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Synchronize E-Commerce with Social Media: Cold-Start Product Recommendation Using Micro Blogging Information

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Abstract: In recent years, the limit between e-commerce and social networking has become increasingly blurred. Many e-commerce websites support the mechanism of social login where users can sign on the websites using their social network identities such as their Face book or Twitter accounts. Users can also post their newly purchased products on social networking sites with links to the e-commerce product web pages. In this paper, we propose a new solution for users to recommend products from e-commerce websites to users at social networking sites. A major problem is how to leverage knowledge extracted from social networking sites for .We proposes to use the linked users across social networking sites and e-commerce websites as a link to map users' social networking features to another feature representation for product recommendation. In specific, we propose learning both users' and products' feature representations from data collected from e-commerce websites using recurrent neural networks and then apply a modified gradient boosting trees method to transform users' social networking features into user embeddings. Now we proposed a new approach, like supports the concept of social networking sites. Here e-commerce websites allows users to provide sign in to face book and twitter like in ecommerce to send user request and suggest products and view their friend profile activities.
Keywords: Micro-blogging, Ecommerce, Social media, Recommendation

I. INTRODUCTION

In recent years, the boundaries between e-commerce and social networking have become increasingly blurred. Ecommerce websites such as eBay features many of the characteristics of social networks, including real-time status updates and interactions between its buyers and sellers. Some e-commerce websites also support the mechanism of social login, which allows new users to sign in with their existing login information from social networking services such as Facebook, Twitter or Google+. Both Facebook and Twitter have introduced a new feature last year that allow users to buy products directly from their websites by clicking a "buy" button to purchase items in adverts or other posts. In China, the e-commerce company ALIBABA has made a strategic investment in SINA WEIBO1 where ALIBABA product adverts can be directly delivered to SINA WEIBO users. With the new trend of conducting e-commerce activities on social networking sites, it is important to leverage knowledge extracted from social networking sites for the development of product recommender systems. In this paper, we study an interesting problem of propose products from e-commerce websites to users at social networking sites who do not have historical purchase records, i.e., in "cold-start" situations. We called this problem cross-site cold-start product production. Although online product recommendation has been extensively studied before [1], [2], [3], most studies only focus on constructing solutions within certain e-commerce websites and mainly utilize users' historical transaction records. To the best of our knowledge, cross-site cold-start product recommendation has been rarely studied before. In our problem setting here, only the users' social networking information is available and it is a challenging task to transform the social networking information into latent user features which can be effectively used for product recommendation. To address this threat, we represent to use the linked users across social networking sites and e-commerce websites (users who have social networking accounts and have made purchases on e-commerce websites) as a bridge to map users' social networking features to latent features for product recommendation. In specific, we represent learning both users' and products' feature representations (called user embeddings and product embeddings, respectively) from data collected from ecommerce websites using recurrent neural networks and

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then apply a modified gradient boosting trees method to transform users' social networking features into user embeddings. We then develop a feature based matrix factorization approach which can leverage the learnt user embeddings for cold-start product recommendation. We built our dataset from the largest Chinese microblogging service SINA WEIBO2 and the largest Chinese B2C e-commerce website JINGDONG3, containing a total of 20,638 linked users. The experimental results on the dataset have shown the feasibility and the effectiveness of our proposed framework.

1.1 Aim/Goals

Our major aim is to connect the social media to ecommerce website for improve in recommendation system for the user with trusted friends

1.2 Methodology

Our major contributions are summarised below:

• We formulate a novel problem of recommending products from an e-commerce website to social networking users in "cold-start" situations. To the best of our knowledge, it has been rarely studied before.

• We propose to apply the recurrent neural networks for learning correlated feature representations for both users and products from data collected from an e-commerce website.

• We propose a modified gradient boosting trees method to transform users' microblogging attributes to latent feature representation which can be easily incorporated for product recommendation.

• We propose and instantiate a feature-based matrix factorization approach by incorporating user and product features for cold-start product recommendation.

In this paper, we study an interesting problem of recommending products from e-commerce websites to users at social networking sites who do not have historical purchase records, i.e., in "cold-start" situations. We called this problem cross-site cold-start product recommendation. Although online product recommendation has been extensively studied before [1], [2], [3], most studies only focus on constructing solutions within certain e-commerce websites and mainly utilise users' historical transaction records. To the best of our knowledge, cross-site cold-start product recommendation has been rarely studied before.

In our problem setting here, only the users' social networking information is available and it is a challenging task to transform the social networking information into latent user features which can be effectively used for product recommendation. To address this challenge, we propose to use the linked users across social networking sites and e-commerce websites (users who have social networking accounts and have made purchases on e-commerce websites) as a bridge to map users' social networking features to latent features for product recommendation. In specific, we propose learning both users' and products' feature representations (called user embeddings and product embeddings, respectively) from data collected from ecommerce websites using recurrent neural networks and then apply a modified gradient boosting trees method to transform users' social networking features into user embeddings. We then develop a feature based matrix factorization approach which can leverage the learnt user embeddings for cold-start product recommendation.

II. System Analysis

In the existing system the users are allowed to view the product, ratings and its details so on. The user views the product details, rates and features, then he/she purchases the products by online payment to buy these things. Existing activities such as selling online can be directed at consumers or other businesses, involves the online sales of goods, services and provision of information directly to consumers, and refers to the online selling of products, services, or information between businesses.

