Cross Site Cold Start Product Recommendation Using Micro Blogging Information

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Abstract--- *Nowadays many e-commerce Web sites support the mechanism of social login where users can sign on the Web sites using their social network identities. The solution for cross-site cold-start product recommendation, which aims to recommend products from e- commerce Web sites to users at social networking sites in "cold-start" situations. In specific, to learning both users' and products' feature representations from data collected from e-commerce Web sites 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.*

Keywords-*e-commerce, cold-start, recurrent neural network, modified gradient boosting tree, feature-based matrix factorization.*

I. PROBLEM DESCRIPTION

Although online product recommendation has been constructing solutions within certain e-commerce websites. To 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. It mainly utilizes users' historical transaction records. It is a challenging task to transform the social networking information into latent user features which can be effectively used for product recommendation.

II. PROPOSED SYSTEM

Novel problem of recommending products from an e-commerce website to social networking users in "cold-start" situations. To apply the recurrent neural networks for learning correlated feature representations for both users and products from data collected from an e-commerce website. To propose a modified gradient boosting trees method to transform users' micro blogging attributes to latent feature representation which can be easily incorporated for product recommendation. Apply a feature-based matrix factorization approach by incorporating user and product features for cold-start product recommendation.

III. MERITS

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).It is easy to transform social networking features to latent features for product recommendation.

IV. LITERATURE SURVEY

1] Opportunity model for e-commerce recommendation: Right product; right time
Author:-J. Wang and Y. Zhang
Description: Most of existing e-commerce suggested systems aim to recommend the proper product to a user, supported whether or not the user is probably going to buy or sort of a product. On the opposite hand, the effectiveness of recommendations conjointly depends on the time of the advice. Allow us to take a user World Health Organization simply purchased a laptop computer as an example. She might purchase a replacement battery in a pair of years (assuming that the laptop computer's original battery typically fails to figure around that time) and get a brand new laptop in another a pair of years. During this case, it's not a decent plan to suggest a brand new laptop computer or a replacement battery right when the user purchased the new laptop computer. It may hurt the user's satisfaction of the recommender system if she receives a doubtless right product recommendation at the incorrect time. We have a tendency to argue that a system mustn't solely suggest the foremost relevant item, however conjointly suggest at the proper time.

2] Retail sales prediction and item

recommendations using customer demographics at store level
Author:-M. Giering
Description: This paper outlines a retail sales prediction and products recommendation system that was enforced for a sequence of retail stores. The relative importance of client demographic characteristics for accurately modelling the sales of every client kind square measure derived and enforced within the model. Knowledge consisted of daily sales data for 600 products at the shop level, broken out over a collection of non-overlapping client varieties. A recommender system was designed supported a quick on-line skinny Singular worth Decomposition. It's shown that modelling knowledge at a finer level of detail by clump across client varieties and demographics yields improved performance compared to one mixture model designed for the complete dataset. Details of the system implementation square measure represented and sensible problems that arise in such real-world applications square measure mentioned.

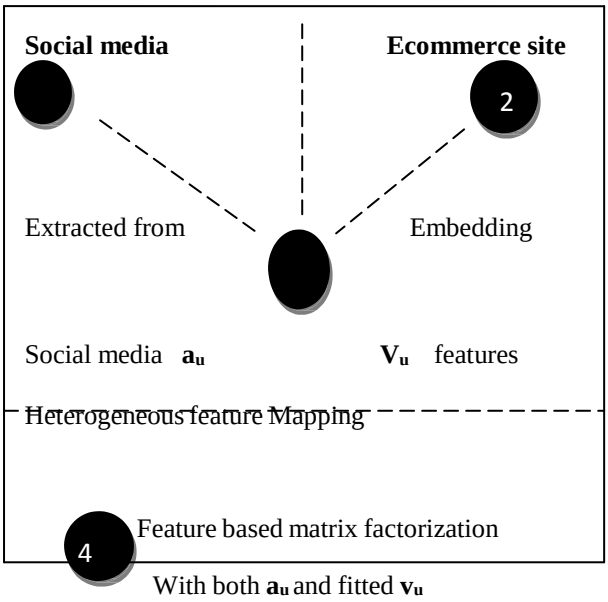
3] Amazon.com recommendations: Item-to-item collaborative filtering
Author:-G. Linden, B. Smith, and J. York
Description: Recommendation algorithms area unit best glorious for his or her use on e-commerce internet sites, wherever they use input a couple of customer's interests to come up with an inventory of suggested things. Several applications use solely the things that customers purchase and expressly rate to represent their interests, however they'll additionally use alternative attributes, together with things viewed, demographic information, subject interests, and favourite artists. At Amazon.com, we tend to use recommendation algorithms to change the web store for every client. The shop radically changes supported client interests, showing programming titles to a engineer and baby toys to a replacement mother. There are unit 3 common approaches to resolution the advice problem: ancient cooperative filtering, cluster models, and search-based strategies. Here, we tend to compare these strategies with our algorithmic program that we tend to decision item-to-item cooperative filtering.

