Evolutionary approaches of Recommendation systems and ontologies in personalized informationsystems

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ABSTRACT:

Searching is the comman activity of people to get the information. Most of the search engines are troubled with understanding of user intentions. So user view oriented search is called as personalized search and application is personalization. We introduce and explore a number of item ranking techniques that can generate recommendations that have substantially higher aggregate diversity across all users while maintaining comparable levels of recommendation accuracy. In addition with recommendation systems personalized ontology model is proposed for knowledge representation and reasoning over user profiles. This model learns ontological user profiles from both a world knowledge base and user local instance repositories. The ontology model is evaluated by comparing it against benchmark models in web information gathering. The results show that this ontology model is successful.

1. Introduction

Over the last 10- 15 years, recommender systems technologies have been introduced to help people deal with these vast amounts of information, and they have been widely used in research as well as e-commerce applications, such as the ones used by Amazon and Netflix. The most common formulation of the recommendation problem relies on the notion of ratings, i.e., recommender systems estimate ratings of items (or products) that are yet to be consumed by users, based on the ratings of items already consumed. Recommender systems typically try to predict the ratings of unknown items for each user, often using other users' ratings, and recommend top *N* items with the highest predicted ratings. Accordingly, there have been many studies on developing new algorithms that can improve the predictive accuracy of recommendations. However, the quality of recommendations can be evaluated along a number of dimensions, and relying on the accuracy of recommendations alone may not be enough to find the most relevant items for each user. In particular, the importance of *diverse* recommendations has been previously emphasized in several studies. These studies argue that one of the goals of recommender systems is to provide a user

with highly idiosyncratic or personalized items, and more diverse recommendations result in more opportunities for users to get recommended such items. With this motivation, some studies proposed new recommendation methods that can increase the diversity of recommendation sets for a given *individual* user, often measured by an average dissimilarity between all pairs of recommended items, while maintaining an acceptable level of accuracy. These studies measure recommendation diversity from an individual user's perspective (i.e., *individual diversity*).

As a model for knowledge description and formalization, ontology's are widely used to represent user profiles in personalized web information gathering. However, user profiles, many models have utilized only knowledge from either a global knowledge base or user local information.

2. Existing models

There is a growing awareness of the importance of aggregate diversity in recommender systems. Furthermore, while, as mentioned earlier, there has been significant amount of work done on improving individual diversity, the issue of aggregate diversity in recommender systems has been largely untouched. By this it is becoming increasingly harder to find relevant content. This problem is not only widespread but also alarming.by considering the models in ontology are as follows

2.1. GOLDEN MODEL: TREC MODEL:

The TREC model was used to demonstrate the interviewing user profiles, which reflected user concept models perfectly. For each topic, TREC users were given a set of documents to read and judged each as relevant or nonrelevant to the topic. The TREC user profiles perfectly reflected the users' personal interests, as the relevant judgments were provided by the same people who created the topics as well, following the fact that only users know their interests and preferences perfectly.

2.2 BASELINE MODEL: CATEGORY MODEL:

This model demonstrated the noninterviewing user profiles, a user's interests and preferences are described by a set of weighted subjects learned from the user's browsing history. These subjects are specified with the semantic relations of superclass and subclass in an ontology.

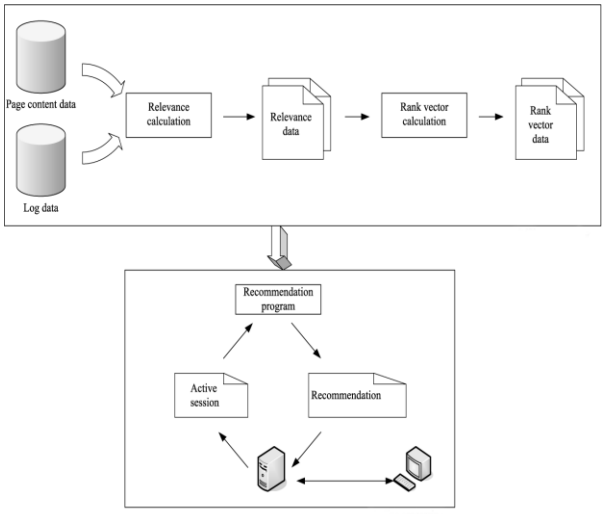
When an OBIWAN agent receives the search results for a given topic, it filters and reranks the results based on their semantic similarity with the subjects. The similar documents are awarded and reranked higher on the result list.

