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Introduction

- The transmission of information and knowledge resources based on the Internet has become a mainstream trend. In online Q&A communities, users can ask questions freely and other users will participate in answering questions, which realizes the transfer of knowledge and information. Users' activities may affect the complex information flow within the platform, thus forming a huge social network with levels of nesting.
- However, the related studies mainly from the perspective of "users" and pay less attention to the impact of local structure generated by the relationship between users on the whole network. In addition, most of them ignore the interaction between different networks and treat all information as knowledge.

Methods

- This paper uses the text classification method to classify the answer texts from "Zhihu" Q&A community and extract the real knowledge.
- Network subgroup extraction: We use the node degree method in Pajek to partition the answer-users network. Moreover, the FR algorithm is used to visualize the network. Finally, it extract three subgroups with 54, 66 and 116 node degree, respectively.
- It constructs a multilevel network of answer-users' knowledge sharing and uses the multilevel network exponential random graph models (ERGMs) to explore the possible relationship characteristics created by different network levels' interaction and the influences of the local network structures represented by these relationship characteristics on the overall network.

Graphics

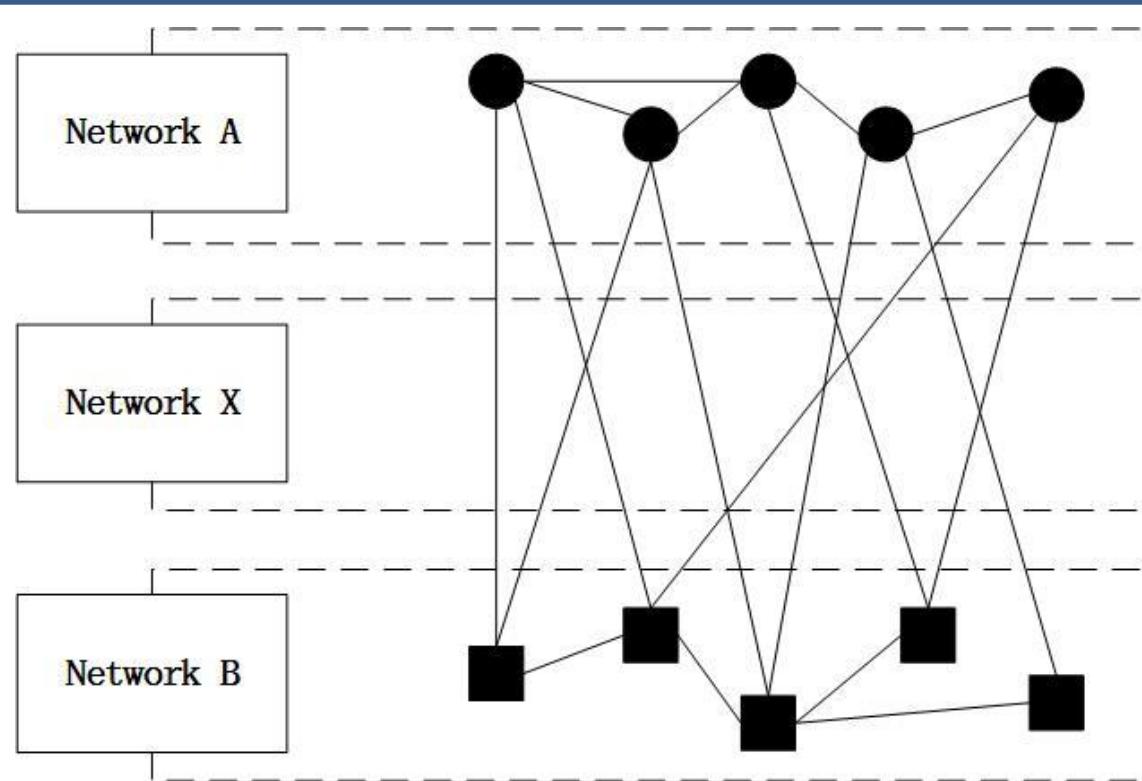
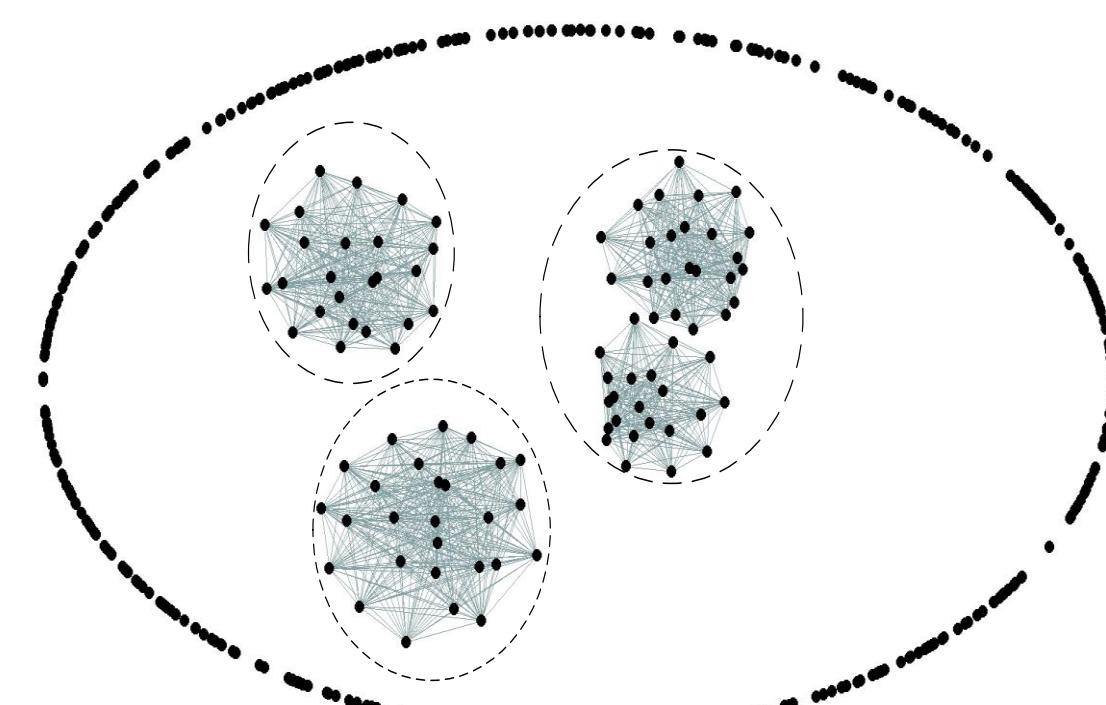