4] The new demographics and market fragmentation
Author:-V. A. Zeithaml
Description: The underlying premise of this text is that dynamic demographics can result in a breakage of the mass markets for grocery product and supermarkets. A field study investigated the relationships between five demographic factors-sex, feminine operating standing, age, income, and matrimonial status-and a large vary of variables related to preparation for and execution of food market looking. Results indicate that the demographic teams dissent in important ways that from the standard food market shopper. Discussion centers on the ways in which dynamic demographics and family roles might have an effect on retailers and makers of grocery product.

5. We know what you want to buy: a demographic-based system for product recommendation on micro blogs
Author:- W. X. Zhao, Y. Guo, Y. He, H. Jiang, Y. Wu, and X. Li
Description: Product recommender systems square measure usually deployed by e-commerce websites to boost user expertise and increase sales. However, recommendation is proscribed by the merchandise data hosted in those e-commerce sites and is barely triggered once users square measure playing e-commerce activities. During this paper, we tend to develop a completely unique product recommender system known as breed, a merchandiser Intelligence recommender System that detects users' purchase intents from their micro blogs in close to time period and makes product recommendation supported matching the users' demographic data extracted from their public profiles with product demographics learned from micro blogs and on-line reviews. Breed distinguishes itself from ancient product recommender systems within the following aspects: 1) breed was developed supported a micro blogging service platform. As such, it's not restricted by the knowledge obtainable in any specific e-commerce web site. Additionally, breed is in a position to trace users' purchase intents in close to time period and build recommendations consequently. 2) In breed, product recommendation is framed as a learning to rank drawback. Users' characteristics extracted from their public profiles in micro blogs and products' demographics learned from each on-line product reviews and micro blogs square measure

fed into learning to rank algorithms for product recommendation.

Architecture Diagram



Modules

1) Extracting And Representing Micro blogging Attributes
   i) Micro blogging Feature Selection
   ii) Distributed Representation Learning With Recurrent Neutral Networks
   iii) Heterogeneous Representation Mapping using Gradient Boosting Regression Trees
2) Applying The Transformed Features To Cold-Start Product Recommendation
   i) The General SVDFeature Framework for Product Recommendation

V. MODULES DESCRIPTION

1) Extracting and Representing Micro blogging Attributes

a) Micro blogging Feature Selection

DEMOGRAPHIC ATTRIBUTES

A demographic profile (often shortened as "a demographic") of a user such as sex, age and education can be used by e-commerce companies to provide better personalized services.

Text Attributes

Recent studies have revealed that micro blogs contain rich commercial intents of users. Also, users' micro blogs often reflect their opinions and interests towards certain topics. As such, we expect a potential correlation between text attributes and users' purchase preferences.

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 parse out latent user groups by the users' following patterns assuming that users in the same group share similar purchase preferences.

b) Distributed Representation Learning With Recurrent Neutral Networks

We have discussed how to construct the micro blogging feature vector a_u for a user u.However; it is not straightforward to establish connections between a_u and products. Intuitively, users and products should be represented in the same feature space so that a user is closer to the products that she has purchased compared to those she has not. Inspired by the recently proposed methods in learning word embeddings using recurrent neutral networks, we propose to learn user embeddings or distributed representation of user v_u in a similar way.

c) Heterogeneous Representation mapping using Gradient Boosting Regression Trees

We have presented how to construct a micro blogging feature vector a_u from a micro blogging site and learn a distributed representation v_u from an e-commerce website respectively. In the cross-site cold-start product recommendation problem we considered in this paper (i.e., make a product recommendation to a user u who has never purchased any products from an ecommerce website), we can only obtain the micro blogging feature vector a_u for user u. The key idea is to use a small number of linked users across sites as a bridge to learn a function which maps the original feature representation a_u to the distributed representation v_u.

2) Applying the Transformed Features to Cold-Start Product Recommendation

The General SVDFeature Framework for Product Recommendation

SVDFeature is built based on the traditional matrix factorization approach, and it considers factorization in three aspects, namely global features (also called as dyadic features), user features and item features.

VI. CONCLUSION

In this paper, we have studied a novel problem, cross-site cold-start product recommendation, i.e., recommending products from e-commerce websites to Micro blogging users without any historical records. For this, we have used the social media connectivity for a new user for knowing his/her profile information.

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