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Effective Cross Domain Recommendation for TV User

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Abstract: ***Social TV is a social media service via TV and social network through which TV users exchange their experiences about TV programs that they are viewing. For social TV service, two technical aspects are envisioned: grouping of similar TV users to make social TV communities and recommending TV programs based on group and individual interests for personalizing TV. In this, we propose a unified topic model based on grouping of related TV users and recommending TV programs as a social TV service. The proposed unified topic model employs two Latent Dirichlet Allocation (LDA) models .One is a topic model of TV users, and the other is topic model of the description words for viewed TV programs. The two LDA models are then integrated via a topic proportion parameter for TV programs. Our proposed unified topic model will be extended for cross-domain recommendation where three topic models of TV users viewing history data, TV program description data, and web content description data are tied together and an appropriate rank method for cross-domain recommendation is studied. Using the extended unified topic model, effective cross-domain recommendation is expected to be feasible from the TV domain to the web domain for TV users who can then easily select associated web contents for the TV programs that they have enjoyed watching. With the help of unified model we identifies the semantic relation between TV user groups and TV program description word groups so that more meaningful TV program recommendations can be made. The unified topic model also overwhelms an item ramp-up problem such that new TV programs can be reliably recommended to TV users. Furthermore, from the topic model of TV users, TV users with related tastes can be grouped as topics, which can then be recommended as social TV communities.***

Keywords: Latent Dirichlet Allocation (LDA), model parameter update, social TV, topic model, TV program recommendation

1. Introduction

In a Social TV environment, the TV users can share the viewing experiences and communicate with other users. For example, TV users can exchange TV program information and their experiences with TV programs in social TV communities (online virtual communities) through social networks. Thus, social networks are the networked communities through which TV users can exchange their experiences of TV programs that they have watched. Social TV in two trends associated with TV experience: social interaction and personalization. Social interaction involves shared TV experience that includes content discovery and shared watching experience with movies and TV recommendations, and beleaguered advertisements in online virtual communities through social networks. Personalization features personalized experience via personal devices that are connected to social networks. In this way, individuals can be rudiments of social TV groups. The main idea is expected to be viable from the TV domain to the web domain for TV users who can then easily choice associated web substances for the TV programs that they have enjoyed watching. Recommender system is defined as a decision making policy for users under composite information environments. Also, recommender system was defined from the perception of E-commerce as a tool that aids users search over records of knowledge which is related to users' concern and preference. Recommender system was defined as a means of supporting and augmenting the social process of using recommendations of others to make choices when there is no necessary personal knowledge or experience of the options. Recommender systems handle the problem of information overload that users usually encounter by providing them with personalized, exclusive content and service recommendations.

2. Literature Review

Literature review was carried out throughout the whole project to gain knowledge and improve the skills needed to complete this project. The main sources for this project are previous related projects, research thesis, books, journals and online tutorials. This chapter focuses on the basic concepts and all fundamental theories which related to this project and the drawbacks of the current system.

1. Topic Modeling

Probabilistic topic modeling approaches discover latent topics that are inherent in observed data such as a text corpus and users usage history data. Application of probabilistic topic modeling for recommendation allows more diverse and flexible recommendation of items (TV programs) based on the inferred latent features (topics). The polylingual topic model (PLTM) in uses polylingual corpora and discovers topics aligned across multiple languages for machine translation between different languages.

The bilingual topic model (BLTM) in is a special case of PLTM, which has the same graphical model topology of our unified topic model. But BLTM has a limitation in fully capturing the unique topic priority of each document. One popular algorithm in probabilistic topic modeling is the LDA algorithm, which is a generative probabilistic model for a corpus of documents.

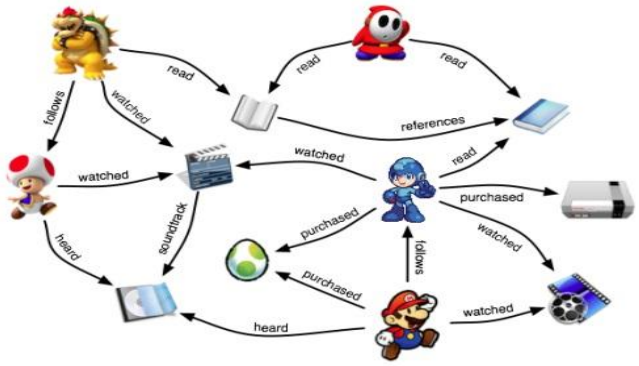
2. Latent Dirichlet Allocation

Latent Dirichlet allocation is a generative statistical model that allows sets of annotations to be explained by unobserved groups that explain why some parts of the data are similar. For example, if observations are words collected into documents, it suggests that all document is a

mixture of a small number of topics and that each word's making is attributable to one of the document's topics.

3. Cross Domain Recommendation System

Recommender system is a very useful tool, since it has the capability of filtering the information according to user interest and offer personalized suggestion. One of the major disadvantages of the classical recommender system is that, they deal with the only solitary domain. cross domain recommendation where we exploit knowledge from auxiliary domains which contains extra user preference data to improve recommendation on the objective domain.



3. Database Creation

3.1 New User Registration

The user can create a new account by giving the information like user id, name, address and also the contact no. The user have two passwords one for login purpose and other password for viewing others comments. It is for security purpose using encryption. The user id and name should be unique so that only able to identify the users. All the user details and activities are automatically stored in database. Admin also have user id and password.

