AI – Powered Nutrition Analyzer for Fitness Enthusiasts

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**Abstract**

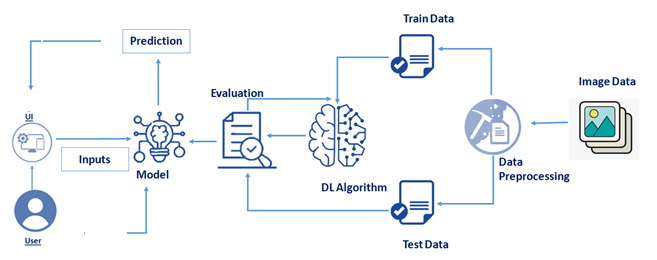
Artificial intelligence (AI) is a rapidly evolving area that offers unparalleled opportunities of progress and applications in many healthcare fields. In this review, we provide an overview of the main and latest applications of AI in nutrition research and identify gaps to address to potentialize this emerging field. AI algorithms may help better understand and predict the complex and non-linear interactions between nutrition-related data and health outcomes, particularly when large amounts of data need to be structured and integrated, such as in metabolomics. AI-based approaches, including image recognition, may also improve dietary assessment by maximizing efficiency and addressing systematic and random errors associated with self-reported measurements of dietary intakes.

**Introduction**

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.

The main aim of the project is to building a model which is used for classifying the fruit depends on the different characteristics like colour, 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, Fibre, Protein, Calories, etc.).

**System Design**



**Key Objective**

* know fundamental concepts and techniques of Convolutional Neural Network.
* gain a broad understanding of image data.
* Knowhow to pre-process/clean the data using different data preprocessing techniques.
* know how to build a web application using the Flask framework.

**Literature Survey**

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| --- | --- | --- | --- |
| **Year** | **Title** | **Proposed Idea** | **Limitations** |
| 2021 | Artificial Intelligence in Nutrients Science Research | There has been an expansion of AI applications in medicine and biomedical sciences. The possibilities of artificial intelligence in the field of medical diagnostics, risk prediction and support of therapeutic techniques are growing rapidly. Thanks to the use of AI in ophthalmological, radiological and cardiac diagnostics, measurable clinical benefits have been obtained. AI was used in research on new pharmaceuticals . | The intention to maintain transparency. Therefore, studies that directly or indirectly relate to humanhealthwereincluded, excluding research on nutrients in agricultural and veterinary sciences. |
| 2022 | Precision Nutrient Management Using Artificial Intelligence Based on Digital Data Collection Framework | The AI Precision Nutrient Analysis Model was used to analyze the ingredients of the dishes and calculate nutrient intake by automatically analyzing the dishes, and portion sizes were analyzed using a digital data semantic analysis model | A complete set of publicly available data on food nutrient ingredients; more complete data and references on micro-nutrients should be available |
| 2022 | AI BASED SYSTEM TO PROVIDE DIET PLAN FOR OLDER HOSPITALIZED PATIENTS | AI powered virtual dietician based on android technology is implemented. Presented system includes a login page for client, nutritionist and administrator respectively. Users should perform a sign up and generate their respective profiles. The neces in sary formation regarding health condition as well as BMI should be entered in the system. The work of administrator is to monitor the client data and discard invalid database. Various nutritionists can visit the application and access data via dietician | If inaccurate details are given to the system the output VII. generated might be irrelevant to the user’s health condition. |
| 2022 | AI-Based Dietictian | consulting a dietician could be timeconsuming. This research proposes an expert system method to recommend a personalized diet pl an. The system consists of a recommender module that uses machine algorithms to recommend personalized diet plans based on factors such as age, gender, height, weight, allergies, and personal preferences. | the BMI and the BMR, recommends a diet plan and if the user is not satisfied with the current diet plan, it generates an alternative diet plan |
| 2020 | Machine Learning Based Approach on Food Recognition and Nutrition Estimation | Because people are very keen on measuring weight, healthy diets, and staying away from obesity, there is an increasing demand for food caloric measurement. Adult obesity is increasing at an alarming rate. The main source of obesity is the difference between dietary intake and the energy people get from the diet. High-calorie intake may be injurious and lead to various diseases. | To enhance the usability and accuracy of the system. |

**Conclusion**

This study proposed an Intelligence Precision Nutrient Analysis Model based on a digital data collection framework, where the nutrient intake was analyzed by entering dietary recall data. The AI Precision Nutrient Analysis Model was used to analyze the ingredients of the dishes and calculate nutrient intake by automatically analyzing the dishes, and portion sizes were analyzed using a digital data semantic analysis model. The results of this study show very little difference in nutrient intake between the model and the NNHS analysis and are highly accurate; therefore, the AI model can be used as a reference for nutrition surveys and personal nutrition analysis. In terms of data access, as there is not yet a complete set of publicly available data on food nutrient ingredients; more complete data and references on micro-nutrients should be available in the future. On the other hand, the scope of recipes should be expanded.

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