MAPPING SOCIAL NETWORKS FOR LEAST COST INFLUENCE USING COUPLING

Bessmitha S
PG student, Department of CSE
Ponjesly College of Engineering, Nagercoil

Shajini N
Assistant Professor,Department of CSE
Ponjesly College of Engineering, Nagercoil

Abstract-The online social network has become popular for sharing the information. Online social networks exhibit many platforms to create awareness of new products. In recent time Least cost Influence problem to find minimum number of seed user is most important topic in online social networks. The eventual target is to find the least advertising cost set of users which produce enormous influence. When considering the single network the spread of information is estimated incorrectly. So it is difficult to find the influential user. To overcome this multiple network is used. In multiple networks the Least Cost Influence problem is managed by finding seed user. The seed user is found by mapping set of networks into single network through coupling schemes.

Keywords: Coupling, influence, diffusion, multiple networks, online social networks.

I. INTRODUCTION

A social network is a social structure made up of a set of social actors such as individuals or organizations, and other social interactions between actors. The social network perspective provides a set of methods for analyzing the structure of whole social entities as well as a variety of theories explaining the patterns observed in these structures. The study of these structures uses social network analysis to identify local and global patterns, locate influential entities, and examine network dynamics. A Social network can be defined as a set of socially relevant individuals with some patterns of interactions or contacts among them, which are connected by one or more online relations. Online social networks provide platforms for users to share information and to communicate with their families and friends. With the prosperous development of online social networks, many marketers have exploited the opportunities and attempt to select influential users within online social media to influence other users through online.

The growth of online social networks like facebook, twitter, gmail and so on has created major communication medium. The people of 83% believe platforms like twitter, facebook help them make new friends. Each day facebook users spend 10.5 billion minutes on the online social network. 50% of facebook users have more than 100 friends, 340 million tweets are sent out every day on twitter. An online social network can be defined as a set of socially relevant individuals with some patterns of interactions or contacts among them, which are connected by one or more online relations. Online social networks provide platforms for users to communicate and share information with the relatives and friends effectively, connecting users across the world. The various online social networks are fundamentally classified by their node degree distributions. The most frequently mentioned categories of online social networks are randomly distributed, scale free and complex networks.

Online social networks are self-organizing, emergent, dynamic, and complex. They are most commonly characterized as scale-free and small-word effect. The scale-free network was defined as a social network whose degree distribution is at least infinitely close to a power law form indicating that the network is independent of the social network scale. The main feature of a scale-free social network is

inhomogeneity. Most of the nodes in a social network have few physical link connections, while the connections of a few nodes far exceed the average number of physical link connections within the social network. An online social network is the small-word effect. It describes that almost any two nodes in the online social network even non-neighboring nodes can be connected by a very short path. In addition, small-world online social networks are governed by two important parameters clustering, coefficient and the diameter.

II.   RELATED WORK

In existing the single network was used. In this it is very difficult to find the overlapping users. While considering the single network the information are spread inaccurately. The influence in only one network fails to identify the most influential users [1]. There are also works on linear threshold model in which the active user can be found only up to a threshold value. Then the greedy algorithm is used in which the improvements are slow and not scalable [2] .The researches have started to explore multiplex networks [3], [4] which studied the connection between offline and online networks. In existing it focus on information sharing but it does not focus on solving least cost influence problem.

III.   PROPOSED SYSTEM

The least cost influence problem is solved by coupling multiple networks into single network. The seed user is found from the coupled network. The seed user refers to the user who is active for more time in online social network. The seed user will propagate massive influence. To find the seed user the improved greedy algorithm is used. It improves the scalability in large network.

3.1   NETWORK INITIALIZATION

A social networking service is a platform to build social networks or social relations among people who share similar personal and career interests, activities, background or real life connection. Create one or more social network for the information sharing in the online social network so it helps us to gather information from one user to another user.

The accounts are initialized by registering all the individual elements into database and common password is given. By giving network id and password login to the network and the information are shared.

