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Item Based Collaborative Filtering Recommendation System

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ABSTRACT: Recommender systems are used to assist users in making choices from various alternatives. Goal is to understand users' preferences and makes suggestions on appropriate actions. A social recommender system tries to improve the accuracy of conventional recommender systems by taking the social interest and social trust between users in social networks into account. The Item Based Collaborative Filtering is used for the recommendation system, to provide the effective recommendation for the individual user based on the reviews. The item based is a form of collaboration system based on the similarity between items calculated using people's rating of those items. The recommendation may differ from user to user depending on the data density for each user's item rating and relationship network and it also evolve over time. The social recommender system maintains a controlled size of close/ stable relationship network for each user and tries to improve the accuracy of conventional recommender system by taking the social interest and social trust between users in social network into account.

KEYWORDS: Social recommendation, Social network, Sparsity, scalability, neighbourhood model

I. INTRODUCTION

In recent years, social media has enriched and sometimes dominated many individual's social activities, connecting them with their families, friends, colleagues, and even total strangers. It has produced rich social relationship information such as friendships in Facebook and Douban, followers in Twitter, and trust in Epinions. The vast quantity of online social relationships not only makes it easier for individuals to share their opinions, however can also serve as an additional source of information to enhance simple rating based recommendations. Recommender systems are used to assist users in making choices from various alternatives. Their goal is to understand users' preferences and makes suggestions on appropriate actions. A social recommender system tries to improve the accuracy of conventional recommender systems by taking the social interest and social trust between users in social networks into account.

This approach is to address the infused complexity of social relationships in social recommender systems. The approach can be applied to both user-user and item-item relationships. It defines the individual relationship network (IRN) for each user or item, and present an algorithm based on the similarity, density and confidence measures to make a balance between its accuracy and efficiency. The recommendation method addresses the cold start problem, captures the diversity of tastes between connected users, and enables scalability by fusing MF and neighbourhood models via IRN's. The method generates an individual relationship network for each user/item to control the complexity of social relations. Moreover, existing social recommendation methods try to reduce data sparsity and cold-start users from the user perspective, however the cold-start problem for items still remains. This approach incorporates item relationship network by using user-oriented and item-oriented perspective and can address the cold-start problem for items.

The system fuse the neighbourhood model and MF via IRN's to maximize the potential of relationship network. Unlike the regularization method with predefined similarities in relationship network, it models the taste diversity between

