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Survey on “Healthy Diet Recommendation System using Data Mining”

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ABSTRACT–We aim to utilize the recent advancement in technology to develop dietary as assessment solutions which is a more convenient approach to monitor daily food intake and control eating habits. Food, calorie and nutrition measurement system is very beneficial for peoples to measure and manage their daily food intake. Content based filtering will make recommendations based on the items that are of user’s interest or liked by them in the past. Collaborative filtering algorithm is used to recommend the food that the user may like. The recommended food and food in standard recipes set by user’s own situation are in the same cluster, which meets the user’s nutritional balance. We highlight the issue of selection of proper diet that must fulfill everyone’s nutritional requirements.

KEYWORDS–Healthy Diet, Data Mining, Collaborative filtering algorithm, Food recommendation.

I. INTRODUCTION

In today’s hectic world, the importance of diet management has increased exponentially. Due to unhealthy and haphazard eating habits, the spread of diet related diseases is at an all-time high. In India, more than 2 out of every 100 people suffer from diabetes, while 32 out of every 100 people suffer from coronary heart disease. There are a host of diet related applications and solutions available today. While the importance of balanced diet keeps on increasing, the variety of applications on display today still lack completeness. This application will help users structure their daily diet according to various individual factors which include BMI, allergies, diseases, etc.

II. PROBLEM DEFINITION

To develop a system that recommends an appropriate nutritional intake to its users based on their diet history and personal preferences and helps fulfill the daily dietary requirements of the user by taking various inputs and generating the menu accordingly.

III. LITERATURE SURVEY

1. Zhicai Yuan, Fang Luo “Personalized Diet Recommendation Based on K-means And Collaborative Filtering Algorithm” IOP Conf. Series: Journal of Physics: Conf Series 1213, 2019.

Zhicai Yuan, Fang Luo [1], This paper considers the user’s dietary preferences and nutritional balance needs to meet the user’s personalized dietary needs. Firstly, the k-means algorithm is used to divide the food cluster into independent clusters, and then it analyses the user’s diet records to find v neighbours whose dietary preferences are close to the target users’. Then, according to the standard recipe, it looks for foods with higher food recommendation values in the “cluster” as recommended foods. After experimental tests, it is verified that the recommended algorithm constructed in this paper can better meet the user’s personalized dietary needs.

Limitations:

Difficult to satisfy the needs of the user’s dietary preferences and nutrition at the same time [1]

2. Hao Jiang, Wenjie Wang, Meng Liu, Liqiang Nie, Ling-Yu Duan, Changsheng Xu “Market2Dish: A Health-aware Food Recommendation System” Proceedings of the 27th ACM International Conference on Multimedia October 2019.

Hao Jiang et.al [2] states that to assist individuals with creating smart dieting propensities, we present a customized wellbeing mindful food suggestion framework, called Market2Dish. Market2Dish could perceive the fixings in the miniature recordings taken from the market, portray the medical issue of clients from their online media accounts, and eventually suggest clients with the customized sound nourishments. In particular, we utilize a word-class communication based content order model to gain proficiency with the fine-grained comparability between meagre

wellbeing highlights on the web-based media stages and pre-characterized wellbeing ideas, and afterward a classification mindful various levelled memory network based recommender is acquainted with get familiar with the client formula connections for better food suggestions. Besides, we exhibit this framework as an online application for ongoing cooperation's with clients.

Limitations:

- Convolutional Neural Networks have high computation cost and need a lot of training data.
- For Bi-directional RNN an entire sequence must be available before we can make predictions.

3. Celestine Iwendi, Suleman Khan, Joseph Henry Anajemba Ali Kashif Bashir And Fazal Noor "Realizing an Efficient IoMT Assisted Patient Diet Recommendation System Through Machine Learning Model" IEEE access 2019

Celestine Iwendi et.al[3] proposed that a profound learning answer for well-being base clinical dataset that consequently distinguishes which food should be given to which patient base on the sickness and different highlights like age, sexual orientation, weight, calories, protein, fat, sodium, fiber, cholesterol. This examination system is centered around executing both machine and profound learning calculations like, smachine and deep learning algorithms like, logistic regression, naive bayes, Recurrent Neural Network (RNN), Multilayer Perceptron (MLP), Gated Recurrent Units (GRU), and Long Short-Term Memory (LSTM). The clinical dataset gathered through the web and clinics comprises of 30 patient's information with 13 highlights of various illnesses and 1000 items. Item area has 8 highlights set. The highlights of these IoMT information were investigated and further encoded prior to applying profound and machine and learning-based conventions. The presentation of different AI and profound learning procedures was conveyed and the outcome demonstrates that LSTM strategy performs in a way that is better than other plan concerning determining exactness, review, accuracy, and F1-measures.

Limitations:

- Naive-Bayes faces the 'zero frequency problem' where it assigns zero probability to a variable whose category in the test data set wasn't available in the training data set. Its estimation can be wrong in some cases.
- For RNN due to its recurrent nature the computation is slow and the training of RNN model can be difficult.

4. Romeshwar Sookrah, Jaysree Devee Dhowtal, Soulakshmee Devi Nagowah "A DASH Diet Recommendation System for Hypertensive Patients Using Machine Learning" 2019 7th International Conference on Information and Communication Technology (ICoICT)

Romeshwar Sookrah et.al [4] introducing Hypertension is turning into a genuine medical problem in the world. Individuals will in general have a bustling way of life and to receive unfortunate weight control plans. Because of helpless dietary patterns, the pace of Non Communicable Diseases (NCDs, for example, hypertension together with the pace of death brought about by such infections are rising. All together to advance good dieting propensities in Mauritius, the paper proposes a DASH diet recommender framework that suggests solid Mauritian eating regimen plans to hypertensive patients. The framework comprises of a proposal motor that utilizes procedures, for example, content- based separating alongside AI calculations to prescribe customized diet plans to hypertensive patients dependent on components, for example, age, client inclinations about food, hypersensitivities, smoking level, liquor level, circulatory strain level and dietary admission. The framework utilizes a versatile application which is helpful and snappy to utilize. In view of a review did, the application has assisted clients with controlling and diminish their BP level.

