NUTRITION ASSISTANT APPLICATION

LITERATURE SURVEY

DOMAIN NAME: CLOUD COMPUTING

TEAM ID: PNT2022TMID29616

BATCH: B7-1A3E

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Paper 1: APPLICATION OF ARTIFICIAL INTELLIGENCE ON NUTRITION ASSESSMENT AND MANAGEMENT

Published year: May 2021

Author: Dr. Kavita Sudersanadas

Journal Name: EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

Summary: 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 the 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. Fat Secret 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. AI-based nutrient intake assessment system is of immense value to obtain and assess food intake data in isolation wards and for the follow-up without contact.

Methodology used: Artificial Intelligence

Paper 2: Virtual Nutritionist using AI

Publication year: June 2019

Author: Siddarthan Chitra Suseendran, Nanda Kishore B, Josephus Andrew, M.S. Rajya Shree

Journal Name: International Journal of Engineering and Advanced Technology (IJEAT).

Summary: In this way, a requirement for a full help for furnishing them with solid nourishment is a fundamental focus to reach. In this paper, we propose a model for a sustenance master framework which point is to give its clients the nourishment skill. It creates solid dinners for people in various ages as indicated by various criteria including their development stage, sexual orientation, and their wellbeing status. An application is created and a few contextual investigations are connected to show how the proposed model can be connected for deciding one's nourishment utilizing Artificial Intelligence (Machine and deep learning). Few key advantages are: Customized diet for any lifestyle and age along with various types of diets to choose from which acknowledges your pre medical conditions with appropriate macronutrient ratio split that ensures micronutrient supplement suggestions based on the foods you consume.

Methodology used: Artificial Intelligence

Paper 3: Personalized dietary assistant — An intelligent space application

Author: Ballaz's Tusor, Gabriella Simon-Nagy, J.T. Tóth, A. R. Várkonyi-Kóczy

Summary: 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 analyses 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 (e.g., diabetes, celiac disease, food allergies, etc). Finally, the system uses the findings to make suggestions about adding items from the consumption list, or change one item to another.

Methodology used: Data Analytics

Paper 4: Development of Cloud Based Solution For Effective Nutrition Intervention in the management of lifestyle diseases

Author: Manju P. George*, Kalpana C.A

Summary: A web-based tool is being planned for therapeutic nutrition prescriptions in clinical settings. The cloud-based system would have the ability to calculate the nutritional requirements and to guide first line nutritional management to patients and clients automatically. Also, it serves as an electronic medical and dietetic record, and personalised nutrition consultation approach can be planned even in the client's busy schedule. One to One approach is much more simplified and the client can converse to his/ her personal dietitian at their own convenient setting. The implementation once done would invite more and more queries for personalised nutrition support rather than depending on the set menu plans as in the case of current online approaches. Authenticity of the consultant dietitian would also be ensured by the responsible team providing nutrition support.

Methodology used: Cloud Computing

Paper 5: A DIET CONTROL AND FITNESS ASSISTANT APPLICATION USING DEEP LEARNING-BASED IMAGE CLASSIFICATION

Published date:2019

Author: Tianren Dong1, Yu Sun and Fangyan Zhang

Journal Name: CSCP

Summary: With more and more attentions paid on health, people begin to care about healthy diet options created by experts on nutrition. However, it will take a long time to observe the effects by taking healthy diet. This causes great difficulty for users to follow the healthy diet strictly. Most existing applications are not user-friendly in inputting information to the application. Then it becomes difficulty to track for exact health status. This paper proposes an android application which can be trained to recognize different kinds of food and facilitate the information input through phone camera using machine learning algorithms. Thus, nutritional information can be fed in application accurately.

Methodology Used: Machine learning, Image recognition

Paper 6: Smartphone Applications for Promoting Healthy Diet and Nutrition: A Literature Review

Published date: January 2016

Author: Steven S. Coughlin, Mary Whitehead, Joyce Q. Sheats, Jeff Mastromonico, Dale Hardy, Selina A. Smith

Journal Name: Jacobs J Food Nutra

Summary: Rapid developments in technology have encouraged the use of smartphones in health promotion research and practice. Although many applications (apps) relating to diet and nutrition are available from major smartphone platforms, relatively few have been tested in research studies in order to determine their effectiveness in promoting health. In this article, we summarize data on the use of smartphone applications for promoting healthy diet and

nutrition based upon bibliographic searches in PubMed and CINAHL with relevant search terms pertaining to diet, nutrition, and weight loss through August 2015.

Methodology Used: Bibliographic searches in PubMed and CINAHL with relevant search terms pertaining to diet, nutrition, and weight loss through August 2015.