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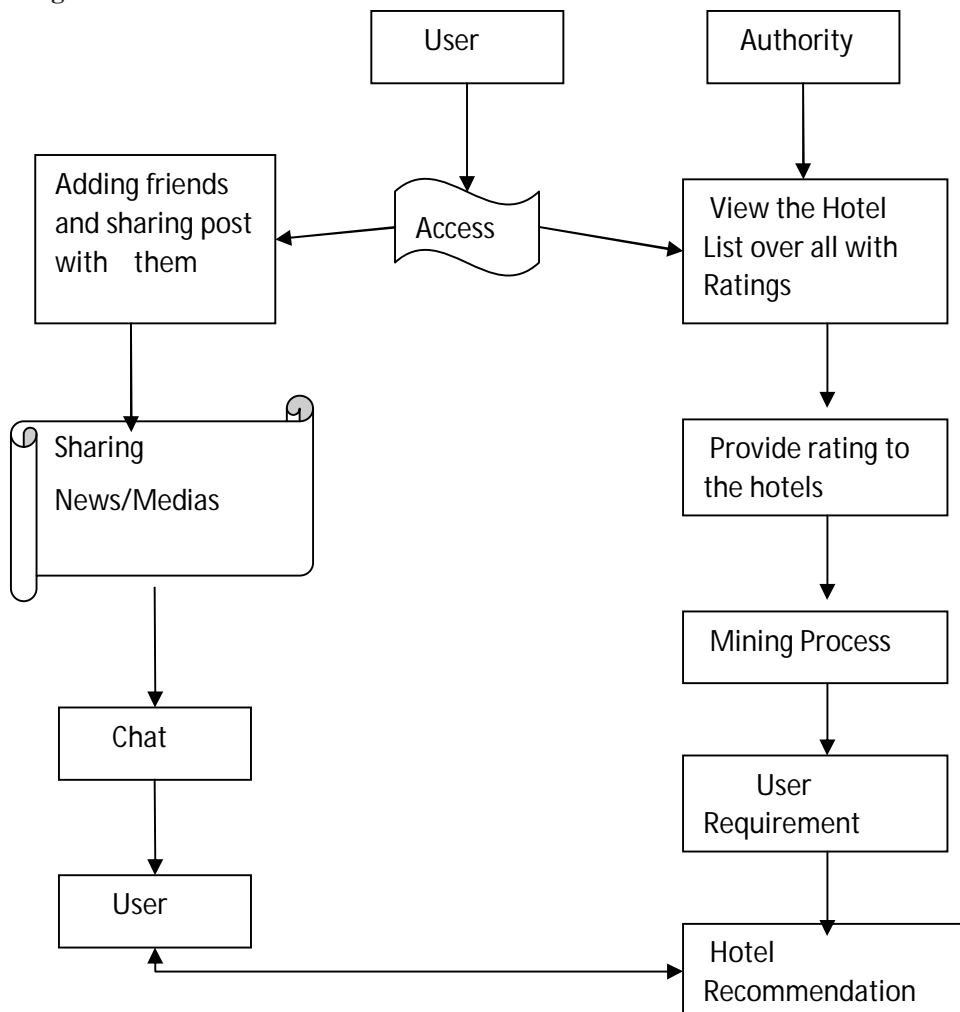
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relationship members as dynamic similarity constraint to capture the time-evolving nature of tastes in model learning. Unlike earlier works with a manual control of balance coefficient, our method targets the social influence as an extra user-item specific bias and absorbs the balance coefficient into an interpolation weight matrix which represents the influence a user exert on another user, since the influence is learned from the data automatically.

II. PROPOSED SYSTEM

The approach can be applied to both user-user and item-item relationships. It defines the individual relationship network (IRN) for each user or item, and present an algorithm based on the similarity, density and confidence measures to make a balance between its accuracy and efficiency. Therecommendation method addresses the cold start problem, captures the diversity of tastes between connected users, and enables scalability by fusing MF and neighbourhood models via IRN's. This method generates an individual relationship network for each user/item to control the complexity of social relations. Moreover, existing social recommendation methods try to reduce data sparsity and cold-start users from the user perspective,however the cold-start problem for items still remains. This approach incorporates item relationship network by using user-oriented and item-oriented perspective and can address the cold-start problem for items.

System Design



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Sub Systems

The algorithms used are

1. Collaborative Filtering algorithm
2. Recommendation System algorithm
3. Distributed and privacy preserving

The system consists of four subsystems and they are

- Social Network Application
- Data Sharing with Access Control
- User view and Rating System
- Social Recommender System

1. Social Networking Web Application

In this module, the OSN web application is build as social networking application in which new user can register for the services. The registration fields are validated user is able to login with his credentials. The user's can set Cover picture, Profile photos and can add friends. The friend request will be dispatched to end user account and will be readily available once he logged in. He can accept/reject the friend request. The friend list is shown in the right panel and can be able to chat with the recipient private manner.

2. Data Sharing With Access Control

In this Module, The user's can post some News, Images and Video and some other information. These posts can be shared with friends with access control. The shared posts can be viewed by friends if they have proper access control once they login. Friends can reply to the posts with some comments and like/dislike the posts.

3. User View And Rating System

In this Module, to collect the user friends list from social network. And user views the all hotel names and its overall ratings. To search the specified hotel rating information in the database. The user can be rated to the selected hotel and its attributes (e.g.: rating overall, rating room, rating cleanliness, etc).The hotel rating attributes are updated to the database.

4. Social Recommender System And Graphical Rating

In this Module, The mining process is performed to filter the hotel list.to filter out the friends and friends of friends rated hotel list and show them to the user. The user gives the requirement for hotel (e.g.: cleanliness, room, service, Location, etc). The users' preferences are cumulated based on user requirement. The user requirements are find to the friends list, the required list not in the friends rated list to find the friend of friends rated list. Finally recommend the user requirement hotel.

