

NUTRITION ASSISTANT APPLICATION

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PROBLEM STATEMENT

Due to the ignorance of healthy food habits, obesity rates are increasing at an alarming speed, and this is reflective of the risks to people's health. People need to control their daily calorie intake by eating healthier foods, which is the most basic method to avoid obesity. However, although food packaging comes with nutrition (and calorie) labels, it's still not very convenient for people to refer to App-based nutrient dashboard systems which can analyze real-time images of a meal and analyze it for nutritional content which can be very handy and improves the dietary habits, and therefore, helps in maintaining a healthy lifestyle.

S.No	PAPER NAME	YEAR OF PUBLICATION	AUTHOR	OBJECTIVE AND WORK DONE IN THE PAPER
1.	APPLICATION OF ARTIFICIAL INTELLIGENCE ON NUTRITION ASSESSMENT AND MANAGEMENT	(June 2021)	Dr.Kavita Sudersanad as	Artificial Intelligence can be applied in multidisciplinary fields, including patient service and care. It enables precise and personalized medical nutrition care by assessing food and nutrient intake, nutritional evaluation. The application of AI for the provision of food services to hospitalized patients is of immense scope. This review details the various ways through which AI can be applied for nutrition assessment. Even though commercial AI-based nutritional assessment systems are available, many do not evaluate the nutrient intake, and the data available through them were not validated. FatSecret is a commercially available AI-based food and nutrient assessment system that can evaluate the food's calorie content. Also, the major challenge posed by such systems is the availability of locally appropriate data sets. Hence further research and validation are essential in this field.

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2.	EFFECTS AND CHALLENGE OF USING A NUTRITION ASSISTANCE SYSTEM: RESULTS OF A LONG-TERM MIXED-METHOD STUDY	(October 2021)	Hanna Hauptmann.et.al	<p>Healthy nutrition contributes to preventing non-communicable and diet-related diseases. Recommender systems, as an integral part of mHealth technologies, address this task by supporting users with healthy food recommendations. However, knowledge about the effects of the long-term provision of health-aware recommendations in real-life situations is limited. This study investigates the impact of a mobile, personalized recommender system named Nutrilize. Our system offers automated personalized visual feedback and recommendations based on individual dietary behavior, phenotype, and preferences. By using quantitative and qualitative measures of 34 participants during a study of 2–3 months, we provide a deeper understanding of how our nutrition application affects the users’ physique, nutrition behavior, system interactions and system perception. Our results show that Nutrilize positively affects nutritional behavior measured by the optimal intake of each nutrient. The analysis of different application features shows that reflective visual feedback has a more substantial impact on healthy behavior than the recommender. We further identify system limitations influencing this result, such as a lack of diversity, mistrust in healthiness and personalization, real-life contexts, and personal user characteristics with a qualitative analysis of semi-structured in-depth interviews. Finally, we discuss general knowledge acquired on the design of personalized mobile nutrition recommendations by identifying important factors, such as the users’ acceptance of the recommender’s taste, health, and personalization</p>

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3.	DESIGN AND EVALUATION OF MOBILE-BASED NUTRITION EDUCATION APPLICATION FOR INFERTILE WOMEN IN IRAN	(March 2022)	Mostafa Langarizadeh Seyed Ali Fatemi Aghda, and Azadeh Nadjarzadeh	According to the nutritionists and infertility specialists, the contents determined for the nutrition educational application were categorized under three general sections of user's demographic data, educational contents, required capabilities. The users' mean score of the application usability was calculated as 7.44 out of 9 indicating a good level of satisfaction. Conclusions Nutrition education of women with infertility problems can play a significant role in improving their awareness and treatment outcomes. Due to the increasing use of smartphones, designing a mobile-based nutrition educational application can be of great benefit for women with infertility according to the cultural conditions and characteristics of each community.

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4.	Personal Health Assistant on Android Mobile Device: Sleeping, Nutrition and Exercise	(March 2014)	Kiatateeti Anusornpak dee, Matugorn Limpanadus adee, Sangsuree Vasupongay ya and Sinchai Kamolphiw ong	<p>Good health can be achieved by maintaining good behaviors such as a good night sleep, enough exercise and good nutrition. However, the competitive environment nowadays prevents such good behaviors. Thus, this work aims to develop an application on mobile devices that is able to record the daily sleeping, exercise and nutrition information, analyze the collected information in order to provide a notification or an alarm, and present the analyzed results in a simple and easy to understand format. The proposed application can collect data from other application and from the users. A set of simple data analysis methods is performed on the collected data in order to provide a personal health advice based on the user pre-defined preferences.</p>

