Chapter 14

On Group Extraction and Fusion for Tag-Based Social Recommendation

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ABSTRACT

With the recent information explosion, social websites have become popular in many Web 2.0 applications where social annotation services allow users to annotate various resources with freely chosen words, i.e., tags, which can facilitate users’ finding preferred resources. However, obtaining the proper relationship among user, resource, and tag is still a challenge in social annotation-based recommendation researches. In this chapter, the authors aim to utilize the affinity relationship between tags and resources and between tags and users to extract group information. The key idea is to obtain the implicit relationship groups among users, resources, and tags and then fuse them to generate recommendation. The authors experimentally demonstrate that their strategy outperforms the state-of-the-art algorithms that fail to consider the latent relationships among tagging data.

1. INTRODUCTION

Tag-based services, e.g., Del.icio.us¹, Last.fm², and Flickr³ have undergone tremendous growth in the past several years. All of the above services allow users to express their own opinions on resources with arbitrary words. Making use of social tagging data for recommendation is emerging as an active research topic in the field of recommender systems recently. Traditional recommender systems focus on the explicit rating data of users, e.g., movie ratings, to gain the user preference and make predictions for new items. Different from rating data, social tagging data does
not contain user’s explicit preference information on resources, instead, reflecting the personalized perceptions on resources by users. In particular, such data involves three types of objects, i.e., user, resource, and tag. These differences bring in new challenges as well as opportunities to deal with recommendation problems in the context of social tagging systems. A primary concern of recommender systems in tag-based recommender systems is to present users with avenues for navigation that are most relevant to their information needs. Tags serve as intermediaries between users and resources; therefore, the key challenge in social annotation recommender systems is how to accurately capture user preferences through tags.

Figure 1(a) is a typical social annotation recommender system. It has three types of entities that are considered by the recommender system: \(<\text{user}, \text{resource}, \text{tag}>\). One user prefers some resources, which he is interested in and annotates them with some words. In this case, one resource can be tagged by several tags or one tag can be annotated on several resources. Therefore, tags just serve as intermediaries between users and resources. So far, we can see that one user may be interested in some resources and annotate tags on them. Here, the tag which has been annotated on resource describes user’s own opinion and indicate his interests. Likewise, for the same resource, different users may use different tags to annotate. If we want to retrieve resources via these ambiguous tags, it is very common that we cannot find the desired results through just browsing the returned resources. However, there are also some tags the users have common view, i.e., these tags can also represent resources properly. Therefore, a user may annotate some tags on various resources, we can illustrate these activities as a user preferring resources based on their interests. Likewise, some common view tags reflect the topic information of resources. We illustrate these two scenarios in Figure 1(b) and (c), respectively, after extracting this information. From the figures, we can see that, tags form different aggregate based on user or resource views. Here, we call these aggregates as “Groups.” Moreover, different users may reach via resources different groups. Let’s take the following example, consider one user Tom, who annotated the Website of Chicago City with the ambiguous tags “Jordan,” “NBA,” “basketball,” or “Bulls,” etc., while another user John annotated with “tour,” “relax,” “O’Hare,” etc. From these tags, we can see that, Tom is a basketball fan while John is a tour pal. The tags reflect the interest of users. If John intends to retrieve resources based on the tags, which Tom annotated, he may not obtain his desired results because they have different interests. However, there are also tags, such

Figure 1. Tag-based recommender system
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