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Preference-Search based Recommendation System for Accommodation Facilitator : A Review

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ABSTRACT

Finding an online house or rented property that meet renters' requirements is increasingly getting difficult due to large pool of choices available with the renters' before finalizing accommodation. A renter may spend considerable amount of time exploring numerous online resources to locate accommodation that fit his requirements. Furthermore, renters may not always express their preferences in a manner that easily matches their requirements. Exploring and searching for accommodation online has been done mainly through database queries that return a list of the most suitable accommodations. Recommendation systems methods can be applied to smooth the task of finding desired and required accommodation online. This study proposes a recommendation system that enables renters to carry out a preference-based search on rental properties for accommodation. In this paper preference-based search technique is combined with method called as example-critiquing. Rather than executing a query against the database, this combined approach prompts the renters to express some preferences on rental properties for accommodation. Than this method will be used to construct a preference model for the user, and finally generates a list of properties that best match that preferences.

Keywords : Accommodation, Renters, Preference-Based Search, Example-Critiquing, Recommendation System

I. INTRODUCTION

With increased access of Internet through desktops, laptops and mobile devices, people are looking at the Web to search for items of interest to them. Whether looking for information or shopping online, the size and diversity of the Web makes it increasingly difficult to find what one is looking for. In general, it is simply not possible to examine all available alternatives. For instance, on a typical day approximately 25 million individual products are listed on amazon. Searching a catalog of this size can be frustrating and unproductive. This problem is exacerbated when the user cannot articulate specific properties of the item (s) he is seeking, or if the user does not know exactly what (s) he is seeking. Moreover, many consumers enjoy discovering the right item serendipitously, a concept difficult to incorporate into the classical notion of information search.

Looking for accommodation on rental basis is one great example of such search. Renting a house has a central importance to quality of life with considerable economic, social, cultural and personal significance. This equally applies to searching for rental accommodation at new place in any corner of world for people who look for such property. Hence searching for rental accommodation can be challenging task. Prospective tenants may spend a significant amount of time exploring various websites advertising properties for rent. It was found that searching real estate assets online does not benefit renters' in terms of time, flexibility and intuitive results [3]. Search engines generally do a good job by helping users find what they are looking

for, however many people find it hard to match their preferences to a query that is likely to produce the desired search results [1]. Using recommendation systems technology can address the problem of mapping user's preferences to items that are likely to meet them [1]. Recommendation systems contains such software gives suggestions for items useful to user [2]. Users uses those suggestions to make decisions such as which product to buy, which place to go, what apartment to rent, etc. These systems helps users to filter data from so much of information when looking for variety of products. Same system can be created for recommendation system for rental properties.

Applications of recommender systems technology are Amazon, Mynta, Flipkart for variety of products [4].

II. Problem Statement

Since its difficult for renters' to find accommodation as per their need manually this work proposes a system where user can find accommodation as per his desire needs by filtering his choice of house, furniture, food, location and review of house etc. based on recommendation system preference-search user will be able to find accommodation online in much simpler and easier way than traditional offline and online systems.

III. Objectives

In this work objective is to achieve efficient yet easy, simple and fast way to find rental house for accommodation. To develop a prototype of a recommendation system for accommodation to validate proposed system.

IV. Literature Survey

The recommendation was found many years way before the emergence of computers. Earlier recommendation existed among flea, cave man and other creature [5].

The ability of computers to provide recommendations was known very little earlier [6]. Grundy, a computer-based librarian, used stereotypes derived from interviews to recommend books to readers who fell in those stereotypes. Soon, Tapestry was proposed to address overload in online information spaces. It enabled users to filter through their emails separating those from known contacts from the rest [5].

Automated recommender systems based on collaborative filtering emerged in the 1990s. Some of these included Ringo for music, BellCore Videos Recommender for movies, and Jester for jokes, among others. Perhaps the most recognizable business application of recommender system is Amazon. Based on the user purchase history, browsing history, the current item the user is viewing, and other users' behavior, Amazon can recommend items for the user to consider purchasing [6].

Recommendation technology has gone beyond collaborative filtering to include content-based, Bayesian inference and case-based reasoning methods [7]. Research on recommendation systems boosts with the Netflix Prize, a research for one million dollar reward that could improve the accuracy by 10% of Netflix recommendations for movies [5].

Recommendation systems (RS) is such a mechanism, they aim at recommending items to users. These items are linked to the users' expectations and tastes.

The use of recommendation systems results in a decrease of the time spent by users in their search. Moreover, it suggests users' pertinent items that they would not consult on their own initiative (they may not know of the existence of such items). Users' satisfaction is thus increased. An item (also called a resource) can for example be a web page, a book, a movie, music, etc.

A recommendation system can be defined as any system that produces individualized recommendations as output or has the effect of guiding the user in a personalized way to interesting or useful objects in a large space of possible options [8].

Traditional approaches such as collaborative filtering and content-based filtering are not suitable for high-value items such as electronics, vehicles and real estate assets since they are not purchased as frequently as are other objects. Consequently, buyers are not able to leave a sufficient number of reviews (ratings) on this objects to facilitate useful recommendation to other users, who may not be satisfied with years-old ratings [9].

Hence Recommendation system can be defined as any system that produces individualized recommendations as output or has the effect of guiding the user in a personalized way to interesting or useful objects in a large space for possible options [8].

Preference-based search can be defined as "Given a collection O = {o1, …, on} of n options, preference-based search (PBS) is an interactive process that helps identify the most preferred option, called the target option ot , based on a set of preferences that they have stated on the attributes of the target [1].

V. Recommender System Function

Recommender systems functions fall into two categories: 1) Role played by recommender systems as service provider 2) Role played as end-user.[10] According to some author, a service provider can use a recommender system to attain the following [10]:
Increased Sale: With this system service provider hopes for more sale. And this could be achieved because this system suits end-user desire.

Diversity of Sold Things: With this system user can find things which is not discovered by him as recommendation was unavailable. So chances for service provider to sale things which are not famous in general but it may suit end- user needs.

Understanding of User Needs: System generates a details of users' preferences which is collected either directly or indirectly. This helps in using this information again for service provider to achieve extra goals for example, ameliorate the management of the item's production or stock. Roles played by Recommender System as an end-user has following functions [10]:

Few Useful Things: Recommendation to a user about the ranked list of things with predicts that how much user will like it.

All Useful Things: Recommends all the items that user may needs. It will be based on end-users' input given under system.

All in One: Suggesting all end-users' needs all together in form of a bundle package. For instance recommending distance of accommodation from various nearby public places.

VI. Critiquing-Based Recommender Systems

Traditional recommendation system , are not good with scenario with high priced items such as vehicles, electronics and real-estate assets, which are not purchased that often as other items. As people are not likely to purchase these items that often thus, the do not give their views for the same.

Because of this reason it is unworkable to gather ratings for these items, and potential customers may not be satisfied with years-old preferences expressed on such items [9]. Knowledge-based recommenders suffer from knowledge- acquisition bottlenecks associated with the initial efforts required to generate the domain knowledge [9].

Critiquing-based recommender systems has appeared and has been widely identified as an methodical preference-based search and recommender technology, using a feedback technique called critiquing [12]. The system provides recommendations on the basis of users current preferences and then manage to get information in the form of critiques, for example- " I want an outfit with a lower budget".

This requirement manages to get information until the customer can find the desired product. A typical customer has many preferences and constraints that are not mentioned up front, and the method allows him to be known of these latent preferences when proposed solutions violate them [13].

Critiquing-based recommender systems follow a four-step user-system interaction model [12]:

Step 1: the user is asked to give some preferences on the required product;
Step 2: the system gives one or more recommended results based on the user's requirement;
Step 3: the user either selects the desired item and terminates the process or provides feedback on the presented items (critiquing);
Step 4: once the user states the critiques, the system will update its recommendations and return them for the next interaction cycle.
The study states three main types of critiquing-based recommender systems: (i) natural language dialogue-based recommender systems,(ii) system-suggested critiquing systems and (iii) user-initiated critiquing systems [12].

Recommending Accommodation for Renters': Considering the types of critiquing-based approaches for recommending products to consumers online, this study will acquire the preference-based search tool and will club it with the example-critiquing method. Preference-based search is a tool for the elicitation of users' initial preferences, whereas example-critiquing is a method that allow users to rectify their preferences to locate the ideal item that suits well their requirements [1].

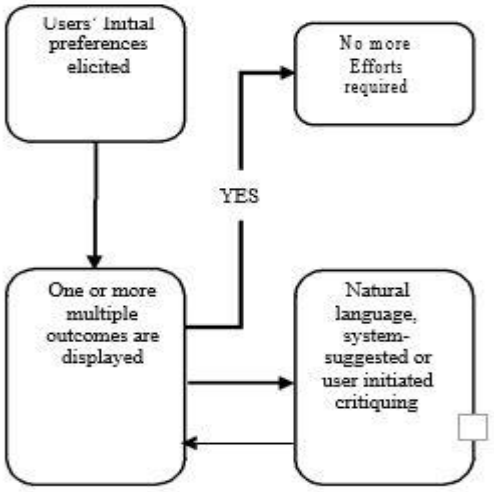

Figure 1 : Communication between users and critiquing based recommender systems [12].

This method invites users to state their preferences (preference-based search) explicitly. This is formally defined the problem as [1]:

Given a collection O = {o1… on} of n options, preference- based search (PBS) is an interactive process that helps users find the most preferred option, called the target option ot based on a set of preferences that they have stated on attributes of the target.

They define the target option as the option most preferred by the user among all the possibilities.
Following the expression of initial preferences by the user, the system typically generates two sets of the examples: candidates and suggestions. Candidates are examples that are optimal for the current preference query, and suggestions are examples that are used to stimulate the expression of further preferences [1]. The user revises his preference model by critiquing examples, a process that can take several iterations. When the user locates the target item, he terminates the process.
Following steps shows how this work helps in providing choices are relevant, i.e. they could be acceptable options, and (iii)They are not already optimal for the already stated preferences.

Based on above techniques in order to make recommendations, the proposed system accommodation facilitator uses these key attributes that are considered by users who search for accommodation for rent online. These attributes include the type of the house, the location of the house, the rent amount, the number of bedrooms, and the number of bathrooms, furnished or unfinished, kitchen facilities(optional) etc.

VII. System Requirements

The main functional requirements of the proposed system includes (1) Perform a preference-based search (PBS); here in search box user can perform preference-based search by selecting his desired attributes for accommodation by considering their relevance with their needs. (2) Display & Select Searched Results; Once, a probable tenant has searched a desired property; the system supply him with the services to select the property and go through the images and videos. (3) Allow admin to add and remove property.

VIII.CONCLUSION

The use of preference-search based recommendation system using example-critiquing can immensely benefit online users for searching accommodation. This system help renters' finding their choice of home by fulfilling their requirements. The increased access to Internet connectivity makes this system more compelling for business organizations, including those who advertise rental properties online, to invest more resources in online platforms that connect consumers to s and services they are looking for.

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