3.2 LOG IN

The user login into his account with his id and password. Once the user id and password is validated he/she is allowed to access his account and share comments. The user should give the password so that only able to see the approved comments. That also should be valid.

3.3 Share Comments

The user can share comments with the basic details like comment desc, comment date, status, channel list etc. Once the comments is shared the user are grouped based on the channel list.

3.4 View Comments

The user can view the comments of similar TV users by giving valid password. Otherwise encrypted message only displayed for the users.

4. Grouping

4.1 Based on Channels

The users are grouped based on channels (similar TV viewers) .Here, each TV user group (topic) becomes a recommended social TV community in which its TV users share the same context with respect to TV programs. That is, the TV users in the same TV user group (topic) have similar preferences for TV programs. Furthermore, based on the two kinds of topics, the RSs for TV programs are calculated and sorted for recommendation.

4.2 TV Program Recommendation Using the Proposed Topic Model

In this section, we describe a TV program recommendation method based on the proposed unified topic model with the inferred model parameters in Section III-B. Since φ(j)u,tin (A6)is the probability of a particular TV user t to be assigned to the jth topic, it can be interpreted as the preference of TV user t for the jth topic. Therefore, $\varphi(\cdot)_{u,t}$ represents the topic (user group) preference vector of a TV user t for all K topics. In (A8), $\theta_{(m)p,\ j}$ is the jth topic proportion for p_m, which indicates the degree of preference for p_m by the jth topic (user group). For two vectors $\varphi_{(\cdot)u,t}$ and $\theta_{(m)p}$, the inner product indicates the degree of preference for p_m by a TV user t. Since $\_p$ includes the K topic proportions for all TV programs p_m for $m = 1, \ldots, M_p$,
we define a RS for TV program recommendation as

$$RS_t = \_p \cdot \varphi_{(\cdot)u,t}$$

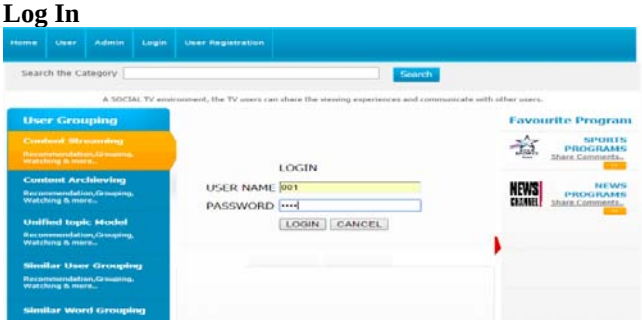
where the rank score RS_{pt} is a M_p-dimensional vector for all TV programs for TV user t. Thus, based on (4), we can sort the rank score values for all TV programs and recommend to TV user ta list of top-N TV sorted programs.

4.3Prediction of TV Programs for New TV Users

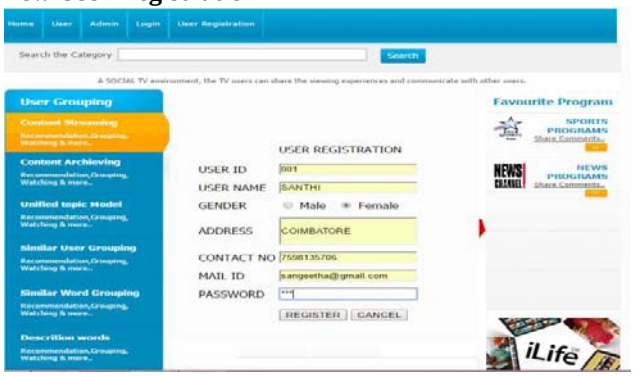
If there is no information about a new TV user, it is difficult to precisely recommend appropriate TV programs for the TV user. In this case, the proposed recommender system may make suggestions to the new TV user with a word topic list by asking him/her to rank the suggested word topics according to his/her topic preference. Based on the feedback (topic order) ranked by the TV user, he/she can be categorized into appropriateTV user groups. Then, the TV programs that containthe most preferred topic of the new TV user with the largestportion can be recommended.

5. Experimental Results

Log In



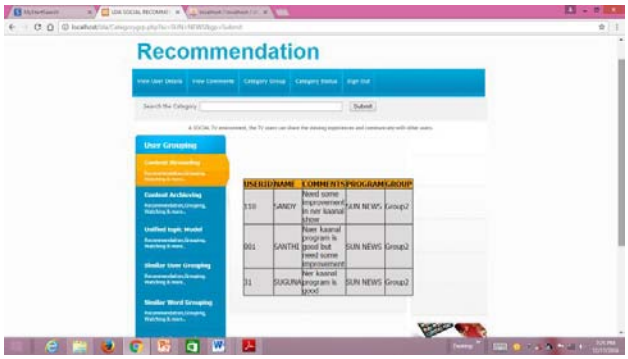
New User Registration



Share Comments

View Comments

Grouping on Channels



6. Conclusion

In this paper the unified topic model will be extended for cross-domain recommendation where three topic models of TV users viewing history data, TV program description data, and web content description data are tied together. We propose a novel time-topic coupled latent Dirichlet allocation (LDA) model, which considers the topic of TV programs viewed as well as the timestamps of the viewing behaviors, in order to capture the inherent viewing patterns of individual users along the topic as well as the time dimensions .Using the extended unified topic model, effective cross-domain recommendation is expected to be feasible from the TV domain to the web domain for TV users who can then easily select associated web contents for the TV programs that they have enjoyed watching.

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