Recommender Systems with Social Regularization

Pulkit Kariryaa  Anubhav Kumar
15111031  13132

Guide: Prof. Piyush Rai

Abstract
Recommender system is a information filtering system which is used to predict user responses to various options. In this project we will try to use the social graph available for a user to improve the obtained results. Social influence plays an important role in product marketing. We try to implement personalize recommender system which can utilize information in social networks. For this, we will implement a matrix factorization framework with social regularization.

Motivation
Recommender systems have become very useful in giving users suggestions on the product they might like and is widely used in e-commerce like Amazon, Netflix etc. Traditional approaches to recommender systems are based on collaborative filtering methods but make no use of social data available.

With the deep penetration of social media, and it's tight linking with e commerce sites(facebook login etc.) gives us an opportunity to tackle this problem keeping in mind that now we have the social information of the person to exploit. Since we rely on recommendations of friends in real life, such info can easily be gathered from social networks and used to improve existing recommender systems.

Previous work
Traditional Recommendation system use Collaborative filtering.
It has two subclasses- Neighborhood based approaches and model based approaches.

Neighborhood based approaches employs various similarity measures in different ways to come up with the possible rating a user can give to an item, using the information available from user-item rating matrix.

Model Based approaches tries to explain the data by developing a suitable model, and then using that model to predict ratings of a user for a particular product.

This was further improved by trust based approach where a user marks people who they deem similar to themselves in a trust circle. This trust circle is used to improve the earlier approach.

It had the limitation that we were relying on strangers to infer ratings of a user, but this is not always reliable. In the real world, advice of known people and friends are found to be more relevant to a user. Also, strangers may match the user in some way and their likings can coincide, but for
other things they can be completely different. While for friends, the set of common likings is larger. Traditional approaches missed out completely on the social data available to us, and are therefore limited in the quality of their results.

**Proposed Approach**

Our task is to effectively predict the missing values in the user-item matrix by using different data sources like social information matrix.

There are various approach to recommender system. One approach is to factorize the user-item matrix using low rank matrix factorization and predict missing data.

To implement social model we will use two methods:
- Average based regularization and individual based regularization

**Datasets**

In this project we will use product review data sets called Epinions and Ciao. Epinions was a general customer review website and for each user it contains profile, Rating and trust relation information. Ciao is an online-shopping portal and it contains data similar to Epinions.

**Timeline**
References

1. Hao Ma, Dengyong Zhou, Chao Liu, Michael R. Lyu, Irwin King. Recommender systems with social regularization, Proceedings of the fourth ACM international conference on Web search and data mining, February 09-12, 2011, Hong Kong, China

