A Community Detection Method Towards Analysis of Xi Feng Parties in the Northern Song Dynasty

Qianying Liu[*1], **Qiyao Wang**[*2], **Wending Chen**[3] **and Daisuke Kawahara**[1]
[1] Graduate School of Informatics, Kyoto University
[2] National School of Development, Peking University
[3] Department of History, Peking University
ying@nlp.ist.i.kyoto-u.ac.jp; qywang2018@nsd.pku.edu.cn;
paulorchen@pku.edu.cn; dk@i.kyoto-u.ac.jp

Abstract

Factional conflict has played an important role in historical research, espcially studying the features of political scholars. Previous studies mainly analyze factional conflict based on hand-work, which makes it difficult to consider minor political scholars. In this paper, we use the Chinese Historical Biography Database to build a graph based on the relations among scholars in the Xi Feng factional conflict, and then use social network algorithms to model and analyze their impact. We use community detection algorithms to unsupervisedly extract the clusters of the two major parties. By analyzing the data obtained from the algorithm, we confirms several conclusions about the political influence of Cai Jing, Wang Anshi, and the new and old parties in the study of North Song history.

1 Introduction

Factional conflict plays an important role in studying historical events. It is a key figure of parties and it is representative of the conflicts among the ruling class during this dynasty. Factional conflicts in different dynasties often present various characteristics, which are a result of their unique political environment and culture, especially the culture of the political scholars. For example, the conflict between the Niu and the Li in the Tang Dynasty focused on whether to open the path of imperial examination to the poor people, while the factional conflict in the Song Dynasty emphasized the connection between the administration and the law of the ancestors. In general, party disputes may be concentrated within the literati group, or may be composed of foreigners, eunuchs, and scholar-officials, and are not limited to one party. Therefore, studying factional conflict has an important role in studying the characteristics of the dynasty and the literati group. In the dispute between the New and Old parties in the Xifeng period of the Northern Song Dynasty, the New and the Old made a division in the administration. They were a challenge to the ancestral concept of the Song Dynasty, and they were commendable to the spirit of the reform of the previous generation.

The relation network between political scholars during the Xi feng (熙丰) factional conflict is complex. The centralization of power was greatly strengthen in the early years of the Northern Song Dynasty by Song Taizu (太祖), which led to the result that the political environment was potentially full of crises. The ruling class has several new attempts such as "Qingli New Deal (庆历新政)" and the Wang Anshi Reformation (王安石变法), that tried to solve this problem. While previous studies focused on major political scholars such as Wang Anshi and Sima Guang, and also the some common features of the parties (Deng, 2006; Rongke, 1999; Luo, 2011; Liu, 1999). However, due to the limitation of manpower, the studies on minor scholars and indirect relations were limited. Also, the evaluation of different parties and their characters is strongly based on the subjectivity of the historical researchers, and may lose sight of facts that do not match with his expectation. The advantage of digital humanity methods is that it can automatically

[*] This denotes equal contribution.

33rd Pacific Asia Conference on Language, Information and Computation (PACLIC 33), pages 129-137, Hakodate, Japan, September 13-15, 2019

process large-scale data, and the data itself cannot be subjectively influenced by the researchers.

However, one problem for using digital humanity methods on this theme is that labeling data for such kind of party classification would require expert knowledge, and is hard to adapt across different domains (e.g. different dynasties). Thus here we introduce an unsupervised method based on the relation network graph among scholars, which is easy to obtain through databases. Community detection algorithms can be considered as unsupervised clustering algorithms in graph. If nodes are members of the same 'community', they are more likely to connect; if they do not share the 'community', they are less likely to link. The community can correspond to parties or groups in the factional conflict.

We use the data from Chinese Historical Biography Database (CBDB) to construct our relation network. The relationship between the scholars can be seen as a directed multi-graph $G = (V, E)$, where each node V represents a political scholar and each edge E represents a relationship between them, which might be kin relationship or social relationship. The relationships are extracted from CBDB with Breadth-First Search. In this view, many characteristics of the graph can be related to important issues in the history. Therefore, based on this database and graph, we introduce algorithms in graph to analyze our relationship-based graph.

In this paper, we use the Fluid Communities algorithm (Parés et al., 2017) and the improved Kernighan-Lin algorithm kernighan1970efficient, for community detection, and use the results to further analyze some of the properties of the two parties. We use a pipeline-based framework here. First, we use the Fluid Communities algorithm, and get a preliminary result under the condition of considering only the positive relationship. Then we use the results of this step to initialize the improved Kernighan-Lin algorithm so that the new community detection method can consider both positive and negative relationships. Our experiments show that such a pipeline algorithm can achieve better results than using the two alone and benefit our analysis.