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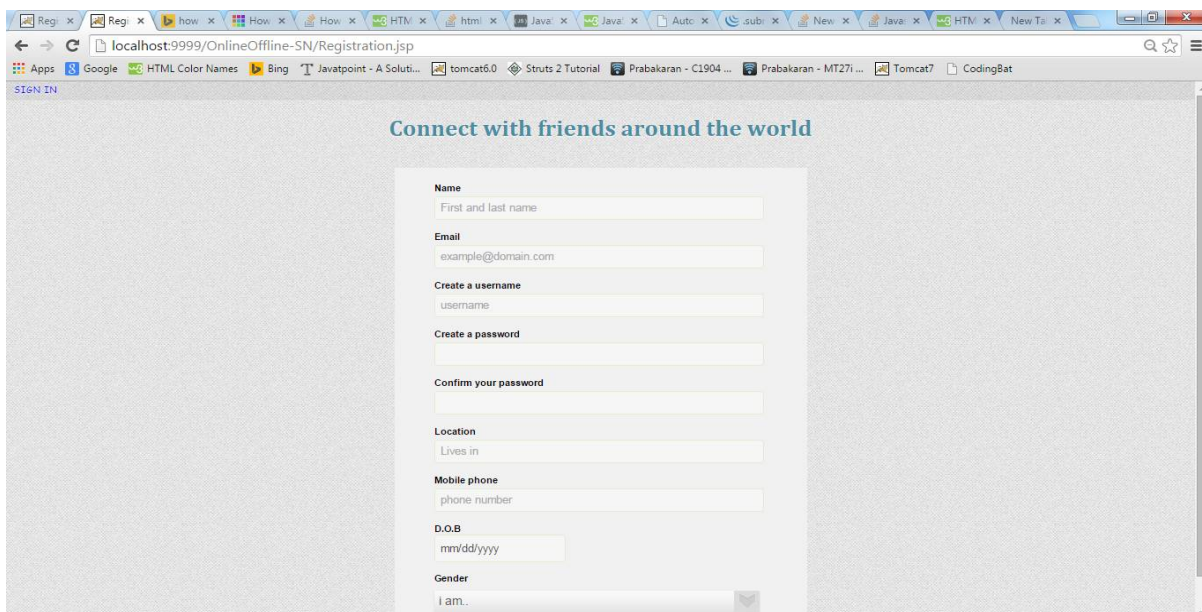
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III. RESULTS

Welcome Page:



Registration:



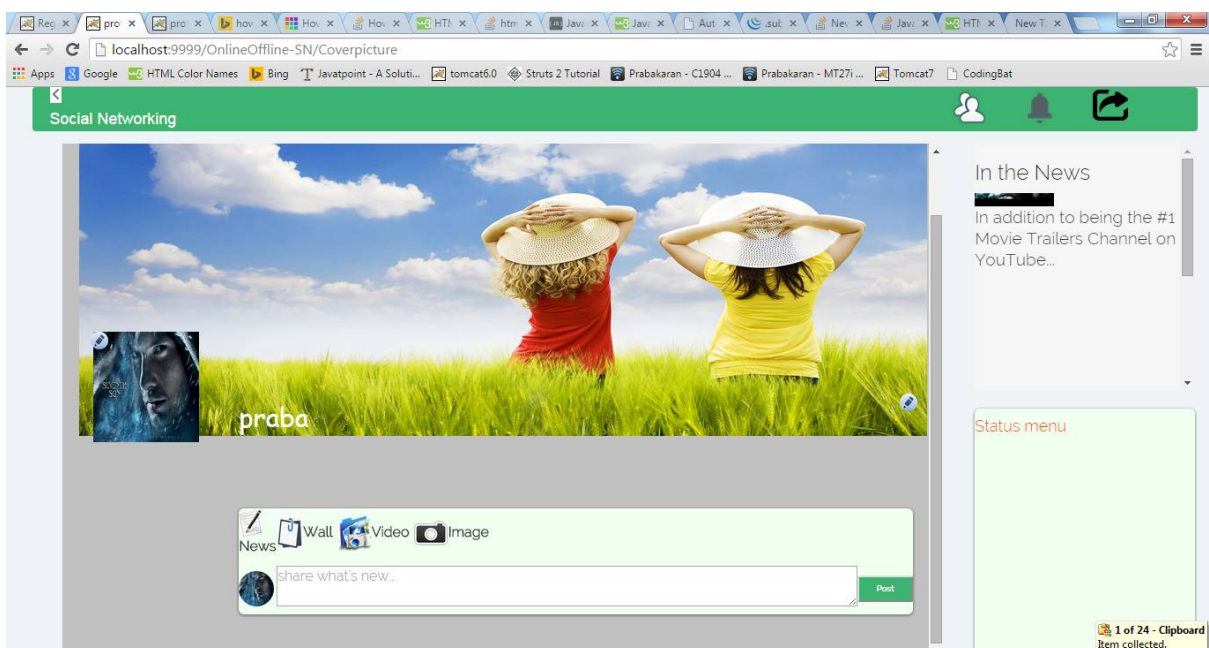
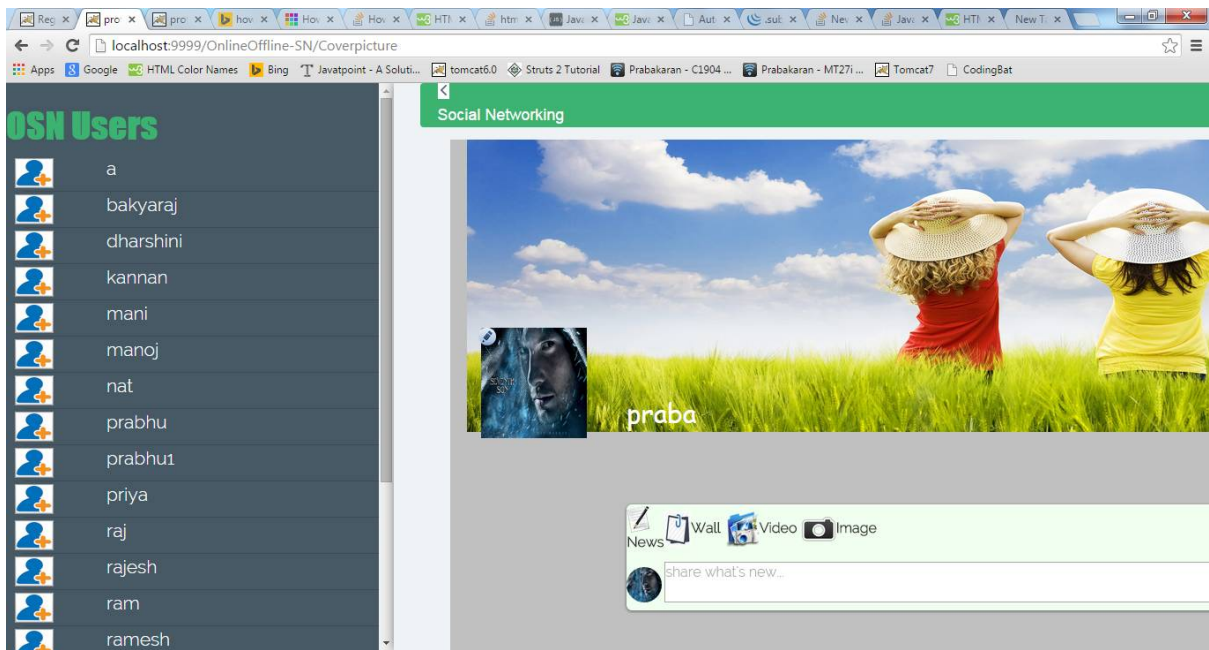
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Profile Page:

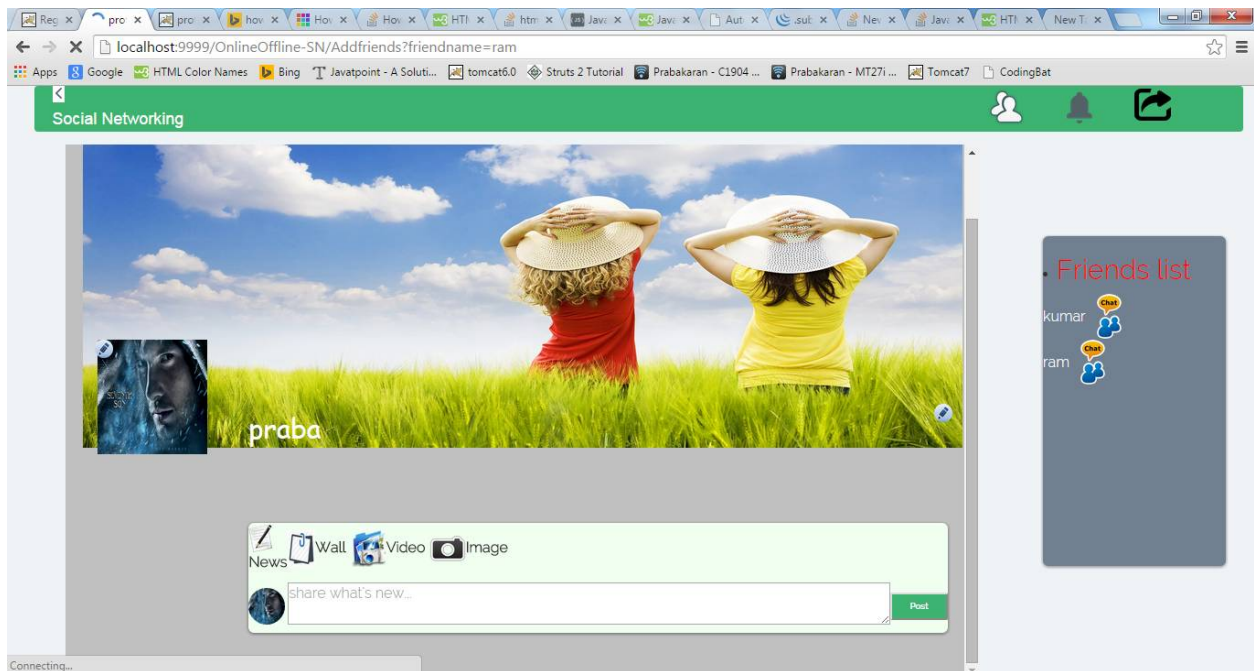
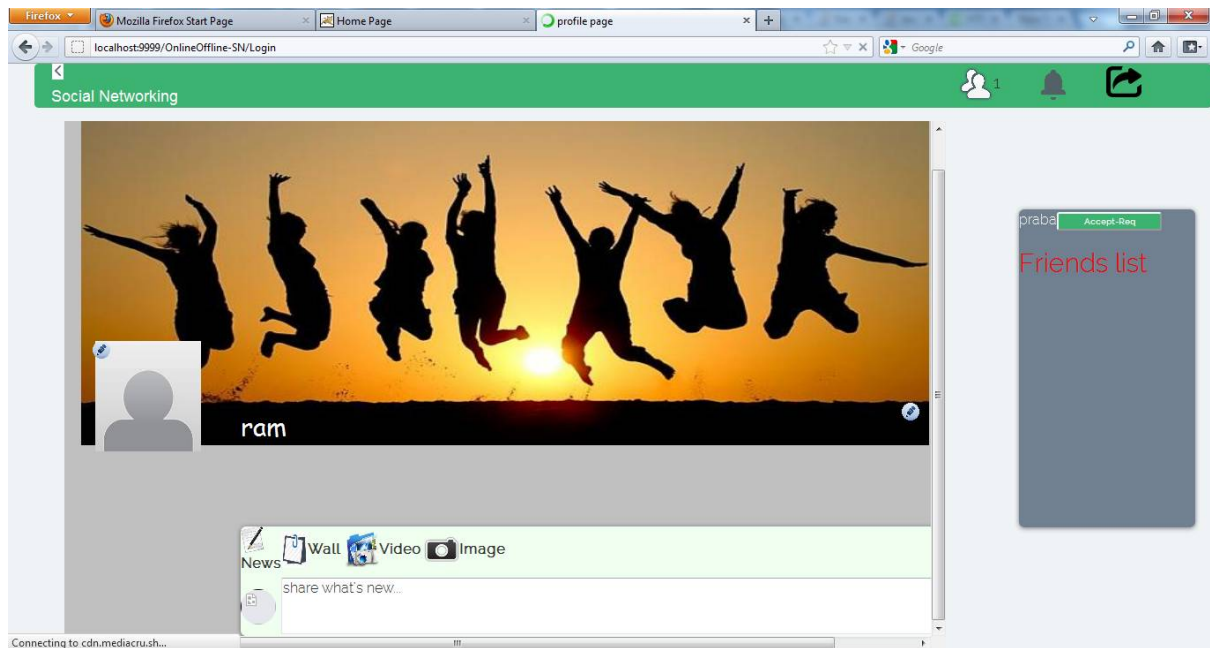


