



Indian Cuisine Recipe Recommendation based on Ingredients using Machine Learning Techniques

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Abstract: There are plenty of different types of Indian delicacies available with the same ingredients. In India, traditional recipes are varied due to the locally available spices, vegetables, fruits & herbs. In this paper, we purposed a way that recommends Indian recipes based on readily available ingredients and popular dishes. In this task, we perform a web search to create a collection of recipe types and apply a content-based approach to machine learning to recommend recipes. This system provides Indian food recommendations based on ingredients.

Keywords: Machine Learning, content-based, bag-of words, NLP, Indian cuisine, Web scraping, Recommendation System

1. INTRODUCTION

MOTIVATION

We are motivated from the existing system where user can think of only the recipes which are introduced to him through cookery shows, recipe books mothers/grandmas or according to his cooking experience or dining experience.

PROBLEM STATEMENT

To provide personalized territorial Indian cuisine experience to user. Thus, we introduce the Location Based Recommendation of Indian Cuisine Recipes based on Ingredients using Machine Learning Techniques. In cooking, a set of ingredients composes a particular dish. Ingredients are the main substances that determine the taste or flavour of the dish. Here for the given ingredients recipes one can make is limited to his cooking

knowledge. It is hard to think what to prepare with limited ingredient that in the kitchen. To overcome this hurdle, it is necessary to expand the data on the feature value of automation and analyse it.

2. LITERATURE SURVEY

[1] Optimization Framework for Flavour and Nutrition Balanced Recipe: A Data Driven Approach.

Author: Isura Nirmal, Amith Caldera, Roshan Dela Bandara

Description: Food has been playing a major part of human civilization as not only being a physiological need, but being a major factor for defining the culture and society. The choice of the food is mainly depended on both flavour and nutrient but the biasness towards to the flavour factor has lead the human to effect badly on their healthier lifestyle. Recipe recommendation literature typically considers either flavour or nutrient factor. Various flavour traits are also preventing the promotion of healthy foods while maintaining the pliability. Our data driven flavour and nutrient optimization framework consists of classification model which achieved 79.546 % prediction accuracy when detecting the cuisine, generalized flavour recommendation approach and personalized nutrient recommendation approach when deciding the optimization task.

[2] Cuisine classification using recipe's ingredients.

Author: S. Kalajdziski, G. Radevski, I. Ivanoska, K. Trivodaliev

Description: The purpose of this paper is to explore the linkage between recipe's ingredients and identification of a cuisine. This has been tackled as a problem of cuisine classification. We will examine various approaches (different machine learning algorithms) for recipes classification based on the recipe's ingredients. The output will be the Recommendation of the classification methodology, i.e. what kind of pre-processing can be done to improve the Classification and the performance of several classifiers on the dataset we will be using.

[3] You Are What You Eat: Exploring Rich Recipe Information for Cross- Region Food Analysis.

Author: Weiqing Min, Bing-Kun Bao, Shuhuan Mei, Yaohui Zhu, Yong Rui,

Fellow, IEEE, and Shuqiang Jiang

Description: Cuisine is a style of cooking and usually associated with a specific geographic region. Recipes from different cuisines shared on the web are an indicator of culinary cultures in different countries. Therefore, analysis of these recipes can lead to deep understanding of food from the cultural perspective. In this paper, we perform the first cross-region recipe analysis by jointly using the recipe ingredients, food images, and attributes such as the cuisine and course (e.g., main dish and dessert). For that solution, we propose a culinary culture analysis framework to discover the topics of ingredient bases and visualize them to enable various applications. We first propose a probabilistic topic model to discover cuisine-course specific topics. The manifold ranking method is then utilized to incorporate deep visual features to retrieve food images for topic visualization. At last, we applied the topic modelling and visualization method for

three applications: 1) multimodal cuisine summarization with both recipe ingredients and images, 2) cuisine-course pattern analysis including topic-specific cuisine distribution and cuisine-specific course distribution of topics, and 3) cuisine recommendation for both cuisine-oriented and ingredient-oriented queries.

[4.] Recommendation of Indian Cuisine Recipes Based on Ingredients.