Limitations:

- It requires substantial food tracking and is not designed for weight loss.
- It may not be appropriate for everyone and is hard to maintain.

5. Ayob Ainaa Fatehah, Bee Koon Poh, Safi Nik Shanita, and Jyh Eiin Wong "Feasibility of Reviewing Digital Food Images for Dietary Assessment among Nutrition Professionals" online mdbp.com nov 2018

Ayob Ainaa Fatehah et.al[5] introducing Legitimacy of picture helped and picture put together dietary appraisal techniques depends with respect to the exactness of bit size assessment dependent on food pictures. Nonetheless, little is known on the capacity of nourishment experts in evaluating dietary admission dependent on advanced food pictures. This investigation plans to inspect the capacity of sustenance experts in checking on food pictures concerning food thing ID and bit size assessment. 38 nutritionists, dieticians, and nourishment specialists took an interest in this investigation.

Limitations:

- System could not accurately identify types of drinks and syrups used.
- System could not recognize size of plates and bowls.

6.Rung-Ching Chen;Yu-Hsien Ting;Jeang-Kuo Chen;Yu-Wen Lo “The nutrients of chronic diet recommended based on domain ontology and decision tree” International Conference on Technologies and Applications of Artificial Intelligence (TAAI) 2017

Rung-Ching Chen et.al [6] proposed as society creates and science and Innovation demonstrate, individuals have come to think more about a sound diet. Diet types have continuously changed and centered more on wellbeing the board. Taiwan is turning out to be a maturing society where people have sporadic ways of life, long haul undesirable eating regimens, distressing work, furthermore, constant sicknesses, for example, diabetes, hypertension, furthermore, elevated cholesterol. Be that as it may, most dietary recommendation frameworks can’t give dietary recommendations for patients with constant infections. However sound nourishments are suggested, the frameworks contain little data on whether supplements are in equilibrium. Consequently, this investigation developed an eating regimen recommendation framework for constant sicknesses utilizing master knowledge, which empowers more advantageous and exact dietary suggestions for ongoing sicknesses. In this study, we utilize a metaphysics, choice trees, and Jena to build the suggestion framework.

Limitations:

- Decision trees are unstable meaning that a small change in data can lead to large change in the structure of the optimal decision tree and the calculations can get very complex.

Recommender system would improve your organic process structure and lift your healthstandards. On the opposite hand, we tend to conjointly track user’s individual preferences. This method might advocate the related diet attempt to fulfill the personalizedneeds by the exploitation of association rule mining. So it’d give higher service andknowledge to users.

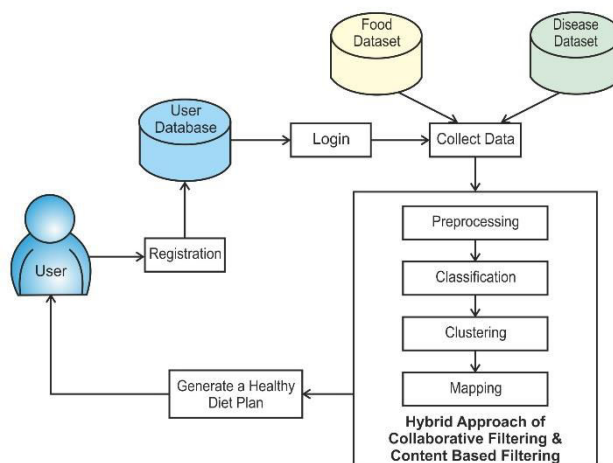


Fig.1 Block Diagram

In fig.1 Block Diagram of healthy diet recommendation system .In this system consist following steps are data Acquisition and Collection, Data Pre-processing, Information Filtering and Recommending Healthy Diet.

IV. ALGORITHM USED

1. Content Based Filtering Algorithm

Content based filtering is another approach to make recommendations. This method is used to recommend appropriate items to the users based on the user’s preferred profile. This type of filtering is mainly based on keywords. Those keywords were considered as the user’s interest. Content based filtering make recommendations based on the items that are of user’s interest or liked by them in the past. In the nutshell, this kind of filtering is used to recommend the items based on the ratings of user’s interests by comparing with the items in the collection.

2. Collaborative Filtering

Collaborative Filtering is the most common technique used when it comes to building intelligent recommender systems that can learn to give better recommendations as more information about users is collected. It looks for users who shares the same patterns with the active users. This technique is used to build the recommenders that gives the suggestions to the users on the bases of the likes and dislikes of the similarusers.

Collaborative Filtering Techniques are follows:



- i. User based filtering
- ii. Item based filtering

3. Hybrid Approach

The research in the field of Recommender systems results in a new approach called hybrid approach. The hybrid approach which combines the two techniques called Collaborative Filtering (CF) and Content-Based Filtering (CBF). This new approach can be implemented by making the predictions of two filtering and then combining them and then applying the functionalities of content based to collaborative method and vice versa or by combining them into a single model. The hybrid approach performs better and also provides accurate recommendations than the pure collaborative and content based method which was revealed by several studies. The common problems such as cold start and the sparsity problem were overcome by the hybrid approach.

V. CONCLUSION

With this system we can provide a user-friendly application that covers aspects like diseases, and menu generation along with providing nutritional information.

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