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Applying Artificial Intelligence Techniques for Devising Recommendation System

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Abstract: ***Recommendation System filters the information from large data source by recommending or predicting the interest of the user. This have become fundamental applications in electronic commerce and information access, providing suggestions that effectively prune large information spaces so that users are directed toward those items that best meet their needs and preferences. The most popular domains where recommendation is done are: movies, music, search queries, social tags, and products in general. However, there are also recommender systems for experts, jokes, restaurants, financial services, life insurance and Twitter followers. Our project mainly focuses on domain called Food. Where, food can be recommended either based on text mining or by using artificial neural networks. In text mining, the user writes the query and recommendation is done on the basis of that given query. In artificial neural networks, recommendation is done by entering area or dish. In this project use of artificial neural networks as the core prediction function of a recommender system. In the past, ANNs have mainly concentrated on using collaborative-based filtering.***

Keywords: Recommender System, Artificial Intelligence, Filtering, Content based, Collaborative, Hybrid

1. Introduction

To filter the information from large data source by recommending or predicting the interest of the user. This recommendation technique can be done using content based, collaborative based or by using hybrid approach. If only single technique is used it will have some time constraint. As, recommendation system is real time, so time constraint is very important.

Recommendation System filters the information from large data source by recommending or predicting the interest of the user. This have become fundamental applications in electronic commerce and information access, providing suggestions that effectively prune large information spaces so that users are directed toward those items that best meet their needs and preferences. The most popular domains where recommendation is done are: movies, music, news, books, research articles, search queries, social tags, and products in general. However, there are also recommender systems for experts, jokes, restaurants, financial services, life insurance and Twitter followers. Our project mainly focuses on domain called Food. Where, food can be recommended either based on text mining or by using artificial neural networks (ANNs). In text mining, the user writes the query and recommendation is done on the basis of that given query. In artificial neural networks, recommendation is done by entering area or dish. In this project use of artificial neural networks (ANNs) as the core prediction function of a recommender system. In the past, ANNs have mainly concentrated on using collaborative-based filtering. But collaborative based filtering suffers from some drawback. This drawback is nullified by adding content-based filtering. In this way , network topology alter , which itself affects the accuracy of the recommendations generated. In particular, we investigate a mixture of experts topology. And hence creation of two expert clusters in the hidden layer of the ANN, one for content-based data and another for collaborative-based data. Due to this the number of connections between the input and hidden layers reduces significantly. This new experimental evaluation shows that this new architecture produces the same accuracy of recommendation as the fully connected configuration. Due to this large decrease in the amount of time it takes to train the network. This decrease in time is a great advantage because of the need for recommender systems to provide real time results to the user.

2. Literature Survey

1) A mobile cooking recipe recommendation system with food ingredient recognition

In this demo, we demonstrate a cooking recipe recommendation system which runs on a consumer smart phone. The proposed system carries out object recognition on food ingredients in a real-time way, and recommends cooking recipes related to the recognized food ingredients. By only pointing a built-in camera on a mobile device to food ingredients, the user can obtain a recipe list instantly. The objective of the proposed system is to assist people who cook to decide a cooking recipe at grocery stores or at a kitchen. In the current implementation, the system can recognize 30 kinds of food ingredient in 0.15 seconds, and it achieved the 83.93% recognition rate within the top six candidates.

2) Food Recommendation System Using Sequential Pattern Mining

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In this paper, we studied a sequential pattern mining-based food recommendation system. The purchase history of users is analyzed to find their sequential patterns using SPADE algorithm [5]. These patterns are then used to predict the next possible purchase. One of these patterns will be shown as a special offer with discount. The proposed approach is experimented on real transaction data. It demonstrate that the proposed system effectively improves the efficiency for mining sequential patterns, increases the user-relevance of the identified sequential patterns, and most importantly, generates significantly more accurate next-items recommendation for the target users.

3) **Hybrid Collaborative Filtering and Content-Based Filtering for Improved Recommender System, Kyung-yong Jung,Dong-Hyun Park, and Jung-Hyun Lee**

The paper describes an autonomous agent, WebBot: Web Robot Agent, which integrates with the web and acts as a personal recommender system that cooperates with the user on identifying interesting pages. Hybrid components from collaborative filtering and content-based filtering, a hybrid recommender system can overcome traditional shortcomings. In this paper, an effective hybrid collaborative filtering and content-based filtering for improved recommender system.

4) **Data Mining Methods for Recommender Systems Xavier Amatriain, Alejandro Jaimes, Nuria Oliver, and Josep M. Pujol**

The main Data Mining techniques used in the context of Recommender Systems. We first studied common preprocessing methods such as sampling or dimensionality reduction. Next, we studied the most important classification techniques, including Bayesian Networks and Support Vector Machines. We describe the k-means clustering algorithm and discuss several alternatives. We also studied association rules and related algorithms for an efficient training process. In addition to introducing these techniques, we learned their uses in Recommender Systems and present cases where they have been successfully applied.

3. Problem Definition

To filter the information from large data source by recommending or predicting the interest of the user. This recommendation technique can be done using content based, collaborative based or by using hybrid approach. If only single technique is used it will have some time constraint. As, recommendation system is is real time, so time constraint is very important.

4. Methodology / Approach

- Basically we have two application one is web application and another one is mobile application.
- Web application is responsible for all transaction i.e. It directly communicate with database and performed various request like insert, update, select * etc.
- Also in web application Restaurant Owner can add/edit/delete new Menu Group items or Dish Items.
- For accessing data in mobile app from our Web app, we have used JSON api services for exchanging the data. In this when mobile apps need some data from our web app, A HTTP request for particular data is triggered from mobile app to our web app. At our web application it's validate the request for authorized or not, If its authorized then its give data in the form JSON. That JSON data is read by our mobile app. And shows in the view of mobile app.
- All communication between mobile app to the web app is done in the form of JSON API.

As the domain of our project is to retrieve the information and apply recommendation on it we are using H.3.3 information search and retrieval. To bind the big data together and to give the recommended result we will be using the clustering technique and also information filtering. For getting the knowledgeable data we use the Data Mining technique. For applying the logic to recommend we are using seven algorithms

- k-nearest neighbor algorithm
- Gaussian(EM)clustering algorithm
- Rocchio algorithm
- Artificial neural networks(ANNs)algorithm
- Apriori algorithm
- Decision Tree algorithm
- Naïve Bayes algorithm

5. Result

The expected result of the paper is that we have to prepare an application which would be easily able to recommend food items to the users on the basis of age, gender, and occupation. The proposed system will take information from the user and accordingly will recommend the food item to the user. The system is thus expected to recommend food item to the user and take the order from the user and inform to the hotels. This failure case of the project would be when the system does not recommend the right item / irrevent items recommended by the system to the user. it is very important to check if the system produces better predictions than the simple random approach. Hence It is expected that the system should be able to recommend the food properly to the user according to his/her likings'.

6. Conclusion

Recommending menus can be a demanding task because simple liking based comparison might produced misleading predictions. Preferences are expressed by rating presented menus but also by specifically including or excluding liked and disliked dishes respectively. Hence we conclude that the system thus created should be able to recommend food items properly. The users could order food according to his/her liking. System thus created should be easily able to help the user in deciding what to eat and order the food accordingly.

7. Future Scope

For one, the system could not be evaluated in this short time. To do that a large number of ratings and users are needed. However it is very important to check if the system produces better predictions than the simple random approach. Bringing the client to iOS phones might be worth considering also because the base of the iPhone is just as big if not even bigger than that of android based phones which would benefit the prediction quality but also make evaluation easier.

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