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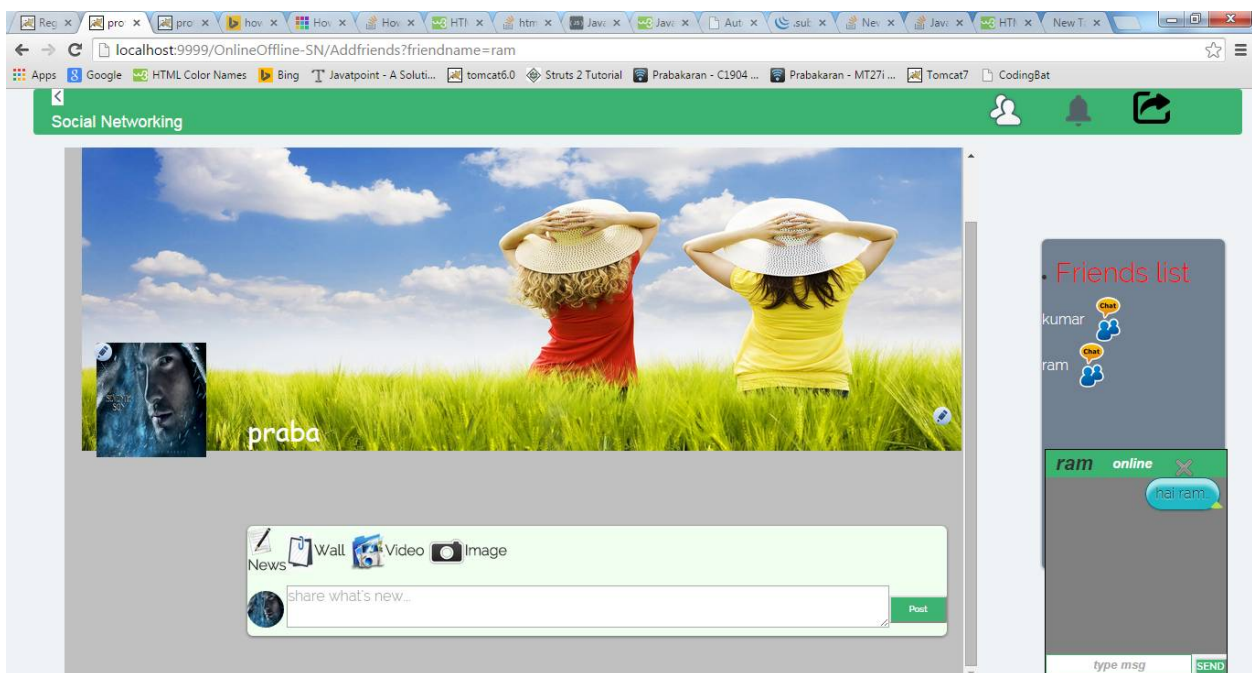
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Chatting



IV. CONCLUSION AND FUTUREWORK

This paper presents a social recommendation approach that exploits individual relationship networks (IRN's) for users and items to address the huge size, sparsity, imbalance and noise in relationship networks and to improve efficiency and accuracy of social recommender system. This recommendation approach improves the accuracy by adaptively handling the trade-off between individual preferences and experiences and social influence, taking into account the diversity of tastes between relationship members. This method further enables the scalability for relationship networks by filtering out noise and redundant connections of relationship networks at the same time.