Paper 7: An Intelligent Application for healthcare Recommendation using Fuzzy Logic

Published date:2019

Author: Nikahat Mulla, Swapnali Kurhade, Meghana Naik, Nida Bakereywala

Journal Name: IEEE

Summary: In the beginning of the application, the user has to sign-up with the application, where he/she has to put data regarding his height, weight, eating preferences, physical activity etc. After signing up, the application finds the membership value of the information such as age, BMI (which it calculates from the weight and height which the user inputs), physical activity and maps it to the output calorie function. The user must log in to the system where the user gets the information such as required total daily calorie intake, and the calories intake according to nutrients such as fats, proteins etc. The user also can keep the count of his/her daily steps so that on an everyday basis if his/her physical activity changes, the calorie intake should also change. For doing so the application uses the sensors in android studio which helps in detecting the user movements. This makes the application dynamic. The user can also update his profile as it changes.

Methodology Used: Fuzzy Logic:Min-Max algorithm

Paper 8: Smart-Log: A Deep-Learning based Automated Nutrition Monitoring System in the IoT

Published date: 29 August 2018

Author: Prabha Sundaravadivel, Kavya Kesavan, Lokesh war Kesavan, Saraju P. Mohanty, and Elias Kougianos

Journal Name: IEEE Transactions on Consumer Electronics

Summary: A correct balance of nutrient intake is very important, particularly in infants. When the body is deprived of essential nutrients, it can lead to serious disease and organ deterioration which can cause serious health issues in adulthood. Automated monitoring of the nutritional content of food provided to infants, not only at home but also in daycare facilities, is essential for their healthy development. To address this challenge, this paper presents a new Internet of Things (IoT)-based fully automated nutrition monitoring system, called Smart-Log, to advance the state-of-art in smart healthcare. For the realization of Smart-Log, a novel 5-layer perceptron neural network and a Bayesian network-based accurate meal prediction algorithm are presented in this paper. Smart-Log is prototyped as a consumer electronics product which consists of WiFi enabled sensors for food nutrition quantification, and a smart phone application that collects nutritional facts of the food ingredients. The Smart-

Log prototype uses an open IoT platform for data analytics and storage. Experimental results consisting of 8172 food items for 1000 meals show that the prediction accuracy of Smart-Log is 98.6%.

Methodology Used: Internet of Things (IoT), Deep-Learning

Paper 9: Intelligent SVM Based Food Intake Measurement System

Published date: 15-17 July 2013

Author: Parisa Pouladzadeh ,Shervin Shi Mohammadi ,Tarik Arici

Journal Name: 2013 IEEE International Conference on Computational Intelligence and Virtual Environments for Measurement Systems and Applications (CIVEMSA)

Summary: As people across the globe are becoming more interested in watching their weight, eating more healthily, and avoiding obesity, a system that can measure calories and nutrition in everyday meals can be very useful. Recently, due to ubiquity of mobile devices such as smart phones, Net books and tablets, the health monitoring applications are accessible by the patients practically all the time. A semi-automated food intake measurement application, running on a mobile device, could assist the patient to estimate his/her consumption calories. In this paper, to improve the accuracy of the current state of the art technologies, we have engaged color k-mean clustering along with color mean shift and texture segmentation schemes to get more accurate results in segmentation phase. Furthermore, the proposed system is built on food image processing techniques and uses nutritional fact tables. Via a special calibration technique, our system uses the built-in camera of such mobile devices and records a photo of the food before and after eating it in order to measure the consumption of calorie and nutrient components. The proposed algorithm extracts important features such as shape, color, size and texture. Using various combinations of these features and adopting computational intelligence techniques, such as support vector machine, as a classifier, accurate results are achieved which are very close to the real calorie of the food.

Methodology Used: SVM Based, AI

Paper 10: Diet monitoring and management of diabetic patient using robot assistant based on Internet of Things

Published date: 17-18 November 2017

Author: Shreejay Mall; Mansi Gupta; Rahul Chauhan

Journal Name: 2017 International Conference on Emerging Trends in Computing and Communication Technologies (ICETCCT)

Summary: This paper is presented to improve the eHealth care platform by using Robots which are connected through IoT for providing personalized multiple-care approach particularly to a diabetic patient. The architecture of this model is such that it makes use of Internet of Things for Disease Management Hub web-centric platform which is then wirelessly connected to the robot. The robot has a chain of capillary networks in it which contains medicals sensors and sensor for dietary monitoring of the diabetic patient and thus provides them with fully multidimensional-care. The architecture of software is built so simply that even a person with little knowledge of platform can develop various applications out of it. This is possible by using the multi-layer approach which is working on the principle of automatic service delivery and object virtualization.

Methodology Used: Using robot assistant based on Internet of Things

Comparative Statement: