

Recommendation of Dishes Based on Flavor

Ritika Dhyani

M.tech CSE Student

Centre for Development Of Advanced Computing (CDAC)

Noida, INDIA

Sanjay Ojha

Assistant Professor, School of IT

Centre for Development Of Advanced Computing (CDAC)

Noida, INDIA

Abstract:- There are an assortment of nourishment proposal strategies dependent on client's inclinations, nutrition balance, or client's well being condition. Be that as it may, there is little examination on food recommendation considering flavor inclinations of every individual client, which is useful for a creation of recommendations for the dishes and to be generally welcomed by the client. Therefore, we propose a technique to suggest a dish along with the location of close by restaurant where the dish is available.

Keywords:- Food Recommendation, Flavor, Location, Preference, Hybrid.

I. INTRODUCTION

Wherever we go we always have a question like "What should we have for lunch or supper?" are regular inquiries we need to answer every now and then. While numerous recommender frameworks just attempted to coordinate clients' inclinations to music, film, or book areas, as of late they additionally have been applied in the nourishment space so as to offer solid responses to the above questions. For example, RecipeKey is a recipe recommendation framework that channels plans based on thinking about most loved ingredients, existing nourishment hypersensitivities, and item depictions (e.g., supper type, cooking, planning time, and so on.) picked by clients.

In connection to the nourishment utilization nowadays, it is perceptible that there has been an expansion of way of life related ailments, for example, diabetes and obesity, which are the reason of many ceaseless illnesses. This issue can be improved by applying suitable dietary. For this situation, nourishment recommender frameworks not just gain proficiency with clients' inclinations for ingredients and cuisines, yet additionally select sound nourishment by considering flavor that client need, medical issues, dietary needs, and past eating practices.

Seeing food as tasty is significant. It isn't sufficient essentially to tell individuals what is healthy on the off chance that they don't think those foods are additionally tasty as well. This recognition brings about individuals devouring food without respect for its consequences for their general well being. This thus requests for information and innovation to be joined with master information to control clients towards ideal well being and nourishment decisions.

One way to deal with the plan of recommender frameworks that has wide utilize is **Collaborative Filtering**. Collaborative oriented filtering depends on the suspicion that individuals who concurred in the past will concur later on, and that they will like comparative sorts of things as they loved before. The framework produces suggestions using rating profiles for each individual. They make recommendations by estimating peer customer/things ratings similar to the present client or thing.

Next approach while making a recommendation system is **Content-Based Filtering**. This strategy works on depictions of thing and customer's tendencies profile. These techniques are most appropriate to conditions where there is known constraints on a thing (area, portrayal, and so forth.), yet not on the client. Content-based recommenders treat proposal as a client explicit characterization issue and gain proficiency with a classifier for the client's preferences dependent on item includes. In this framework, keywords are used to depict the things and a customer profile is attempted to show the kind of thing this customer likes. Toward the day's end, these counts endeavor to endorse things that resemble those that a customer favored previously, or is investigating in the present. It doesn't rely on a individual sign-in component to produce this regularly impermanent profile. Specifically, various applicant are compared and items recently appraised by the individual and the most-coordinating items are prescribed. This methodology has its foundations in information retrieval and information filtering research.

Hybrid framework basically combines two or more techniques and hence provide advantage over the others by eliminating the disadvantages of individual technique. It can be implemented in many ways : By combining all techniques into a single model; or by taking individual technique's output as the input for another technique; or by separately applying the techniques and then joining their results to form a suitable recommendation.

II. MOTIVATION

First, First factor is Taste i.e., To recommend specific food to a user, based on their prior ordering history and sense of that user's taste, to reduce cognitive load. And secondly Location, as it will help in answering the questions like "Where should I eat now? or What's near me?". By considering the above two factors, it motivates me to build a recommendation system that performs better than existing systems.