We mainly consider the first old and new party conflict in Xifeng years. We combine our method with Liu at el. (2018) to further analysis not only the relations but also the impact of political scholars. Previously, although Liu at el. (2018) used link analysis to study the impact of the scholars, no one has focused on the parties before. Our approach has naturally combined graph models with historical research.

2 Historical Background

In this section we give a brief overview of the details of the factional conflict between the new and old parties. Historians widely accepted Guangming Deng's work "Wang Anshi", which has been polished and modified for four times during the second half of the last century.

In 1067, Emperor Shenzong took the throne, young and ambitious. He highly recommended Wang Anshi's "Reformation Speech Book", in which conveying a core topic, "we should not conform to the politics of the first king, or we will never be achieving success." In the second year of Xining (which is Shenzong's era title, 1069), Shenzong appointed Wang Anshi to be the leader of the government to prepare for the reformation. Wang established the "Regulations on Three Divisions" to carry out the implementation of the new law. Its ideas are mainly divided into two categories: financial one and military one. This challenges the old party. During the reformation, the new factions supporting the new law are obviously opposed to the factions opposing the new law. The ruling group headed by Sima Guang and Wen Yanbo disapproved the new law, and believed that the ancestral law could not be abolished. Wang Anshi had twice stopped, which caused the break of the new law. It is generally believed that the organizational capacity of the New Party is stronger than that of the Old Party.

After the death of Emperor Shenzong, Emperor Zhezong was too young to control the government, giving whose mother Empress Gao a chance to listened to the government and reused Sima Guang and the Old Party. Within a year, the new law was abolished. Coincidentally, Wang Anshi and Sima Guang died in the first year of Yuanyou Era (1086), the new law basically ended in failure in Wang Anshi's time. The second round of factional conflict is after their death. In the 8th year of Yuanyou Era (1093), the emperor became older and also being young and ambitious as his father. He reenabled the charac-

ters of the New Party and protected the reformation again, with changing his era to Shaosheng. However, at this time, the New Party was completely different from the Wang Anshi period, being divided into many little factions. The differences in personality between Zhang Wei, Zeng Bu, Cai Wei and Cai Jing also led to their final destinies. The New Party was also completely divided. This time the conflict was harmful to the dynasty. The parties gradually turned to political factions, not just the contradicting opinions on the ancestral laws, showing their maturity of methods of struggle. In the first month of Yuanfu era (1100), Emperor Zhezong died without a child. Zeng Bu and Zhang Wei and the heir to the throne completely overturned. The second round ends (Li, 2000; Yang, 2010; Liu, 1999; Deng, 2005; Luo, 2011; Tian, ; Zhou, 1996; Rongke, 1999; Deng, 2006).

3 Model

3.1 Page Rank Algorithm

The Page Rank algorithm (Page et al., 1999) is a link analysis algorithm that assigns influence rate to all nodes in the graph, which measures its relative importance within the set. The algorithm can be applied to the graph, and the influence rate r of node E is called the pagerank of E. We follow Liu at el.(2018) and use this algorithm to study the impact of each political scholar in the graph. We follow Liu at el.(2018) and adjust the weights of each edge and use the Page Rank algorithm to calculate the three impact rankings which are the person relationship influence rate, the political influence rate and the positive political influence rate. For the character relationship influence table, we simplified the multi-directional graph to a directed graph with a weight of 1. For the political influence table, we reduce the multi-directed graph to a directed graph whose weight is the number of edges in the multi-graph. For the positive political influence table, we manually label all the relationships and classify them as positive and negative and non-prone, and only use the positive relationships to run the algorithm. The calculated impact rate can represent the influence of the scholar, the total political influence of the scholar and the supporting that the scholar receives.

3.2 Community Detection Algorithm

3.2.1 Fluid Communities Algorithm

In the study of complex networks and graphs, if the nodes of the network can be easily grouped into (possibly overlapping) groups of nodes so that each group of nodes is densely linked internally, the network is said to have a community structure. In the special case of non-overlapping community detection, this means that the network is naturally divided into internal dense linked groups of nodes that sparsely connected between different groups. It can be seen that the community detection algorithm can be used to divide the parties in an unsupervised manner.

