LITERATURE SURVEY

A literature review is a piece of academic writing demonstrating knowledge and understanding of the academic literature on a specific topic placed in context. A literature review also includes a critical evaluation of the material; this is why it is called a literature review rather than a literature report.

1.A Mathematical AI-Based Diet Analysis and Transformation Model.

- YEAR: 2022.
- AUTHOR: L. K. Gautam and S. A. Ladhake

DESCRIPTION:

Inadequacies in nutritional intake can be considered as a major source of adverse effects on the growth and health of individuals in India. A proper balanced diet is essential from the very early stages of life for proper growth, development, remain active and to reduce the risk of diseases. For those with diabetes, a proper diabetes diet is crucial which depends upon their energy requirements. So a need has been identified to develop educational software which should perform the routine task of analyzing, optimizing, and transforming diet by considering their energy requirements and medical problems. The different nutritional values present in a diet are generally affected by imprecision, which can be represented and analyzed by fuzzy logic. For diet balancing, a meta heuristic local search algorithm is proposed which works in a local search space recording the history of search to make it more effective and optimized.

MERITS:

- The AI-based mathematical model for diet optimization and transformation solves the common nutritional problems of public .
- For diet balancing, a meta heuristic local search algorithm

is proposed which works in a local search space recording the history of search to make it more effective and optimized.

- DEMERITS:
  - This changes according to a patient's condition during hospitalization.
  - These nutrition profiles are aimed at the general population and not applicable to specific groups.
  -

2.Artificial Intelligence in Nutrients Science Research: A Review

- YEAR: 2021
- AUTHOR: Jarosław Sak and Magdalena Suchodolska.

- DESCRIPTION:

Artificial intelligence (AI) as a branch of computer science, the purpose of which is to imitate thought processes, learning abilities and knowledge management, finds more and more applications in experimental and clinical medicine. In recent decades, there has been an expansion of AI applications in

biomedical sciences. The possibilities of artificial intelligence in the field of medical diagnostics, risk prediction and support of therapeutic techniques are growing rapidly. The aim of the article is to analyze the current use of AI in nutrients science research. The literature review was conducted in PubMed. A total of 399 records published between 1987 and 2020 were obtained, of which, after analyzing the titles and abstracts, 261 were rejected. In the next stages, the remaining records were analyzed using the full-text versions and, finally, 55 papers were selected. These papers were divided into three areas: AI in biomedical nutrients research (20 studies), AI in clinical nutrients research (22 studies) and AI in nutritional epidemiology (13 studies). It was found that the artificial neural network (ANN) methodology was dominant in the group of research on food composition study and production of nutrients. However, machine learning (ML) algorithms were widely used in studies on the influence of nutrients on the functioning of the human body in health and disease and in studies on the gut micro bio data.

- MERITS:
    - The development of AI systems in dietetics may lead, in the near future, to a partial replacement of medical personnel and reducing the need for personal contact with a nutritionist.

- DEMERITS:
    - One of the main problems in analyzing publications on the use of AI in nutrient research is the range of research areas to be considered.

3. ANDROID APPLICATION FOR PERSONAL DIET CONSULTANT.

- YEAR: 2021.
- AUTHOR: Garvita Gehlot.

- DESCRIPTION:

This application provides the user with a complex algorithm which can provide the user with a diet plan based on his/her characteristics like height, weight, BMI, gender etc. Everyone today dreams of healthy life cycle. In Today's busy life healthy body is dream for everyone to have a proper balanced diet. A balanced diet is important because your organs and tissues need proper nutrition to work effectively. Without good nutrition, your body is more prone to disease, infection, fatigue, and poor performance. Children with a poor diet run the risk of growth and developmental problems and poor academic performance, and bad eating habits can persist for the rest of their lives. At the core of a balanced diet are foods that are low in unnecessary fats and sugars and high in vitamins, minerals, and other nutrients. The following food groups are essential parts of a balanced diet. Calories play a vital role in our growth and energy. A good diet can help you manipulate calorie intake based on your requirements. The proposed application will provide the user with a user-friendly User-Interface where they can create an account, manage their account and get the diet by the click of just one button. If the user is allergic to some kind of food, it also has the feature to contact an actual dietitian to consult.

- MERITS:

  - There's a page where the user can just read some interesting facts on health and human body.
  - The application can be deployed on the cloud by integrating different servers through the cloud in its future iterations.