3.2   COUPLING NETWORK

The multiple networks are coupled into single network by using star lossless coupling. The star lossless coupling is the one in which multiple inputs are given and it gives one output. In star loss less coupling the coupling is done by synchronizing the network edges. The networks are coupled by connecting intermediate node. The intermediate node act as the gateway and all the information are transferred through the intermediate node. The lossless coupling scheme returns solution with higher quality. To understand the benefit of taking consideration of overlapping users and coupled network, influencing a fraction of the nodes in all networks by selecting seeds from each network and taking the union to compare with seeds achieved from lossless coupling scheme.

3.3   FINDING SEED USER

The seed users are the users that actively participate in network. In multiple networks the seed user is found based on all online social networks they participate. Seed user can trigger massive

influence diffusion. The seed user is found by implementing greedy algorithm. The greedy algorithm is designed to achieve optimal solution. A scalable greedy algorithm is used to solve the LCI problem. The greedy algorithm runs much faster in the Lossless coupled networks. In particular, the improvement factor scales up with the size of the network which allows the algorithm to run on very large networks with millions of nodes. Considering multiplex networks instead of a single network can effectively choose the most influential users.

In greedy algorithm the threshold value is used. The users who are using the network above threshold value are inserted in to the heap. The heap sorts the active user by extracting the maximum user. The heap is a special case of balanced binary tree data structure where root node is compared with its children and is sorted as   key (α) $\geq$ key (β). The seed users are found and the information is shared through the seed user to the different network. The lossless coupling scheme achieves the best result in both networks. When the networks is considered as a standalone network and choose seeds individually, the seeds size is relatively larger than choosing from the coupled network. The sizes decrease this improvement is also due to the information diffusion across several networks by the overlapping users.
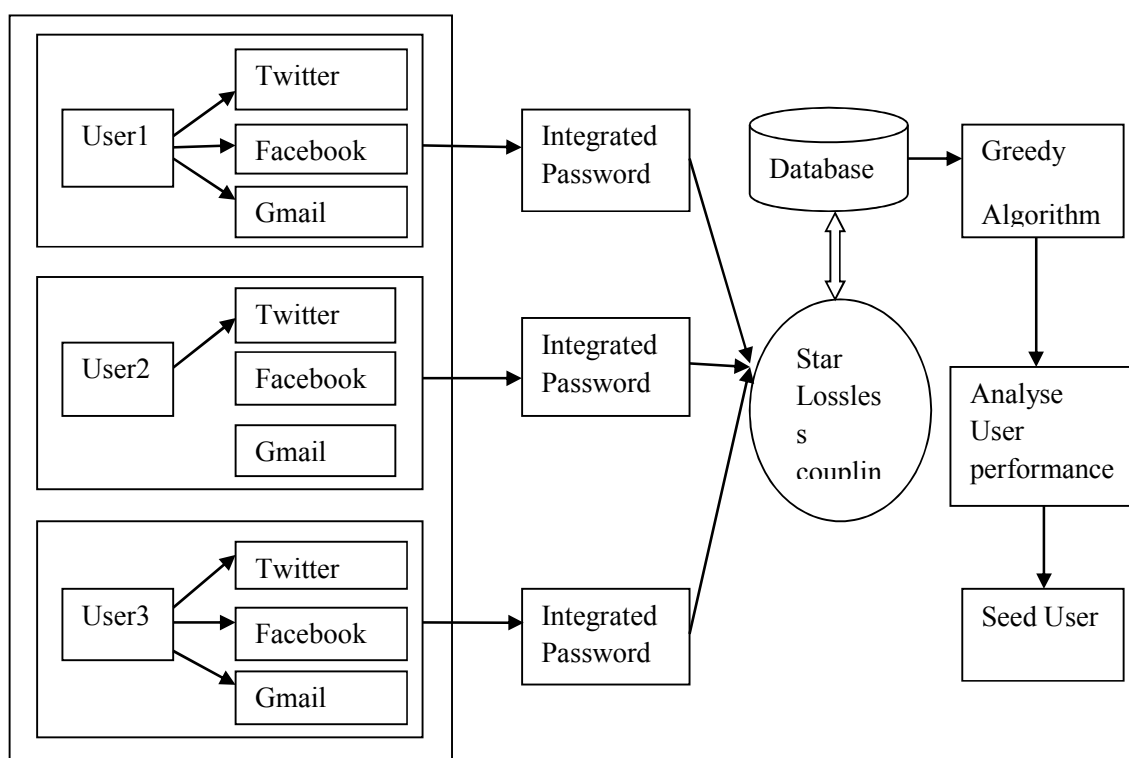