DISADVANTAGES:

- There can be lack of system security, reliability or standards owing to poor implementation of e-Commerce.
- Software development industry is still evolving and keeps changing rapidly.
- In many countries, network bandwidth might cause an issue as there is insufficient telecommunication bandwidth available.
- Special types of web server or other software might be required by the vendor setting the e-commerce environment apart from network servers.
- Sometimes, it becomes difficult to integrate E-Commerce software or website with the existing application or databases.
- There could be software/hardware compatibility issue as some E-Commerce software may be incompatible with some operating system or any other component.

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PROPOSED SYSTEM:

In this paper we proposed a new approach, combination of both social networking sites and e-commerce websites. A Registered user enters our website and views the product categories and purchases it. In additional then he/she search for existing friends or giving request to the new ones. The users recommend the product to their friend, likewise his/her friend may send product recommendation to him and the users are allowed to view top sold items.

ADVANTAGES:

- A customer can put review comments about a product and can see what others are buying or see the review comments of other customers before making a final buy.
- .The user can send friend request to existing user or new user and recommend to products suggestions.

III. MODULES

User Module:

The User module is to authenticate user during login. If the user is a new customer, he/she has to register providing the necessary details. And once the admin gives access to the registered person, the authenticated user is logged in. He/she have access to review all posts and existing users and can search for products and can recommend other friends about the product. The user can give request to the new ones and can accept the request they got in their friend request list. He/she will be able to view all recommended products which are posted by their friends. The user logs out once their work is done. The user can also login using Gmail and facebook.

Ecommerce Module:

Ecommerce module have the option for adding a new category of the products, they can add posts related to products. They can view all the available users. The product brand is uploaded; the product name with its brand name, product price and its warranty are required to add the product and they logout once adding their products.

Admin Module:

In the Admin module, the admin has access to activate the registered users. The users can login only when the admin activates the account. Admin can view all the user details and their recommendations of posts.

Micro blogging

This section describes some of the characteristic properties of Twitter's Social Network including it's network topology and geographical distribution.

Growth of Twitter Since Twitter provides a sequential user and post identifier, we can estimate the growth rate of Twitter. Figure 2 shows the growth rate for users and Figure 3 shows the growth rate for posts in this collection. Since, we do not have access to historical data, we can only observe its growth for a two month time period. For each day we identify the maximum value for the user identifier and post identifier as provided by the Twitter API. By observing the change in these values, we can roughly estimate the growth of Twitter. It is interesting to note that even though Twitter launched in 2006, it really became popular soon after it won the South by SouthWest (SXSW) conference Web Awards6 in March, 2007. Figure 2 shows the initial growth in users as a result of interest and publicity that Twitter generated at this conference. After this period, the rate at which new users are joining the network has slowed. Despite the slow down, the number of new posts is constantly growing, approximately doubling every month indicating a steady base of users generating content.

Due to the short time period for which the data is available and the nature of Microblogging we decided to use X as a period of one week. Figure 4 shows the user activity and retention for the duration of the data. About half of the users are active and of these half of them repost in the following week. There is a lower activity recorded during the last week of the data due to the fact that updates from the public timeline are not available for two days during this period.

Microblogging Feature Selection

In this section, we study how to extract user information from micro blogs. We have three groups of attributes.

a. Demographic Attributes A demographic profile (often shortened as "a demographic") of a user such as gender, age and education can be used by e-commerce companies to provide better customized services. Demographic attributes have been shown to be very important in marketing, especially in product adoption for consumers. As per our

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previous study, we identify six major demographic attributes: gender, age, marital status, education, career and interests.

b. Text Attributes Recent studies tell that microblogs contain rich commercial information of users. Also, users' microblogs often display their opinions and interests towards certain areas. As such, we expect a potential relation between text attributes and users' purchase preferences. We first collate all the microblogs by a user into a document, and then run the analysis function. The benefits of topics distributions over keywords are double. Word embeddings, Standard topic models assume individual words can be exchanged, which is essentially the same as the bag-of-words model assumption. Word representations or embeddings learned using neural language models help addressing the problem of traditional bag-of-word approaches which fail to capture words' contextual semantics. In word embeddings, each dimension represents a latent feature of the word and semantically similar words are close in the latent space. Finally, we average the word maps of all the tokens in a user's published document as the user's embedding vector.

c. Network Attributes In the online social media space, it is often observed that users connected with each other (e.g., through following links) are likely to share similar interests. As such, we can find out useful user groups by the users' following shopping patterns assuming that users in the same group share similar purchase preferences. Latent group preference, we treat a following user as a token and aggregate all the followings of a user as an individual document. Thus, we can extract latent user groups having same interests (called "following topics").

d. Temporal Attributes Temporal activity patterns are also utilized as they show the habits and lifestyles of the microblogging users to some extent. There are some relations between temporal activities patterns and users' purchase preferences. Temporal activity distributions, we analyze two types of temporal activity distributions, daily and weekly activity distributions. The daily activity distribution of a user is characterized by a distribution of 24 ratios, and the ith -ratio indicates the average proportion of tweets published within the ith hour of a day by the user; similarly weekly activity distribution of a user is characterized by a distribution of seven ratios, and the ith -ratio indicates the average proportion of tweets published within the ith day of a week by the user.

IV. CONCLUSION

Our project "Connecting Social Media to E-Commerce: Cold-Start Product Recommendation using Micro blogging Information" includes admin login, ecommerce login and user login. E-commerce website supports social login by connecting with people through internet and can send and accept friend requests. They can also recommend the products to their friends. Thus the products recommended by users more are rated on top of the list. The combination of both social networking sites and e-commerce websites makes this project a unique one.

The project has covered almost all the requirements. Further requirements and improvements can easily be done since the coding is mainly structured or modular in nature. Improvements can be appended by changing the existing modules or adding new modules. In addition to that we propose from base paper an addition of approximate future customer for product is calculated using neural networks.

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