2.3. BASELINEMODEL: WEB MODEL:

The web model was the implementation of typical semi interviewing user profiles. It acquired user profiles from the web by employing a web search engine. The feature terms referred to the interesting concepts of the topic. The noisy terms referred to the paradoxical or ambiguous concepts.

3.ProposedApproachesin Recommendation System

3.1System Architecture:



In real world settings, recommender systems generally perform the following two tasks in order to provide recommendations to each user. First, the ratings of unrated items are estimated based on the available information (typically using known user ratings and possibly also information about item content or user demographics) using some recommendation algorithm. And second, the system finds items that maximize the user's utility based on the predicted ratings, and recommends them to the user.

In particular, these techniques are extremely *efficient*, because they are based on scalable sorting-based heuristics that make decisions based only on the "local" data (i.e., only on the candidate items of each individual user) without having to keep track of the "global" information, such as which items have been recommended across all users and how many times.

POSTING THE OPINION:

we get the opinions from various people about business, e-commerce and products through online. The opinions may be of two types. Direct opinion and comparative opinion. Direct opinion is to post a comment about the components and attributes of products directly. Comparative opinion is to

post a comment based on comparison of two or more products. The comments may be positive or negative.

3.2.RECOMMENDATION TECHNIQUE:

However, the quality of recommendations can be evaluated along a number of dimensions, and relying on the accuracy of recommendations alone may not be enough to find the most relevant items for each User, these studies argue that one of the goals of recommender systems is to provide a user with highly personalized items, and more diverse recommendations result in more opportunities for users to get recommended such items. With this motivation, some studies proposed new recommendation methods that can increase the diversity of recommendation sets for a given *individual* user. They can give the feedback of such items.

3.3.RATING PREDICTION:

First, the ratings of unrated items are estimated based on the available information (typically using known user ratings and possibly also information about item content) using some recommendation algorithm. Heuristic techniques typically calculate recommendations based directly on the previous user activities (e.g., transactional data or rating values). For each user, ranks all the predicted items according to the predicted rating value ranking the candidate (highly predicted) items based on their predicted rating value, from lowest to highest (as a result choosing less popular items.

3.4.RANKING APPROACH:

Ranking items according to the rating variance of neighbors of a particular user for a particular item. There exist a number of different ranking approaches that can improve recommendation diversity by recommending items other than the ones with topmost predicted rating values to a user. A comprehensive set of experiments was performed using every rating prediction technique in conjunction with every recommendation ranking function on every dataset for different number of top-*N* recommendations.

4.Proposed Approaches in ontologies:

The world knowledge and a user's local instance repository (LIR) are used in the proposed model.

- World knowledge is commonsense knowledge acquired by people from experience and education. An LIR is a user's personal collection of information items. From a world

knowledge base, we construct personalized ontologies by adopting user feedback on interesting knowledge. A multidimensional ontology mining method, Specificity and Exhaustivity, is also introduced in the proposed model for analyzing concepts specified in ontologies. The users' LIRs are then used to discover background knowledge and to populate the personalized ontologies.

- Compared with the TREC model, the Ontology model had better recall but relatively weaker precision performance. The Ontology model discovered user background knowledge from user local instance repositories, rather than documents read and judged by users. Thus, the Ontology user profiles were not as precise as the TREC user profiles.
- The Ontology profiles had broad topic coverage. The substantial coverage of possibly-related topics was gained from the use of the WKB and the large number of training documents.
- Compared to the web data used by the web model, the LIRs used by the Ontology model were controlled and contained less uncertainties. Additionally, a large number of uncertainties were eliminated when user background knowledge was discovered. As a result, the user profiles acquired by the Ontology model performed better than the web model.

4.1.WORLD KNOWLEDGE BASE:

The world knowledge base must cover an exhaustive range of topics, since users may come from different backgrounds. The structure of the world knowledge base used in this research is encoded from the LCSH references.

The LCSH system contains three types of references:

- Broader term- The BT references are for two subjects describing the same topic, but at different levels of abstraction (or specificity). In our model, they are encoded as the is-a relations in the world knowledge base.

- Used-for- The UF references in the LCSH are used for many semantic situations, including broadening the semantic extent of a subject and

describing compound subjects and subjects subdivided by other topics. When object A is used for an action, becomes a part of that action (e.g., "a fork is used for dining"); when A is used for another object, B, A becomes a part of B (e.g., "a wheel is used for a car"). These cases can be encoded as the part-of relations.

- Related term- The RT references are for two subjects related in some manner other than by hierarchy. They are encoded as the related-to relations in our world knowledge base.

4.2.ontology data and processing

One reason of this view of ontology and ontology-based rendering is to see the ontology processing in acommon software development framework to facilitate the reuse of its semantics, the establishment of standard interfaces and formalisms, component-based and collaborative development.

A classification of renditions and their rendering processes by basic task types can be the basis for asoftware library that facilitates the development of rendering processes and is extensible for specific task cases. There are four main features of rendering worth considering in designing the development frameworkof rendering processes:

• The rendering process can be pipelined into a composite software process for complex tasks or uses of ontology processing

• The rendering process is configurable by changing its rendition logic.

• The rendering process is classified into a type hierarchy by task or purpose of ontology processing.

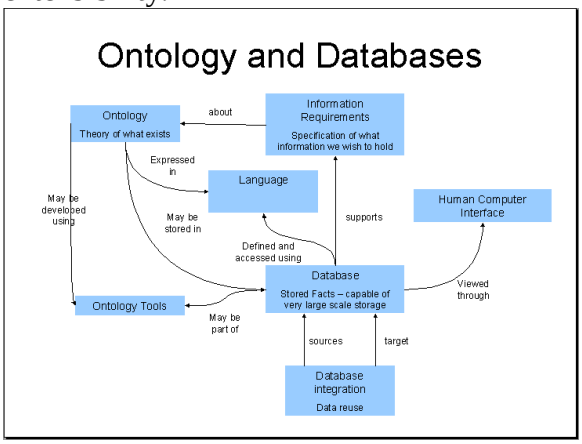
• The framework of rendering processes can be extended in the object-oriented style.

They point to

• a utility suite of parsers and compilers for configuration, ranging from parameter setting to rule specification,

• a class inheritance hierarchy of rendering processes,

• a framework on the basis of design patterns, such composite, visitor, decorator to allow forpipelining, configurability and extensibility.



5. Conclusion:

We proposed a number of recommendation techniques that can provide significant improvements in recommendation diversity with only a small amount of accuracy loss. In addition, these ranking techniques offer flexibility to system designers, since they are parameterizable and can be used in conjunction with different rating prediction algorithms. They are also based on scalable sorting based heuristics and, thus, are extremely efficient.

The investigation will extend the applicability of the ontology model to the majority of the existing web documents and increase the contribution and significance of the present work.

The present work assumes that all user local instance repositories have content-based descriptors referring to the subjects, however large volume of documents existing on the web may not have such content-based descriptors. For this problem, strategies like ontology mapping and text classification/clustering were suggested. These strategies will be investigated in future work to solve this problem.

In our future work, we will investigate the methods that generate user local instance repositories to match the representation of a global knowledge base.

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