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Recipe Recommendation Systems: A Review

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Abstract:-*The paper proposes a goal-oriented recipe recommendation system that utilizes information about nutrition on the internet. Entire world is associated and distinctive clients of various nations are sharing a large number of new recipes on the web, with the dominance of web. Thus, subsequently clients don't know about the every one of the recipe on the web. Recipe contains diverse ingredients, cooking procedure, categories and so on. Along these lines, we think the recipe is conglomeration of the unique heterogeneous elements. In this paper we will review various papers on recommendation system like content based recommending, Collaborative filtering.*

Keywords*:Reciperecommendation, Recommender systems, Content based filtering, Collaborative filtering,*

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I. Introduction

A recommendation system is an information filter system when the information is overloaded by narrowing down the amount of information to only those interesting content. The recommender system is useful in filtering wide range of information of products, services, or media content. However, to filter the right information to the customer is a challenging issue.Normal people usually have three meals a day. For each meal, there are two important questions to answer which are "what kind of food to eat?" and "Where can we find such meal?". Although food is essential to our life, answering the same questions repeatedly is way too boring. It would be helpful to have someone picking our favorite food or new dish to try out for all our meal in the future. This helper could be developed as a food recommendation system.

II. Literature Review

2.1 Automatic Generation of Recipe Recommendation Based On Outlier Analysis

In this study they have developed a dietary recommendation system based on ontology and machine learning. The System Can Recommend recipes based on user's health conditions and preference. In this paper they added one class SVM based ODM and a RGM in our system.Theroticallyinfinitly number of new recipes can be generated by using the RGM based on existing ones, and some of the generated recipes can be recommended to user if they can pass the evaluation of ODM.

2.2Yum-me: Personalized Healthy Meal Recommender System

In this project, they propose Yum-me ,a novel healthy meal recommender that makes health meal recommendation catering to users fine grained preference.They further represent FoodDist, a-best-of its kind unified food image analysis model. The user studies and benchmarking results demonstrate the effectiveness of yum-meand superior performance of FoodDist model.

2.3.Automatic Recipe Metadata Generating method by considering User's Various Moods:

In this paper the presented an automatic recipe metadata generating method for cooking recipe recommendation system that considers users various moods. Our system generates the metadata using the similarities between the feature vector of master recipes and feature vector of target unlabeled recipes.We will be developing the prototype model to evaluate the accuracy of recommended recipes that will consider the five aspects of users mood, in future work.

III. Recommender Systems

A recommender system is an Information Filtering (IF) system that provides personal pref- erence guide based on the user profile and preferences.

3.1 Content-based Filtering

Information filtering (IF) differs from Information Retrieval (IR) in the way that user interests are presented. Instead of allowing user lookup information using a query, an IF system attempts to model the user's long-term interests and suggest relevant information to the user.Content-based filtering methods, based on item description, considers user preferences according to the user profile. A content-based algorithm stores the users preferences such as interests to provide recommendations.

Content-based filtering considers user history in order to match the history to the predicted future interest of the user for recommendations. Based on the algorithm considered, user preferences can be represented by weighted vectors and then compared to completed document dataset in order to retrieve most relevant documents. Bayesian classifiers, cluster analysis, decision trees, or artificial neural networks are methods to calculate weights and classify items to user preferences.

