**LITERATURE SURVEY**

**AI – POWERED NUTRITION ANALYZER FOR FITNESS ENTHUSIASTS**

Artificial Intelligence in Nutrients Science Research: A Review

Author :[Jarosław Sak](https://pubmed.ncbi.nlm.nih.gov/?term=Sak%20J%5BAuthor%5D) and [Magdalena Suchodolska](https://pubmed.ncbi.nlm.nih.gov/?term=Suchodolska%20M%5BAuthor%5D)

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 microbiota. Deep learning (DL) algorithms prevailed in a group of research works on clinical nutrients intake. The development of dietary systems using AI technology may lead to the creation of a global network that will be able to both actively support and monitor the personalized supply of nutrients.

AI for Understanding Food and Nutrition

Author**:** Barbara Korousic Seljak, Tome Eftimov, Fabio Mainardi

Topics of interest include algorithms, methods, and systems related to food and nutrition:

- Information retrieval and extraction in efforts to build food ingredient databases;

- Data normalization, ontologies, and ontology design in efforts to record individual eating patterns with great detail and link eating to important locational, temporal, and social factors, including unstructured (social media, text, images etc.) and structured data resources;

- Predict relationships between food and nutrition and health behaviors, linking this to health and environment outcomes;

- Recommender systems in efforts to build personalized nutrition systems and drive food choices;

- NLP frameworks in efforts to inform community interventions and population health and environment policies that affect access to and consumption of food;

- Digital tracking tools, wearable devices, and other sensors in efforts to record, represent, and analyze quantified-self data, and link food consumption to health and environmental sustainability.

How Nutrition AI Determines People's Health Metrics?

Author : ThinkMl team

Randomized trials in the nutrition field are complex because this technique demands sticking to a diet for years, resulting in higher human error chances. There are several factors of dietary recommendations that influence everyone differently; hence, the ideology of a universal diet plan for everyone fails here as it is impossible biologically. Artificial intelligence allows researchers to analyze big data and better understand how diet affects human health patterns, including factors influencing their nutritional needs.

AI Diet Planner: Use of AI to determine your diet plan

The food business use AI in a variety of ways, such as anticipating the influence of a taste or utilizing robots in manufacturing. A diet plan driven by AI is rapidly gaining traction, with the ability to create tailored diet programs based on our physical characteristics and exact objectives.

Personalized Nutritional Guide by Artificial Intelligence

Nutrigenomics strives to integrate genomic science with nutrition to improve nutritional-based artificial intelligence. DNA tests recommend a personalized diet plan focusing on specific aspects of a person's microbiome, including lifestyle, genetics, and surroundings. These suggestions are based on data extracted from billions of human dietary patterns. Such nutritional guides based on the nutrigenomic approach help scientists leverage AI for personalized recommendations and interventions.

Artificial intelligence made it possible to analyze personal health metrics and give birth to many ongoing projects in the same field. For instance, smartphone nutritional applications are developed that use deep learning to analyze photos of plates for streamlining food logging processing without human-based errors. However, a complete dataset must comprise major factors like sleep patterns, activity levels, microbiome functioning, and medication consumption. Advanced algorithms help achieve this goal by tracking important health metrics for personalized AI diet chart plan development. In the coming five to ten years, it is expected that AI and ML techniques will grow further in the nutrition and fitness department.

A Survey on Automated Food Monitoring and Dietary Management Systems

Author : Vieira Bruno, Silva Resende, Cui Juan

Healthy diet with balanced nutrition is key to the prevention of life-threatening diseases such as obesity, cardiovascular disease, and cancer. Recent advances in smartphone and wearable sensor technologies have led to a proliferation of food monitoring applications based on automated food image processing and eating episode detection, with the goal to conquer drawbacks of the traditional manual food journaling that is time consuming, inaccurate, underreporting, and low adherent. In order to provide users feedback with nutritional information accompanied by insightful dietary advice, various techniques in light of the key computational learning principles have been explored. This survey presents a variety of methodologies and resources on this topic, along with unsolved problems, and closes with a perspective and boarder implications of this field.

Mobile-Based Diet Monitoring System for Obesity Management.

Author: Bruno Vieira Resende E Silva, M. Rad, J. Cui, Megan McCabe, Kaiyue Pan

A new interactive mobile system that enables automated food recognition and assessment based on user food images and provides dietary intervention while tracking users' dietary and physical activities and the realization of real-time energy balance monitoring through metabolic network simulation is presented.

Personal diet management is key to fighting the obesity epidemic. Recent advances in smartphones and wearable sensor technologies have empowered automated food monitoring through food image processing and eating episode detection, with the goal to conquer drawbacks of traditional food journaling that is labour intensive, inaccurate, and low adherent. In this paper, we present a new interactive mobile system that enables automated food recognition and assessment based on user food images and provides dietary intervention while tracking users' dietary and physical activities. In addition to using techniques in computer vision and machine learning, one unique feature of this system is the realization of real-time energy balance monitoring through metabolic network simulation. As a proof of concept, we have demonstrated the use of this system through an Android application.

Integrating Concepts about Food, Nutrition and Physical Activity

Authors: Jennifer Adkins Ernst , MS Anastasia Snelling, PhD, RD Devin Ellsworth

The Community Voices for Health curriculum “Integrating Concepts about Food, Nutrition and Physical Activity into Middle School” is intended to help you increase the amount of nutrition education and physical activity you are providing for your students. Educators agree that healthier students are better learners (Basch, C.), so empowering students to make healthy food choices and be physically active is very important to academic achievement. Healthy environments, good role-models, and learning opportunities all contribute to improving the health behaviours and academic outcomes of your students. The following conceptual model will stimulate teachers’ interest in topics about food, food production, gardening and nutrition, and help them seamlessly include them in their regular lesson plans. The curriculum is organised into six nutrient content areas - carbohydrates, protein, fat, vitamins, minerals and water. Each content area contains fundamental food, growing, nutrient and food labelling information, common core standards for maths, language arts, science and history, provocative facts and questions, and lesson suggestions. The intent of the design is that teachers can easily coordinate with their colleagues across their grade, and the school, to focus the delivery to suit your school schedule and priorities