Figure 1: Architecture diagram

The Figure explains the system architecture of the proposed system to find seed user. The seed users are the one who active in online social network for long time. It is mainly used in viral marketing. When a company produces a new product they advertise the new products in online social networks. While advertising these products in single network its cost is very high and the seed user is found inaccurately because the seed user found in one network will be highly active in other network. To avoid this multiple network is used. The same user uses multiple networks. So to find the seed user in multiple networks the networks are coupled into single network. In this project facebook, gmail and twitter are considered. The user registers to multiple network and give the integrated password. The multiple networks of the different user are coupled using star lossless coupling. After coupling all the multiple networks into single network all these information are stored in the database. From the database by using greedy algorithm the performance of each user is analyzed and the seed user is found. In greedy algorithm

the users above threshold value are inserted into the heap and heap sorts all the user and maximum user will be the seed user.
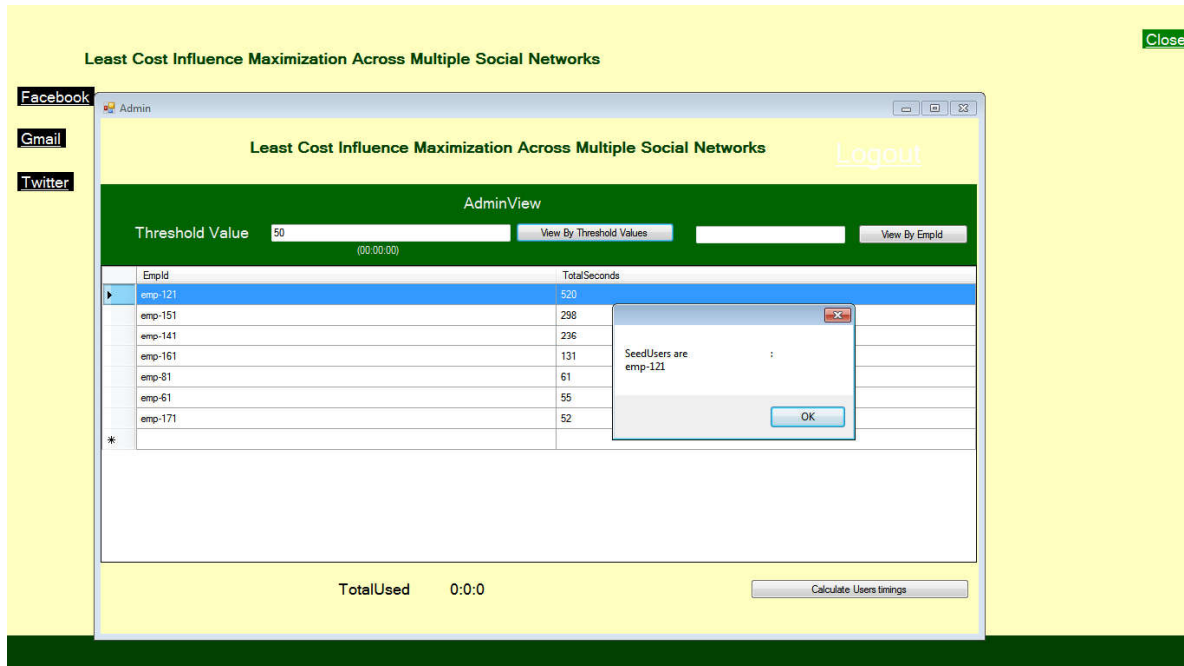
IV.   RESULT & DISCUSSION

Figure 2: Snapshot for Finding Seed User

The above snapshot represents finding seed user. The user who is active for long time in the Online Social Network is displayed as the seed user.

V.   CONCLUSION

The proposed model is to tackle the Least Cost Influence problem in multiplex network. The coupling scheme is introduced to reduce the problem in single online social networks. The running time to find the seed user and the information diffusion can be improved highly.

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