III. LITERATURE REVIEW

In [1], the author exhibited a technique for Indian cuisine suggestion utilizing ingredients matching of cuisine and preferred food. For this they did web scrapping utilizing scrapy 1.5.1 framework and apply data preprocessing strategies in the gathered dataset. The gathered dataset has loads of highlights so they utilized feature extraction strategy and select a portion of the segment depending on which they performed recommendations. They at that point chosen the ingredient section of the dataset. Created bags of word for each recipe. They ranked other recipes in decreasing order of their similarity with the given recipe's keywords which in turn generated the cosine similarity matrix.

In [2], the author proposed a technique to prescribe a restaurant, the dishes of other regions depending upon flavor similarity among the territorial foods in China. Firstly the authors measure ingredient inclinations of a regional cuisine by TF-IDF (Term Frequency-Inverse Document Frequency) and afterward score the dishes of regional cuisines. Furthermore, the cosine similarity is utilized to register the flavor likenesses between regional cuisines. Thirdly, motivated by the Tidal-Trust algorithm, they composed the score of regional cuisine with the flavor similarity between local foods into a suggestion. The result of author's proposed method for the dishes suggested were that the 77% of the mean satisfaction of two professional chefs, and 75 percent of the rest respondents' satisfaction degree are all above 70%.

The author in [3] proposed a recommendation system based on item-component-item. In this paper they analyzed that most of the times user's inclination to an item is guided by the his/her inclination towards the component of an item. Also, it could be said that a user have dissimilar significance importance for various constituents. The author first normalized the user rating. Then obtained the normalized ingredient rating of the corresponding recipes. Then the author estimated the importance of each ingredient and at last weighted integration scheme is given to estimate rating for an unknown recipe.

In the paper[4], the author investigated the task of combining real time logs of GPS, check-in histories for building a restaurant recommendation system. The author proposed a recommendation system based on individuals' present geospatial location, check in histories of user, and time at which recommendations is requested. Here to find out users' visiting trends, food preferences, and admiration of a restaurant, check in histories of individual user is analyzed. Also the recommendation score of each restaurant is calculated using restaurant operation time as well as the distance between the restaurant and the user's current location. Basically the four factors that contributed in calculating recommendation score are : First is user's preference score; Second is time of day; Third is distance of restaurant; and lastly popularity of the particular restaurant.

In this work[5], the author surveyed and evaluated the previous year research paper till 2015, September. They took food, nutrition, diet as the core for their survey. It is found that

most of the systems are based on Content Based approach and also data mining technique is used in this domain. They listed out the challenges and outcomes of the different recommendation techniques.

IV. PROPOSED APPROACH

Proposed Food Recommendation System will going to recommend dishes based on the flavor that a particular user have craving for, also at his location.

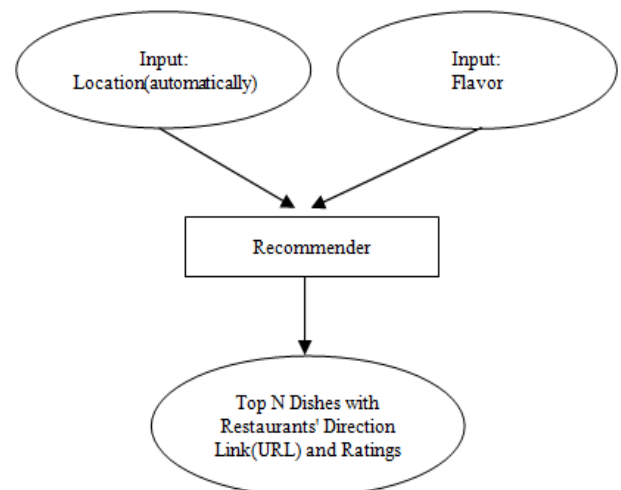


Fig 1:Basic Framework

It enhances personalized experience of each user by utilizing the preference information (flavor) and generates better recommendations.