Here we use the Fluid Communities algorithm (Parés et al., 2017) for community detection. The Fluid Communities algorithm is a high-speed community detection algorithm based on the idea of introducing several fluids in a non-uniform environment, affected by the environmental topology, and the fluids expand and push each other until they reach a steady state. Given a graph $G = (V, E)$ that consists of a set of vertices V and a set of edges E. The algorithm initializes k fluid communities $C = \{c_1, ..., c_k\}$, where $0 < k \leq |V|$. Each community $c \in C$ is initialized in a different random vertex $v \in V$. The density d of each initialization community is in the range $(0, 1)$. The density of the community is the reciprocal of the number of vertices that make up the community:

$$d(c) = \frac{1}{v \in c} \tag{1}$$

The algorithm operates with supersteps. On each superstep, the algorithm traverses all vertices of v in a random order, updating the community to which each vertex belongs using an update rule. When the vertex's assignment to the community does not change in two consecutive supersteps, the algorithm has converged and ended. The update rule for a particular vertex v returns the community with the largest aggregate density in v's neighbour network. The update rules are defined in the equation below:

$$S = argmax_{c \in S} \sum_{w \in (v, \Gamma(v))} d(c) * \delta(c(w), c) \tag{2}$$

$$\delta(c) = \begin{cases} 1 & c(w) = c; \\ 0 & c(w) \neq c; \end{cases} \tag{3}$$

where v is the updated vertex, $\Gamma(v)$ is the neighbor of v, $d(c)$ is the density of community c, $c(w)$ is the community to which vertex w belongs, S is the set of candidates, and community vertex w belongs to and $\delta(c(w), c)$ is the Kronecker delta.

We only use the positive edges in the graph in this stage. In our problem, since Wang Anshi and Sima Guang have quite frequent positive relationship with Ouyang Xiu and Fan Zhongyan when they are young, it is ineffective to directly divide the map into two communities. In order to better capture the relationship between the parties, we chose to detect five smaller communities and then manually use the prior knowledge to merge the communities.

3.2.2 Improved Kernighan-Lin Algorithm

In the above section, we describe a community detection algorithm based on the positive edges only, but its shortcoming is very obvious. It can not use the large number of negative connections in the data (e.g. attack, impeachment, opposition, etc.) to improve the party classification. In the case of factional conflict, negative relationships tend to more prominently represent the party's affiliation, and the two parties tend to attack each other more frequently. Therefore, we propose a method that adds negative relationships to the community detection algorithm to overcome this shortage.

The Kernighan-Lin algorithm (Kernighan and Lin, 1970) is a greedy heuristic algorithm that divides the network into two communities. The goal of the algorithm is to maximize the objective function Q, which is defined as the difference between the number of connected edges in the two communities and the number of edges between the two communities. The algorithm can be divided into four steps:

1. Randomly initialize or use other algorithms to pre-initialize two sets of nodes;
2. Calculate the number of internal and external edges of each node in the community;
3. Consider all possible node pair exchanges, calculate ΔQ, and exchange greedily;
4. Repeat step 3 until the preset maximum number of iterations is reached, or the maximum ΔQ is negative.

Here we simplify the directed graph into a weighted undirected symbolic network. A symbolic network is a network with both positive and negative weights. This simplification is reasonable because the simple addition of the frequency of positive and negative relationships that occurred between two characters can be representative of the relationship between them.

Here we modify the objective function Q so that we can consider both positive and negative weights. We assign the weights w to edges when calculating Q considering the internal and external edges I_s and E_s. Then the negative weight is naturally included in the objective function.

$$Q = \sum_{s \in I_s} w_s - \sum_{s \in E_s} w_s \tag{4}$$

One major drawback of the Kernighan-Lin algorithm is that the size of the two sets must be given at the beginning. Here we initialize the algorithm using the Fluid Communities algorithm explained above, and then use our improved Kerighan-Lin algorithm. This makes the model both capable to automatically decide the size of the two communities and also consider negative edge information.

3.2.3 Total Party Impact

Here we will directly assess the political impact calculated by the Page Rank algorithm to the two communities to estimate the total influence of the two parties.

$$r_{party} = \sum_{e \in E_{party}} r_e \tag{5}$$

where r_{party} represents the overall impact rate of the party, and E_party represents the nodes in one party. Although the marginal scholars in the two communities are not necessarily members of the two parties, we are actually considering the overall political impact of the two parties. Therefore, a direct weighted sum is a reasonable estimate.

3.3 Breadth-First Search

Breadth-first search (BFS) (Moore, 1959) is an algorithm for searching a graph. The algorithm can start from any node of the graph, which is called a search key, and then first explores all the neighbor nodes of the start key, and then moves on to the next-level neighbor node. The algorithm stops when all reachable nodes of the search key are obtained. In this paper, we follow Liu at el.(2018) and choose Wang Anshi as the search key. In the end we get multiple directed graphs based on the relationships of the scholar.