Fig1. Knowledge Sharing Multilevel Network

Fig2. Network subgroup extraction



Results

➤ Answer-users network (Network A):

No network effect of network A is found in subgroup1 and 3 (the network (A) density of the two subgroups is 1)

The network density of subgroup 2 is 0.5, variable Cycle4A is positive significantly. Therefore, when there are obvious structure holes in network A, the aggregation characteristics among answer-users are more obvious.

➤ Affiliation network (Network X):

Variable XEdge of subgroup1 model and is negative significantly. So in the subgroup with the smallest node degree of answer-users, people are less inclined to share knowledge.

Variable XACB indicates the homogeneity tendency of knowledge content shared by different answer-users. When XACB is positive and significant, the more answer-users share the same kind of knowledge. A negative XACB indicates that users pay more attention to the heterogeneity of content when sharing knowledge.

In subgroup 1, the relationship between answer-users is less close than the other two subgroups, and users share less knowledge. At the same time, the knowledge sharing content of users in the corresponding multilevel network of this subgroup is relatively high.

For subgroups 2 and 3, the users pay more attention to the heterogeneity of their knowledge output so as to get more attention in the platform.

According to the results of network A, there are obvious aggregation characteristics among the answer-users in subgroup 2, and the knowledge heterogeneity shared by these users is higher, which once again confirms the relationship between the closeness of the answer-users and the heterogeneity of knowledge output.

Conclusion

The structural characteristics and relationship compositions of the answer-users network have a significant impact on the knowledge sharing multilevel network, which not only affects the enthusiasm of users to share knowledge, but also affects the heterogeneity of the shared knowledge content. Meanwhile, the shared knowledge content also could affect the relationship between answer-users. In the multilevel network, the structural characteristics and relationship compositions of answer-users network are closely related to the network composed of their shared knowledge.