NUTRITION ASSISTANT APPLICATION

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LITERATURE SURVEY

TITLE	Nutritional biomarkers and machine learning for personalized nutrition applications and health optimization
AUTHORS	Dimitrios P.Panagoulias,Dionisios N.Sotiropoulos and George A.Tsihrintzis
YEAR OF PUBLICATION	2021
ABSTRACT	Biomarkers are the key variables in the research and development of new methods of training prognostic models and neural networks in the scientific field of machine learning and artificial intelligence . Important biomarkers related to metabolism are the metabolites. Metabolomics refers to the systematic study of unique chemical fingerprints that are left behind by specific cellular processes. The metabolic profile can provide a snapshot of cell physiology and, by extension, metabolomics provide a direct "functional reading of the physiological state" of an organism. The goal of this paper is to employ current machine learning methodologies, specifically neural networks, to formulate a general evaluation chart of the nutritional biomarkers, to investigate how to best predict body mass index and to discover dietary patterns.In addition to BMI calculation ,we scan foods and display their nutrients.
METHODOLOGY	Machine learning
MERITS	Accurate BMI Calculation
DEMERITS	Ambiguous details lead to negative effects in accuracy
CHALLENGES	To overcome ambiguity by cross verifiction
LINK	**https://www.researchgate.net/publication/356862922_ Nutritional_biomarkers_and_machine_learning_for_personalized_nutrition_applications_and_health_optimization**

TITLE	A food recommender system considering nutritional information and user preferences
AUTHORS	Raciel Year Toledo, Ahmad A.Alzahrani and Luis Martinez
YEAR OF PUBLICATION	2019
ABSTRACT	Unhealthy diets have been identified as the important causing factor of such diseases. In this context, personalized nutrition emerges as a new research field for providing tailored food intake advices to individuals according to their physical, physiological data, and further personal information. Specifically, in the last few years, several types of research have proposed computational models for personalized food recommendation using nutritional knowledge and user data. This paper presents a general framework for daily meal plan recommendations, incorporating as main feature the simultaneous management of nutritional-aware and preference-aware information, in contrast to the previous works which lack this global viewpoint. The proposal incorporates a pre-filtering stage that uses AHPSort as multi-criteria decision

	analysis tool for filtering out foods which are not appropriate to the current user characteristics. Furthermore, it incorporates an optimization-based stage for generating a daily meal plan whose goal is the recommendation of food highly preferred by the user, not consumed recently, and satisfying his/her daily nutritional requirements. A case study is developed for testing the performance of the recommender system.
METHODOLOGY	MCDA and AHP sort
MERITS	Useful in delivering personalized menu
DEMERITS	Considers only physical user information.
CHALLENGES	Usage of previous food logs also as input for calculations
LINK	https://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=8765311

TITLE	The Immersive Virtual Alimentation and Nutrition Application: An Interactive Digital Dietitian
AUTHORS	Caitlyn G. Edward ; Pejman Sajjadi, ; Alex Fatemi ; Erica N. Krieger ; Alexander Klippel ; Travis D. Masterson,
YEAR OF PUBLICATION	2022
ABSTRACT	Current methods for providing nutrition education on portion size and calorie density rely on didactic tactics such as pamphlets, handouts, and slide show presentations in appointments with registered dietitian nutritionists (RDNs). Recent advances in technology, including the development of and increased accessibility to immersive virtual reality (iVR) devices, have been proposed as a novel and impactful method of providing nutrition education.1−4 Immersive virtual reality is becoming increasingly commonplace, with headsets commercially available and as cost effective as a few hundred dollars, or less than the price of other popular gaming systems. Opportunities for designing immersive experiences are manifold and can encompass various aspects of the food choice spectrum, including but not limited to grocery stores, buffets, restaurants, and clinical settings. Within the context of nutrition education, perhaps the largest benefit of iVR is the ability to experience simulated environments in a realistic and ecologically relevant manner at a 1:1 scale, realistically simulating food. For example, individuals can practice cutting food, assembling meals, and interacting with kitchen tools appropriately.
METHODOLOGY	Heuristic evaluation and Digital RDNs
MERITS	The primary objective, synthesis of a virtual experience that facilitates the replication of a real-world context was achieved. the IVAN application is perceived as highly relevant, applicable, and effective by experts currently working in nutritional sciences and nutrition education to provide learning support by creating an environment in which users can explore, hypothesize, experiment, and construct.
DEMERITS	Lack of alterations such as expanding the options of foods available, including culturally diverse offerings and avatars, including additional modules to cover other relevant nutritional topics that would benefit from content delivery in environments.
CHALLENGES	To include a larger set of reviewers of varying backgrounds and age groups to increase the generalizability of these findings.
LINK	**https://www.researchgate.net/publication/360448255_The_Immersive_Virtual_Alimentation_and_Nutrition_Application_An_Interactive_Digital_Dietitian**

TITLE	Using a Personal Digital Assistant for Self-monitoring Influences Diet Quality in Comparison to a Standard Paper Record among Overweight/obese Adults
AUTHORS	Sushama D. Acharya,Okan U.Elsi, Susan M. Sereika, Mindi A. Styn, Lora E. Burke
YEAR OF PUBLICATION	2012
ABSTRACT	Self-monitoring has traditionally been done using paper record (PR), which can be tedious and burdensome. A personal digital assistant with dietary software may provide an alternative to a PR. The study aimed to describe the differences in dietary changes at 6 months between participants randomly assigned to use a paper record or personal digital assistant for self-monitoring in a clinical trial of weight loss treatment. Self-monitoring adherence, change in weight and diet were assessed between 2006 and 2009. The sample (N=192) was 84% female and 78% White with a mean age of 49 years and body mass index of 34.0 kg/m^2. At baseline, the groups did not differ in energy intake, % calories from fat and number of servings of the examined food groups. At 6 months, both groups had significant reductions in weight, energy intake and % calories from total fat and saturated fatty acids (*Ps* <0.001); no between-group differences were found. Compared to the PR group, the PDA group significantly increased consumption of fruit (*P*=0.02), vegetables (*P*=0.04), and decreased consumption of refined grains (*P*=0.02). Interactions between self-monitoring and the two groups were found in relation to changes in % calories from total fat (*P*=0.02), monounsaturated fatty acids (*P*=0.002) and trans-fatty acids (*P*=0.04). Frequent self-monitoring was significantly associated with total sugar (*P*=0.02) and added sugar (*P*=0.01) intake in both groups. Our findings suggest that the use of PDA for self-monitoring might improve self awareness of behavior and dietary changes.
METHODOLOGY	A secondary analysis of the 6-month evaluation from a 24-month randomized clinical trial that used a 3-group design to determine the effects of different methods of self-monitoring on weight loss and adherence to self-monitoring.
MERITS	This might help individuals become more aware of their eating behaviors, which in turn might improve long-term dietary changes.
DEMERITS	Some individuals, in particular those with lower literacy skills and the elderly may encounter difficulty in using the device.
CHALLENGES	To make it easy to handle for all the people and improve its features.
LINK	https://www.researchgate.net/publication/241696563_Development_of_a_field-friendly_automated_dietary_assessment_tool_and_nutrient_database_for_India