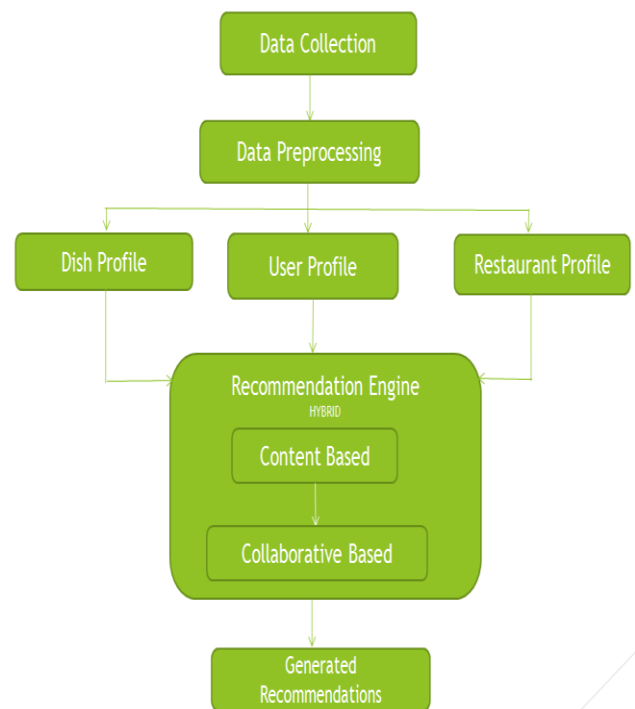


Fig 2: Proposed Approach

- Data Collection : Most of the data will be collected from zomato api and by doing web scraping.
- Data Preprocessing : As the dataset will contain columns that are not related to our work so we will remove such columns, we will normalize the user rating collected in a particular scale etc
- Dish Profile : It stores the dish related constraints like name, ingredients, flavor etc for each dish.
- User Profile : It stores the information regarding each individual user like name, past preference for each flavor, user ratings, current location etc.
- Restaurant Profile : It contains restaurant's information like name of the restaurant, restaurant rating, location etc
- Recommendation Engine : Hybrid Recommendation model will be created using two approaches in a sequential order i.e., Content Based Filtering and Collaborative Filtering. The resulting weighted recommendation score will be generated.
- Generated Recommendation : The various recommendation scores are compared and the top N (Here N =5) recommendations of dishes alongwith restaurants' details will be produced as suggestions to the user.

V. IMPLEMENTATION

1. Dataset used for Implementation:

- Dataset is collected by doing web scraping using tool PARSEHUB from ZOMATO website (for location NOIDA SEC-62, Indrapuram & Connaught Place in INDIA).
- Dataset consist of 1425 Dishes from 28 Restaurant including restaurant details like name, rating, type, location, open and closing time .
- For each restaurant, dish profile is extracted along with the dish name, category, type.

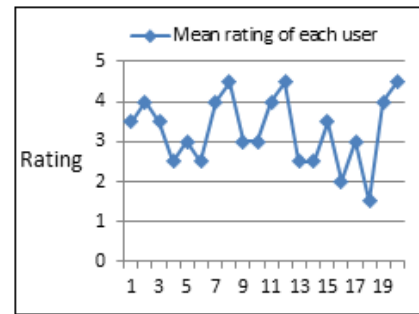
2. Calculating Similarity Matrix

- In Content based approach, We have used cosine similarity function to find the similar dish for the dishes that user liked in the past.
- In Collaborative approach, We have used the pearson correlation function by visualizing the past rating history of the particular user and then finding the most similar dish.

VI. RESULT ANALYSIS

Performance Evaluation: By User Satisfaction

- In order to assess the effectiveness of the method, 20 users were invited to participate who have used the application for 2 days.
- Top 10 dishes were recommended by using hybrid approach and they were asked to rate their satisfaction from 0 to 5 (feedback screen).
- The below graph shows that the 70% of the user has given the rating 3 or above which is quite a positive feedback.



Limitations

- The research output is based on the data quality. For more structured data it will provide better recommendations.
- As the Indian dishes are the combination of variety of flavors, this system does not consider such scenario.

