aims to assist users to organize their diets. This is achieved through food recognition and calorie nutrient analysis. This analysis uses food images as input to the system, based on Mask R-CNN to detect and recognize food class and food masks. The diet's weight is determined using linear regression. By using	Mask R-CNN

				the food mask, it is possible to determine how much food is present in the image.	
2.	DeepFood: Food Image Analysis and Dietary Assessment via Deep Model	Landu Jiang, Bojia Qiu, Xue Liu, Chenxi Huang and Kunhui Lin	2020	The suggested system is a three-step algorithm that determines multi-item (food) images by recognising candidate regions and utilizing CNN. This algorithm will provide consumers a clear understanding of a balanced diet and direct them to improve their health.	Faster R-CNN model

Reference Links:

1. AI-powered Nutrition Analyzer for Fitness Enthusiasts - https://ieeexplore.ieee.org/document/9064257
2. DeepFood: Food Image Analysis and Dietary Assessment via Deep Model - https://ieeexplore.ieee.org/document/8998172
3. Nutrient Food Prediction Through Deep Learning - https://ieeexplore.ieee.org/document/9545014
4. Lightweight and Parameter-Optimized Real-Time Food Calorie Estimation from Images Using CNN-Based Approach - https://www.mdpi.com/1854364

PROJECT OVERVIEW

The project's overall goal is to provide an output by performing image processing and creating a list of nutrients to display. The user enters the image and interacts with the user interface. The input image is then sent to our Flask application, where we will classify the outcome and display it on the UI with the aid of the model we built. The Pycharm is used to anticipate the input and display the output's nutritional value.
Data collection, image processing, model building, and application building are the steps involved in this procedure.
The training and test photos used to train our model are located in the dataset folder.
We are developing a Flask application in which the python file app.py, Sample images, uploads, and nutrition.h5 are stored under the Flask folder, and the templates folder contains the pages home.html, image.html, imageprediction.html, and aboutus.html. The css coding is stored in the static folder, and the HTML pages are stored in the templates folder.

The css files needed to style the html page and carry out the activities were in the static folder.

The uploaded pictures will be in the uploads folder (which are already tested).

PURPOSE

Existing Problem

a. Existing Problem

Unfortunately, some nutritional software programmes are of low quality, and users occasionally receive insufficient technical help. Additionally, despite the availability of many top-notch software programmes and databases, these tools are vulnerable to abuse by users who are unaware of or unappreciative of these systems' constraints. This article looks at a few of the potential reasons of mistake while using nutritional analysis software. There is virtually little information on nutrient content in many build sources. Therefore, it is improvisedMaking this project useful for fitness enthusiasts is its main goal. Sometimes, individuals tempt them to eat more, causing their calorie intake to rise and their diet to fail. As a result, at this stage, the NutriFact website forces them to raise awareness and explain why providing the right nutrition chart makes sense. In order for them to eat only what is necessary. This page provides a list of nutrients, including potassium, carbohydrates, fat, saturated fat, monounsaturated fat, and polyunsaturated fat, as well as energy, protein, sugar, and sodium.

a. Problem Statement Definition:

The primary goal of the project is to develop a model that will be used to categorise fruits according to their various attributes, such as colour, shape, and texture. Here, users can take pictures of various fruits, which are subsequently uploaded to a trained algorithm for analysis. The algorithm examines the image and determines the nutritious content of fruits such (Sugar, Fibre, Protein, Calories, etc.).

We provided a thorough overview of our AI-Nutrition Analyzer Website in the empathy map that follows. The perspective of this is what the people feel, think, and express.

For instance:

Pain: Slow procedure for some, unfavourable comments, and variable accuracy. Gain: Additional items such as advisers, quick and simple, and several food journals.
Think and Feel: Man's power can be decreased by using a specialised smartphone software that is simple to use.
Throughout the ideation phase, we discussed a variety of concepts and grouped them under

Person 1, etc. We have talked about a variety of implementation algorithms. These concepts provide a clear picture of the procedure.