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5.	PRECISION NUTRITION SYSTEMATIC LITERATURE REVIEW	(June 2021)	Daniel kirk Cagatay Catal, BedirTekin erdogan	<p>However, a systematic overview of the state-of-the-art on the use of machine learning in Precision Nutrition is lacking. Therefore, we carried out a Systematic Literature Review (SLR) to provide an overview of where and how machine learning has been used in Precision Nutrition from various aspects, what such machine learning models use as input features, what the availability status of the data used in the literature is, and how the models are evaluated. Our results show that fifteen problems spread across seven domains of nutrition and health are present. Four machine learning tasks are seen in the form of regression, classification, recommendation and clustering, with most of these utilizing a supervised approach. In total, 30 algorithms were used, with 19 appearing more than once. Models were through the use of four groups of approaches and 23 evaluation metrics. Personalized approaches are promising to reduce the burden of these current problems in nutrition research, and the current review shows Machine Learning can be incorporated into Precision Nutrition research with high performance.</p>

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6.	HEALTH AND FITNESS ASSISTANT	(March 2018)	Pooja Nagdev , Simran Batra, Sahil Pamnani, Pranav Parab,Karan Parikh	<p>A personal trainer is a fitness professional that provides motivation needed to reach your target. Personal Trainer plays a vital role in your fitness success. When the target is selected, the trainer will instruct appropriate workout methods and helps in overall development of his client. But all of this comes at great cost. Generally, more qualified the Trainer is, the more personal sessions will cost. This paper enables us to understand how the need for the Personal Trainer can be fulfilled in a web app, by using machine learning algorithms. This app will be able to learn about your diet and customize a diet plan according to type of workout selected. It will also be able to produce custom workout plans for the user based on their recent activities throughout the day, in the last week or the last month. Each plan will bring you closer to the body and healthy lifestyle the user want.</p>

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7.	OBJECT DETECTION USING CONVOLUTIONAL NEURAL NETWORK IN THE APPLICATION OF SUPPLEMENTARY NUTRITION VALUE OF FRUITS	(September 2019)	Anita Chaudhari, Shraddha More, Sushil Khane, Hemali Mane, Pravin Kamble	Object image detection is unique most auspicious claims of visual object recognition, since it will help to estimate nutrition calories and improve commons ingestion habits. The food gives nutrition to our body to provide information to function properly. If we will not get the precise data our metabolic progressions grieve and our fitness decays which cause various health issues. In brief, nutrition we take totally central to our health. Researchers now believe that these difficulties are partly connected to the nourishment. While they used to have faith in that diseases-such as diabetes, obesity, heart disease, and certain cancers were triggered by a single gene mutation, they are now generally accrediting these situations to a system of living dysfunction.

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				In qualitative studies, participants preferred applications that were quick and easy to administer, and those that increase awareness of food intake and weight management. In randomized trials, the use of smartphone apps was associated with better dietary compliance for lower calorie, low fat, and high fiber foods, and higher physical activity levels (p=0.01-0.02) which resulted in more weight loss (p=0.042-<0.0001). Discussion: Future studies should utilize randomized controlled trial research designs, larger sample sizes, and longer study periods to better establish the diet and nutrition intervention capabilities of smartphones. There is a need for culturally appropriate, tailored health messages to increase knowledge and awareness of health behaviors such as healthy eating. Smartphone apps are likely to be a useful and low-cost intervention for improving diet and nutrition and addressing obesity in the general population. Participants prefer applications that are quick and easy to administer and those that increase awareness of food intake and weight management.
8.	Smartphone Applications for Promoting Healthy Diet and Nutrition: A Literature Review	(January 2016)	Steven S Coughlin, Mary S. Whitehead, Joyce Q Sheats, Jeff Mastromonico	

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9.	A Food Recommender System Considering Nutritional Information and User Preferences	(July 2019)	Raciel Yera Toledo; Ahmad A. Alzahrani; Luis Martínez	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.

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10.	PERSONALIZED DIETARY ASSISTANT-AN INTELLIGENT SPACE APPLICATION	(October 2017)	Balazs Tusor; Gabriella Simon-Nagy; J.T. Toth; A. R. Varkonyi-Koczy	<p>Nowadays, there are numerous types of diets that aim to improve the quality of life, health and longevity of people. However, these diets typically involve a strictly planned regime, which can be hard to get used to or even to follow through at all, due to the sudden nature of the change. In this paper, the framework for an Intelligent Space application is proposed that helps its users to achieve a healthier diet in the long term by introducing small, gradual changes into their consumption habits. The application observes the daily nutrition intake of its users, applies data mining in order to learn their personal tastes, and educates them about the effects of their current diet on their health. Then it analyzes the knowledge base to find different food or drink items that align with the perceived preferences, while also add to the balance of the daily nutrition of the users considering their physical properties, activities, and health conditions. Finally, the system uses the findings to make suggestions about</p>



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