An experimental study on four datasets from Epinions, Flixster, Doub anand Netflix has been conducted. The results show that the proposed approach achieves a better prediction accuracy and scalability in most cases. Moreover, the results show that using IRN's in item recommendation improves the scalability without losing accuracy in most cases. The results also show that all social relationships should not be considered equal in social recommender systems[24].

The current study attempts to all eviate the inherent problems of the social recommender systems and match the needs of recommendation accuracy and scalability. However, performance improvement is still possible for future work. First, this study highlights the importance of the data- set with relationship networks. If the intersection of the business with user information space is intrusive or adds clutter, efforts can fail and may drain value from users and online communities. Thus, preserving privacy while employing social networks should be considered. This study also focuses on mining the relationships between users and between items but has less consideration for the context of users and items (e.g., time, location, emotion and active status)[48]. Many application scenarios rely only on the relationships between users and/or items that do not generate effective recommendations. The proposed approach is general and can be easily extended to incorporate other contextual information.

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REFERENCES

- [1] X. Yang, H. Steck, and Y. Liu, "Circle-based recommendation in online social networks," in Proc. 18th ACM SIGKDD Int. Conf. Knowl. Discovery Data Mining, 2012, pp. 1267–1275
- [2] X. Yang, Y. Guo, Y. Liu, and H. Steck, "A survey of collaborative filtering based social recommender systems," *Comput. Commun.*, vol. 41, pp. 1–10, 2014.
- [3] J. Tang, X. Hu, and H. Liu, "Social recommendation: A review," *Social Netw. Anal. Mining*, vol. 3, no. 4, pp. 1113–1133, 2013.
- [4] Y.-M. Li, C.-T. Wu, and C.-Y. Lai, "A social recommender mechanism for e-commerce: Combining similarity, trust, and relationship," *Decision Support Syst.*, vol. 55, no. 3, pp. 740–752, 2013.
- [5] H. Ma, H. Yang, M. R. Lyu, and I. King, "SoRec: Social recommendation using probabilistic matrix factorization," in Proc. 17th ACM Conf. Inf. Knowl. Manage., 2008, pp. 931–940.
- [6] H. Ma, I. King, and M. R. Lyu, "Learning to recommend with social trust ensemble," in Proc. 32nd Int. ACM SIGIR Conf. Res. Develop. Inf. Retrieval, 2009, pp. 203–210.
- [7] H. Ma, D. Zhou, C. Liu, M. R. Lyu, and I. King, "Recommender systems with social regularization," in Proc. 4th ACM Int. Conf. Web Search Data Mining, 2011, pp. 287–296.
- [8] M. Jamali and M. Ester, "TrustWalker: A random walk model for combining trust-based and item-based recommendation," in Proc. 15th ACM SIGKDD Int. Conf. Knowl. Discovery Data Mining, 2009, pp. 397–406.
- [9] M. Jamali and M. Ester, "A matrix factorization technique with trust propagation for recommendation in social networks," in Proc. 4th ACM Conf. Recommender Syst., 2010, pp. 135–142.
- [10] Q. Yuan, L. Chen, and S. Zhao, "Factorization versus regularization: Fusing heterogeneous social relationships in top-N recommendation," in Proc. 5th ACM Conf. Recommender Syst., 2011, pp. 245–252.
- [11] J. Noel, et al., "New objective functions for social collaborative filtering," in Proc. 21st Int. Conf. World Wide Web, 2012, pp. 859–868.