4. Food Calorie and Nutrition Analysis System based on Mask R-CNN.

- YEAR: 2019.
- AUTHOR: Meng-Lin Chiang, Jian-Kai Feng.

DESCRIPTION:

Over the past few decades, obesity has become a serious problem. Obesity is associated with many of the leading causes of death, such as chronic diseases including diabetes, heart disease, stroke, and cancer. The most effective way to prevent obesity is through food intake control, which involves understanding food ingestion, including the nutrients and calories of each meal. To assist with this issue, this study develops a food calorie and nutrition system that can analyze the composition of a food based on a provided image. Further, we introduce a newly collected dataset, Ville Cafe, for food recognition. This dataset contains 16 categories with 35,842 images, including salad, fruit, toast, egg, sausage, chicken cutlet, bacon, French toast, omelet, hash browns, pancake, ham, patty, sandwich, French fries, and hamburger. The system is based on a Mask Region-based Convolutional Neural Network (R-CNN) with a union post processing, which modifies the extracted bounding boxes and masks, without the non-maximum suppression (NMS), to provide a better result in both analytics and visualization. The recognition accuracy for the combination of Ville Cafe and the Food-256 Datasets was 99.8%.

- MERITS:

  - It could also teach you about the density and overall quantity of food you're consuming every day compared to the recommended level.
  - This could be very beneficial for people who are prone to overeating, Those who don't particularly consume many vegetables, fruits, or protein, they're consuming more carbohydrates and fat.

- DEMERITS:
    - This analysis using MASK R-CNN provides nutritional information only about the food ,which model is fed into it.

5. A Framework to Estimate the Nutritional Value of Food in Real Time Using Deep Learning Techniques.

- YEAR: 2018
- AUTHOR: Raza Yunus, Omar Arif, Hammad Afzal, Muhammad Faisal Amjad.

- DESCRIPTION:

There has been a rapid increase in dietary ailments during last few decades, caused by unhealthy food routine. Mobile-based dietary assessment systems that can record real time images of meal and analyze it for nutritional content can be very handy and improve the dietary habits, and therefore, result in healthy life. This paper proposes a novel system to automatically estimate food attributes such as ingredients and nutritional value by classifying the input image of food. Our method employs different deep learning models for accurate food identification. In addition to image analysis, attributes and ingredients are estimated by extracting semantically related words from a huge corpus of text, collected over the Internet. We performed experiments with a dataset comprising 100 classes, averaging 1000 images for each class to acquire top 1 classification rate of up to 85 percent. An extension of a benchmark dataset Food-101 is also created to include sub-continental foods.

MERITS:

- This paper presents a system that exploits the extensive use of mobile devices to provide health information about the food we eat.
- The results are improved via data augmentation, multi crop evaluation, regularization and other similar techniques. 85% accuracy is achieved on our dataset.

- DEMERITS:
  - Limitations of nutrition screening include not validating tools for specific patient populations.

6. A New Deep Learning-based Food Recognition System for Dietary Assessment on An Edge Computing Service Infrastructure.

- YEAR: 2017.
- AUTHOR: Chang Liu, Yu Cao, Guan ling Chen., Yunsheng Ma, Songqing Chen.

- DESCRIPTION:

Literature has indicated that accurate dietary assessment is very important for assessing the effectiveness of weight loss interventions. However, most of the existing dietary assessment methods rely on memory. With the help of pervasive mobile devices and rich cloud services, it is now possible to develop new computer-aided food recognition system for accurate dietary assessment. However, enabling this future Internet of Things-based dietary assessment imposes several fundamental challenges on algorithm

development and system design. In this paper, we set to address these issues from the following two aspects: (1) to develop novel deep learning-based visual food recognition algorithms to achieve the best-in-class recognition accuracy; (2) to design a food recognition system employing edge computing-based service computing paradigm to overcome some inherent problems of traditional mobile cloud computing paradigm, such as unacceptable system latency and low battery life of mobile devices.

- MERITS:
    - Reducing response time that is equivalent to the minimum of the existing approaches.
    - Lowering energy consumption which is close to the minimum of the state-of-the-art.
- DEMERITS:
    - Integration of system into a real-world mobile devices and edge/cloud computing-based system must be done to enhance the accuracy of current measurements of dietary caloric intake estimate.