Author: Prof B.B.Gite, Aarti Nagarkar, Chaitali Rangam

Description: The Recipe Recommendation Program for Indian Cuisines is a program that learns from the past tastes of a user's favourite recipes to recommend a fresh, untested cuisine. The basis of the recommendation is the ingredients that the user has already liked in the recipes. India's traditional cuisine has been largely refreshing owing to its impressive use of herbs and tastes. Indian cuisine is renowned for its broad variety of dishes. The cooking style moves from the city to the district and is usually divided into South Indian and North Indian cuisine. India is very much praised for its variety of multi-foods. Accessible in various and inn resorts, suggestive of unity in a number of ways. The staple food in India involves maize, rice, and chana (Bengal Gram) heartbeats. That are the most important. At present, there has been a great deal of improvement in the Indian sense of taste. Bengali cuisine is exciting because of its excellent usage of panch photon, a word used to apply to the five essential flavours, to be a common mustard. Fenugreek seed, cumin seed, aniseed seed, and black cumin crop. Likewise, other dishes from all over the world are a mix of flavours that nourish taste buds.

[5] Personalized Search over Encrypted Data with Efficient and Secure Updates in Mobile Clouds.

Author: Xuehui Mao, Shizhong Yuan, Weimin Xu

Description: There are a variety of recipe recommendation methods based on user's preferences, nutrition balance, or user's health condition. However, there is little study on recipe recommendation considering flavour preferences of regional cuisines, which is helpful for a restaurant to plan on launching dishes from other regions, and to be well received by the local people. Therefore, we propose a method to recommend a restaurant the dishes of other

regions in terms of flavour similarity among the regional cuisines in China. Firstly, we quantify ingredient preferences of a regional cuisine by TF-IDF (Term Frequency-Inverse Document Frequency) and then score the dishes of regional cuisines by ingredients preference. Secondly, the cosine theorem is used to compute the flavour similarities between regional cuisines. Thirdly, inspired by the Tidal-Trust algorithm, we compose the score of regional recipes and the flavour similarity between regional cuisines into a recommendation. Lastly, the top N dishes of other regions are recommended to a restaurant. The results of our questionnaire evaluation for the dishes recommended using the proposed method were that the mean satisfaction degree of two professional chefs is 77%, and the satisfaction degrees of 75 percent of the rest respondents are all above 70%.

3. OBJECTIVES

- To building a proficient system to determine & recommend a recipe based on the preferred ingredients & location.
- To develop a system that recommends recipe similar to favourite recipes of user.
- To develop a web-based system.

4. PROPOSED SYSTEM

The proposed system is web-based application. For this we will do web scraping to make the database of Indian cuisine and collect information all about the all-cuisine recipes and used ingredients. The dataset will be collected by web scraping which is pre-processed on the basis attributes. The project is recipe recommendation system by using Content Based Filtering Algorithm. In this system we will be using cosine similarity to find out the similarities between recipes and user input. After finding the similarity we will be proving the result to the user. This application is extremely handy and useful for cooking variety of recipe with minimum search effort from internet. It will help people to save their time and energy in finding recipes for daily routine as well as for special occasions.

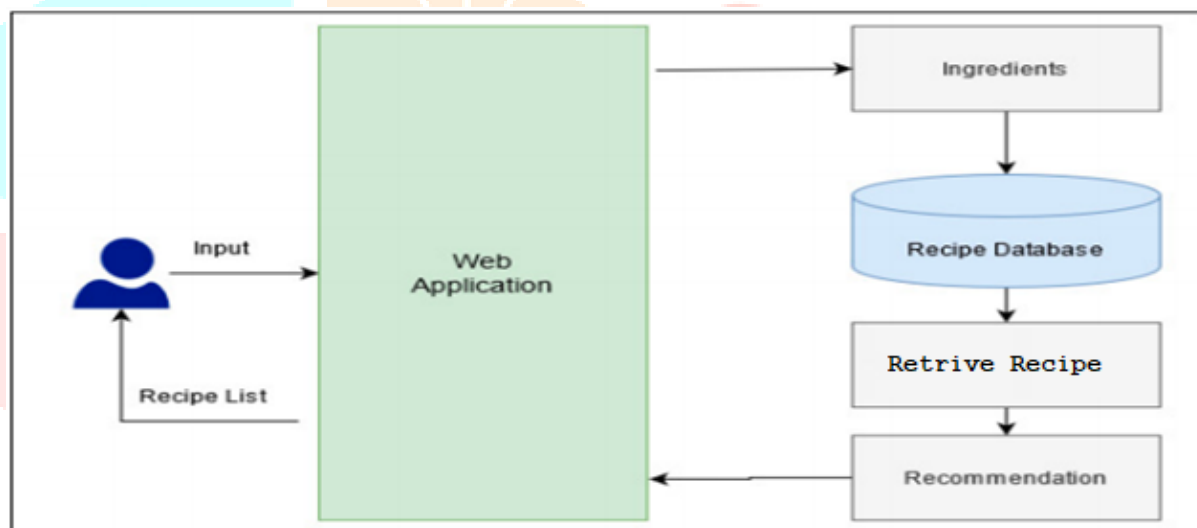


Figure1.1 : System Architecture

We propose web-based application recommendation system by adding more heterogeneous information of recipes like ingredients, cuisines, preparation method, diet, preparation time etc.