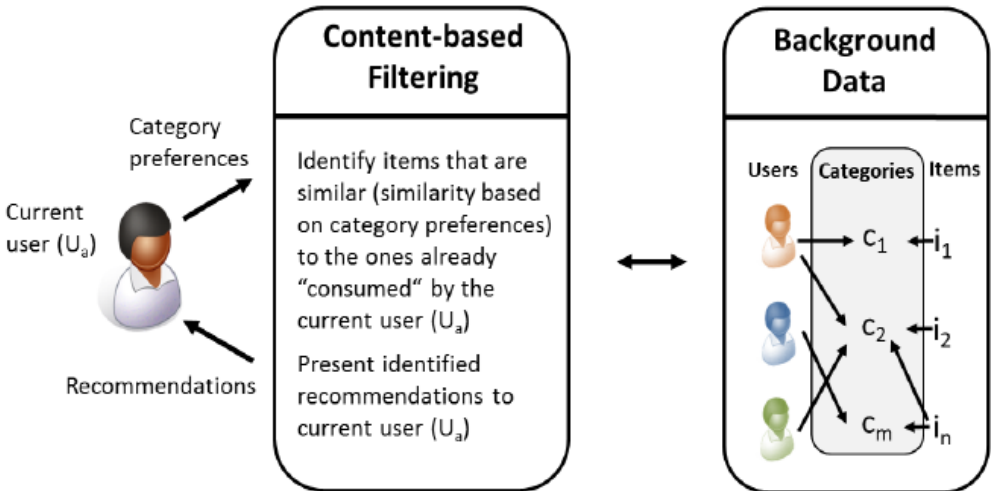

Image 3.1 Content based filtering

3.2 Collaborative Filtering

The collaborative filtering method considers user preferences such as ratings, behaviors, or reviews to provide a filter for user preference information. Collaborative filtering systems are often classified as memory-based (user-based) or model-based (item-based). A memory- based collaborative filtering approach predicts item ratings based on all ratings given by various users for an item. Collaborative filtering algorithms can be applied to any domain, as the algorithm considers explicit user feedback in the form of ratings. K- Nearest neighbors, Pearson Correlation Coefficient are two of the approaches used to predict nearest relevance to the user.

User profile information is obtained through explicit or implicit feedback. Implicit feedback is obtained when the system automatically analyzes the user behavior based on factors such as browsing history, viewed items, and purchases made. Explicit feedback is also obtained by user ratings and reviews explicitly given by the user contributing to user's feedback for constructions of the user's profile.

However, collaborative filtering has a 'cold start' problem. Similarities between users change needs to be determined when new ratings are posted. The new recommendations are determined using all old and the new modified data discarding the previously calculated recommendations. Therefore, the system must be constantly updated. Another problem with collaborative filtering is scarcity of data. A majority of items may not be rated by the user resulting diminished performance.

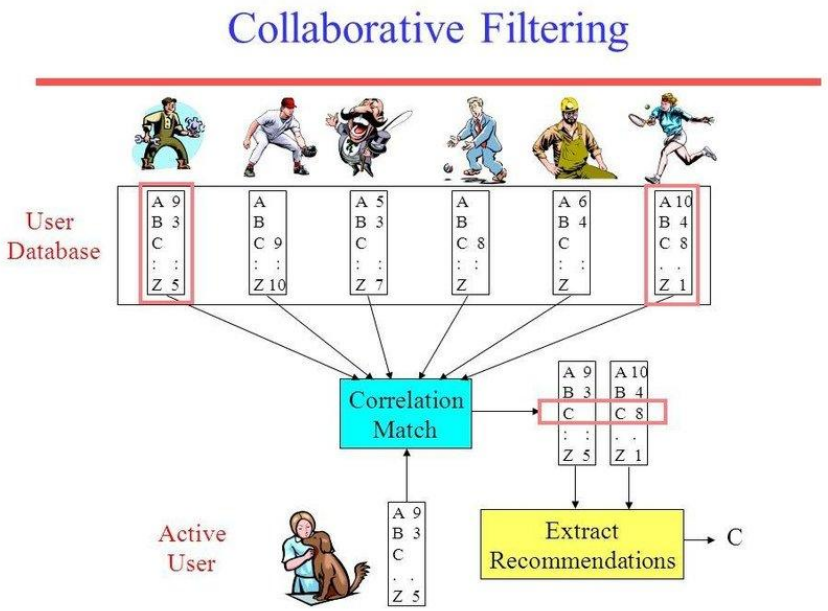

Image 3.2 Collaborative Filtering

IV. Proposed Approach

4.1 User Recommendations based on RecipeIngredients

Recipe ingredients are used to calculate user ingredients in recipe ingredients based recommendation approach.

The user and recipe vectors are constructed based on ingredients as orthogonal terms, or the dimension of the vectors.

A high-level overview of recipe ingredient based recommendation approach is stated in the following figure.

- Extract all recipe ingredients from recipe data.
- Obtain unique ingredient terms with corresponding quantities. Ingredients should be spitted into two sets. For example, ingredients separated with and/or/instead are split into unit set ingredients. Quantity associated with ingredients for the recipes are considered as the frequency of ingredients occurrence in the recipe.
- Frequencies from all recipes as terms and quantities will be constructed as inverted index.
- Calculate maximum ingredient frequencies of the recipes, and the total number of recipes.
- Display all recipes based on ingredients