- [12] C. C. Chen, Y.-H. Wan, M.-C. Chung, and Y.-C. Sun, "An effective recommendation method for cold start new users using trust and distrust networks," *Inf. Sci.*, vol. 224, pp. 19–36, 2013.
- [13] C. Chen, X. Zheng, Y. Wang, F. Hong, and Z. Lin, "Context-aware collaborative topic regression with social matrix factorization for recommender systems," in Proc. 28th AAAI Conf. Artif. Intell., 2014, pp. 9–15.
- [14] G. Guo, J. Zhang, and N. Yorke-Smith, "TrustSVD: Collaborative filtering with both the explicit and implicit influence of user trust and of item ratings," in Proc. 29th AAAI Conf. Artif. Intell., 2015, pp. 123–129.
- [15] H. Liu, Z. Hu, A. Mian, H. Tian, and X. Zhu, "A new user similarity model to improve the accuracy of collaborative filtering," *Knowl.-Based Syst.*, vol. 56, pp. 156–166, 2014.
- [1] X. Yang, H. Steck, and Y. Liu, "Circle-based recommendation in online social networks," in Proc. 18th ACM SIGKDD Int. Conf. Knowl. Discovery Data Mining, 2012, pp. 1267–1275
- [3] J. Tang, X. Hu, and H. Liu, "Social recommendation: A review," *Social Netw. Anal. Mining*, vol. 3, no. 4, pp. 1113–1133, 2013.
- [4] Y.-M. Li, C.-T. Wu, and C.-Y. Lai, "A social recommender mechanism for e-commerce: Combining similarity, trust, and relationship," *Decision Support Syst.*, vol. 55, no. 3, pp. 740–752, 2013.
- [5] H. Ma, H. Yang, M. R. Lyu, and I. King, "SoRec: Social recommendation using probabilistic matrix factorization," in Proc. 17th ACM Conf. Inf. Knowl. Manage., 2008, pp. 931–940.
- [6] H. Ma, I. King, and M. R. Lyu, "Learning to recommend with social trust ensemble," in Proc. 32nd Int. ACM SIGIR Conf. Res. Develop. Inf. Retrieval, 2009, pp. 203–210. [7] H. Ma, D. Zhou, C. Liu, M. R. Lyu, and I. King, "Recommender systems with social regularization," in Proc. 4th ACM Int. Conf. Web Search Data Mining, 2011, pp. 287–296.
- [8] M. Jamali and M. Ester, "TrustWalker: A random walk model for combining trust-based and item-based recommendation," in Proc. 15th ACM SIGKDD Int. Conf. Knowl. Discovery Data Mining, 2009, pp. 397–406.
- [9] M. Jamali and M. Ester, "A matrix factorization technique with trust propagation for recommendation in social networks," in Proc. 4th ACM Conf. Recommender Syst., 2010, pp. 135–142.
- [10] Q. Yuan, L. Chen, and S. Zhao, "Factorization versus regularization: Fusing heterogeneous social relationships in top-N recommendation," in Proc. 5th ACM Conf. Recommender Syst., 2011, pp. 245–252.
- [11] J. Noel, et al., "New objective functions for social collaborative filtering," in Proc. 21st Int. Conf. World Wide Web, 2012, pp. 859–868.
- [12] C. C. Chen, Y.-H. Wan, M.-C. Chung, and Y.-C. Sun, "An effective recommendation method for cold start new users using trust and distrust networks," *Inf. Sci.*, vol. 224, pp. 19–36, 2013.
- [13] C. Chen, X. Zheng, Y. Wang, F. Hong, and Z. Lin, "Context-aware collaborative topic regression with social matrix factorization for recommender systems," in Proc. 28th AAAI Conf. Artificial Intelligence., 2014, pp. 9–15.
- [14] G. Guo, J. Zhang, and N. Yorke-Smith, "TrustSVD: Collaborative filtering with both the explicit and implicit influence of user trust and of item ratings," in Proc. 29th AAAI Conf. Artificial Intelligence., 2015, pp. 123–129.
- [15] H. Liu, Z. Hu, A. Mian, H. Tian, and X. Zhu, "A new user similarity model to improve the accuracy of collaborative filtering," *Knowledge-Based Syst.*, vol. 56, pp. 156–166, 2014.