In this system there will be three main modules,

1. User - In this user get registered with system.
2. Web Application - In this user can add ingredients and search recipe they want or put recipe name and get the list of similar recipes they were looking for.
3. Admin - Admin will manage the dataset.

5. CONCLUSION

The recommendation system suggested in this paper aims at providing recipe recommendation based on the ingredients. If a user gives input of a particular ingredients, recipe containing similar ingredients will be recommended to him. Recommendation systems are widely used for user-based personalization. It helps in searching for reliable and relevant information. While simple recommendation systems recommend users based on a few parameters, complex ones take many parameters into consideration. Machine learning in recommender systems helps to improve user experience. The paper also suggests proposed approach for future work.

6. FUTURE SCOPE

It will be possible in future that enhance the food recommendation by using collaborative filtering, hybrid approach and web crawling methods where the extracted meta-data is more. Future improvements could include making suggestions based on the geographical location where the cuisine originated, or based on the particular chef whose dishes the user likes. The system could also leverage the user's location to suggest specialty dishes found in nearby restaurants. Furthermore, the approach could be comparable with more advanced algorithms.

7. REFERENCES

- [1] Wang, Haoyu, et al. (2018) "A Stock Recommendation System Using with Distributed Graph Computation and Trust Model-Collaborative Filtering Algorithm." 2018 2nd IEEE Advanced Information Management, Communicates, Electronic and Automation Control Conference (IMCEC). IEEE
- [2] Thakkar, Priyank, et al. "Combining -Based and Item-Based Collaborative Filtering Using Machine Learning." Information and Communication Technology for Intelligent Systems. Springer, Singapore, 2019. 173-180.
- [3] Pereira, Nymphia, and Satishkumar L. Varma. "Financial Planning Recommendation System Using Content-Based Collaborative and Demographic Filtering." Smart Innovations in Communication and Computational Sciences. Springer, Singapore, 2019. 141-151
- [4] Pereira, Nymphia, and Satish kumar L. Varma. "Financial Planning Recommendation System Using Content-Based Collaborative and Demographic Filtering." Smart Innovations in Communication and Computational Sciences. Springer, Singapore, 2019. 141-151
- [5] Qian, Yongfeng, et al. "EARS: Emotion-aware recommender system based on hybrid information fusion." Information Fusion 46 (2019): 141-146. [6] Kolla, Bhanu Prakash, and Arun Raja Raman. "Data Engineered Content Extraction Studies for Indian Web Pages." Computational Intelligence in Data Mining. Springer, Singapore, 2019. 505-512
- [7] Patel, Ankit Dilip, and Yogesh Kumar Sharma. "Web Page Classification on News Feeds Using Hybrid Technique for Extraction." Information and Communication Technology for Intelligent Systems. Springer, Singapore, 2019. 399-405

- [8] Goswami, Saptarsi, et al. "A review on application of data mining techniques to combat natural disasters." *Ain Shams Engineering Journal* 9.3 (2018): 365378.
- [9] Zhao, Rui, and Kezhi Mao. "Fuzzy bag-of-words model for document representation." *IEEE Transactions on Fuzzy Systems* 26.2 (2018): 794-804.
- [10] Sang, Jitao, Ming Yan, and Changsheng Xu. "Understanding Dynamic Cross OSN Associations for Cold-start Recommendation." *IEEE Transactions on Multimedia* (2018). [11] Khan, Sadik, Yashpal Singh, and Kalpana Sharma. "Role of Web Usage Mining Technique for Website Structure Redesign." *International Journal of Scientific Research in Computer Science, Engineering and Information Technology* 3.1 (2018)
- [12] Logesh, R., and V.Subramaniya swamy. "Exploring Hybrid Recommender Systems for Personalized Travel Applications." *Cognitive Informatics and Soft Computing*. Springer, Singapore, 2019. 535-544. [13] Sun, Y., Fang, M. and Wang, X., 2018. A novel stock recommendation system using Guba sentiment analysis. *Personal and Ubiquitous Computing*, 22(3), pp.575-587.