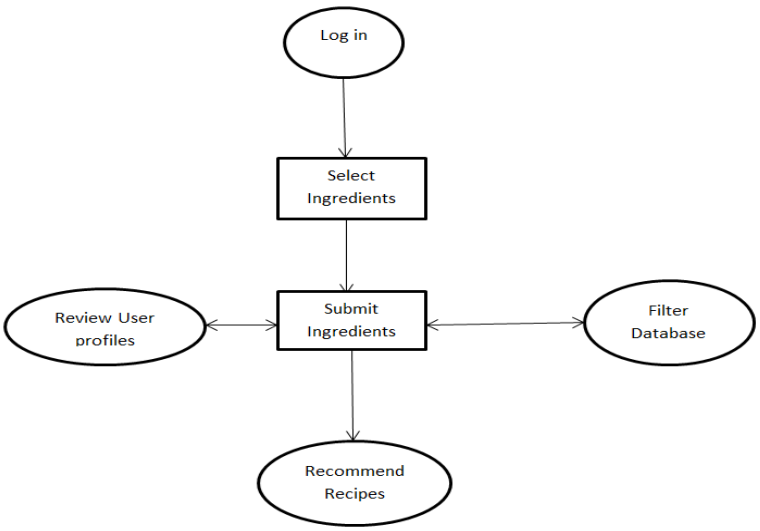

Fig 3.1: Workflow for Ingredient-based Recommendation Approach

4.2 Experimental setup

A high-level overview of the experimental setup is shown in figure following data from www.allrecipes.comwascrawled and stored in the local dataset in order to perform the experiments .The complete dataset was randomly split into twoparts such that 70% of the data was in the training set and 30% was in the test. The training set was given to the algorithm to provide recommendations, and then the training set was evaluated across the test data sets to give recommendation results.

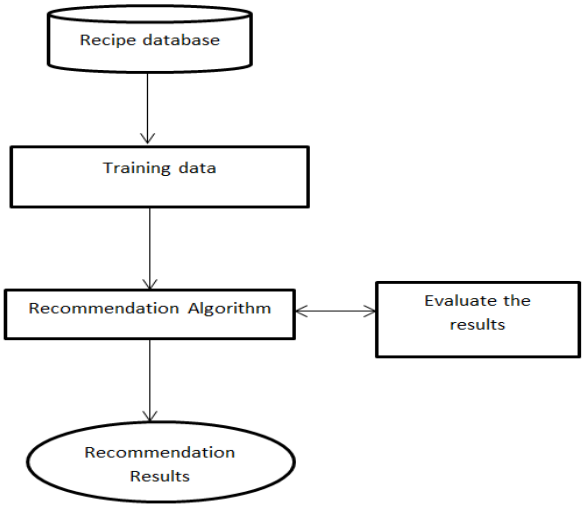

Fig 3.2- Experimental setup

V. Conclusion

In this study we have discussed research paper on recipe recommendation. The review of these papers suggests that some of the recommendation systems have flaws and other have been better at some results. The paper also suggests proposed approach for future work. Collaborative filtering and content based filtering are widely used for recommendation systems.

References

[1] Agarwal, C. C., Wolf, J.L., Wu, K., and Yu, P.S.(1999).Horting Hatches an Egg: A New Graph-theoreticCollaborativeFiltering. In Proceedings of the ACM KDD'99 Conference. San Diego, CA. pp. 201-212

[2] Basu, C.,Hirish,H.,and Cohen, W.(1998).Recommendation as classification: Using Social and Content based Information in Recommendations.

[3] Karypis,G.(2000).Evaluation of Item-Based Top-N Recommendation Algorithms. Technical Report CS-TR-00-46, Computer Science Department, University of Minnesota.

[4] Adomavicius G, Tuzhilin A. Towards the next generation of recommender systems: A survey of the state-of-the-art and possible extensions. IEEE Trans. on Knowledge and Data Engineering, 2005,17(6):734 749. [doi: 10.1109/TKDE.2005.99]

[5] Ricci F. Mobile recommender systems. Int'l Journal of Information Technology and Tourism, 2011,12(3):205-231.

[6] Sarwar,Badrul; Karypis,George; Konstan,Joseph; Riedl,John (2001). Item-based collaborative filtering recommendation algorithms[J]. Proceedings of the 10th international conference on the World Wide Web (ACM): 285–295.

[7] M. A., Ghazanfar and A. Prugel-Bennett, "A scalable, accurate hybrid recommender system". Proceedings of the 2010 Third international conference on Knowledge Discovery and Data Mining, pp. 94-98, 2010.

[8] Gunawardana and C Meek, "A unified approach to building hybrid recommender systems". Proceedings of the third ACM conference on Recommender Systems, pp. 117-124, 2009.

[9] LI Gai,LI Lei. Collaborative filtering algorithm based on matrix decomposition [J]. CEA, 2011, 47(30): 4-7.

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