VII. CONCLUSION AND FUTURE WORK

In this paper, We proposed a food recommendation approach that will take flavor in account and may give better suggestions. Basically, we work on flavor namely, Sweet, Salty, Spicy, Bitter.

The Existing Food Recommendation do not include the constraint of flavor. They simply recommend the food items based on past preferences which is not sufficient to provide personalized recommendations. . Without using the flavor importance, it might happen that somebody wants to eat something zesty ,yet because of absence of flavor labeling he/she probably won't have the option to discover something as per his state of mind at his area And most of the systems are based on Content Based Approach and Collaborative Filtering Approach .So, there is clearly scope for other approaches as well. Also there is wide variety of flavor on which more research needs to be done.

REFERENCES

- [1]. Nilesh, Dr Madhu Kumari, Pritam Hazarika, Vishal Raman, "Recommendation of Indian Cuisine Recipes based on Ingredients", IEEE 35th International Conference on Data Engineering Workshops (ICDEW), China, 2019, pp. 96-99.
- [2]. Xuehui Mao, Shizhong Yuan, Weimin Xu, Darning Wei, "Recipe Recommendation_Considering the Flavor of Regional Cuisine", International Conference on Progress in Informatics and Computing (PIC), Dec, 2016, pp. 32-36.
- [3]. Zemeng Feng, Yuchen Jing, Dan Wang, Hongjia Zhang, Cheng Zhang," A Recommendation Scheme by User Preference to Components," 2015 IET International Radar Conference, Oct , 2015, pp. 1-5.
- [4]. Md. Ahsan Habib, Md. Abdur Rakib, Muhammad Abul Hasan, "Location, Time and Preference Aware Restaurant Recommendation Method", 19th International Conference on Computer and Information Technology (ICCIT), 2016

- [5]. Akshi Kumar, Pulkit Tanwar, Saurabh Nigam , " Survey and Evaluation of Food Recommendation Systems and Techniques" , 3rd International Conference on Computing For Sustainable Global Development (INDIACom), New Delhi, 2016, pp. 3592-3596.
- [6]. Y.Y. Ahn, S.E. Ahnert, J.P. Bagrow, and A. Barabasi, "Flavor network and the principles of food pairing," Scientific Reports, vol. 1, pp: 196-197, 2011.
- [7]. R. Burke, "Hybrid recommender systems: Survey and experiments", User Model. User-Adapted Interact., vol. 12, no. 4, pp. 331-370, 2010
- [8]. Kadowaki, T. Yamakata, Y. Tanaka, "Situation-based food recommendation for yielding good results", IEEE International Conference on Multimedia & Expo Workshops (ICMEW), 2015, pp. 1-6.
- [9]. Ueda, Mayumi, Syungo Asanuma, Yusuke Miyawaki, and Shinsuke Nakajima. "Recipe recommendation method by considering the users preference and ingredient quantity of target recipe." In Proceedings of the International MultiConference of Engineers and Computer Scientists, vol. 1, 2014, pp. 12-14.
- [10]. Toledo, Raciél Yera, Ahmad A. Alzahrani, and Luis Martínez,"A Food Recommender System Considering Nutritional Information and User Preferences " , in *IEEE Access, Vol 7* ,pp. 96695-96711, 2019.
- [11]. Freyne, Jill, and Shlomo Berkovsky, "Recommending food: Reasoning on recipes and ingredients“, In Proceedings of International Conference on User Modeling, Adaptation, and Personalization, pp. 381-386, 2015.
- [12]. Bundasak, Supaporn. "A healthy food recommendation system by combining clustering technology with the weighted slope one predictor." In Proceedings of International Electrical Engineering Congress (iEECON), pp. 1-5, 2017.
- [13]. Ge, Mouzhi, Francesco Ricci, and David Massimo, "Health-aware food recommender system." In Proceedings of the 9th ACM Conference on Recommender Systems, pp. 333-334. 2015.