4 Experiments

4.1 Database

The Chinese Historical Biography Database (CBDB) is a freely accessible relational database with biographical information about approximately 427,000 individuals, primarily from the 7th through 19th centuries. The data is meant to be useful for statistical, social network, and spatial analysis as well as serving as a kind of biographical reference. It involves not only the personal info of historical characters but also the social relationship between them. We show one example of the CBDB database in Table 1.

id 1762: Wang Anshi	
PersonInfo	Basic Info:Eng Name, etc. PersonSources:Source PersonAliases:Alias
...	
PersonSocialStatus	PersonSocialStatus PersonKinshipInfo PersonSocialAssociation

Table 1: Example of CBDB.

4.2 Restrictions

In the search algorithm, we add some restrictions based on historical prior knowledge. To ensure that the person relationship network is established on the characters of the old and new party, we will simplify the network and remove some isolated points that are invalid on the algorithm so that the data extracted from in the original database is clean.

First, there are some dirty data problems in the original database. For example, the relationship with the id 350 is called "temporary reservation, to be deleted". We think that this kind of relationship can be considered as invalid. There are also some relationships that are linked to person ids that do not exist in the database. We remove all such kinds of relationships. Meanwhile, some special relationships such as "Entering Yuanyou Party" are very valuable from a historical point of view, but CBDB does not handle this label very well. Not all people who are involved in this event are marked with this relation. We will not consider these multivariate special relationships here and may consider adding labels manually in further exploration.

For the characters, we require them to have at least one social relationship, and the sum of relatives and social relationships should be at least three. At the same time we require that the index year of the character must exist between 1048 and 1110. The index year is a concept proposed by CBDB and is an artificial value which is used to locate a character in a certain year. The specific calculation is very complicated, here we briefly introduce the rationality of the restriction. If a person's age of death is determined and is less than 60 years old, the index year is the year of death; if a person clearly knows that his or her life is greater than 60 years and knows the year of birth of the person, the index year is the year corresponding to 60 years; If a person's data is missing, use his relatives, the scholar's year, etc., to calculate his life and the year of 60 years old. If the life is less than 60 years old, the estimated death year is taken. If it is more than 60, the estimated 60 years old is used.

We design this limitation based on prior knowledge of the Xifeng parties. Ouyang Xiu's index year is 1068, and Wang Anshi's index year is 1080. In the calculation of the index year, the CBDB used the assumption that the average age that a scholar begins his political career is 30 years old. We use this hypothesis, and set a limitation that the scholars who should their career when Wang Anshi is 60-year-old. The upper limitation bound is calculated by a imaginary character that started his career in the same year of Ouyang Xiu and died 10 years later. The characters in this time period can cover the main body of the old and new party struggles and also consider the

influence of the second old and new party factional conflict and the Qingli New Deal. For a person does not have an index year, it means that with the 20 rules that CBDB designed, we still cannot calculate its index year, then the database lacks information of this person and we will not consider this node.

Here we specifically point out that although the database has already extracted the relationship between the father-in-law pairs and the brother-in-law pairs, and women are often not actual political scholars in ancient China, we still retain the women characters in our graph to further mine implicit information. Most women's social relationships are extracted from their epitaph, which we consider to be important indirect knowledge that is not fully considered by previous studies. Relationship between women also implicitly represent their relatives' political view.

4.3 Community Detection

We show the results of different community detection algorithms in Table 2. We list the scholars that have the highest political influences of the new and old parties. The KL_{noinit} method here is initialized as both parties have the same size. Our algorithms are implemented based on NetworkX (Hagberg et al., 2008).

The underlined names denote classification errors, which is manually labeled by experts based on the historical mainstream views. We can see that the results of the top 20 scholars of the KL-FC initialization algorithm matches with the historical mainstream view, while the uninitialized KL algorithm and FC algorithm present errors. Meanwhile, it is especially difficult to classify scholars of the new party for FC and KL_{noinit}, this is because negative relation is important for detecting the new party members, which makes the two algorithm fail. Meanwhile the new party has less members than the old party, so simply using half of the scholars for initialization of KL algorithm has drawbacks. The results can show the effectiveness of our method.

Meanwhile, the final results show that the old party had a greater influence, with a total of 541 people, it gets an impact score of 0.66491; the influence of the new party was smaller, with a total of 380 people, it gets an impact score of 0.33340.

5 Analysis

We mainly focus on Wang Anshi and Sima Guang, who are the two representative scholars in the Xifeng factional conflict. The factional conflict can be seen for the picture of their political influence.

First, the top four figures of interpersonal influence, political influence, and positive political influence table are consistent. They are Wang Anshi, Ouyang Xiu, Su Shi and Sima Guang. This shows that they are all very powerful and positive in terms of not only from the interpersonal point of view but also from a political point of view. Second, on the issue of the identification of the new and the old parties, we can also see that the results of the KL-FC initialization are basically in line with expectations. The specific analysis will be carried out below.

5.1 Sima Guang and the non-political nature of the old party

During this period, the political culture of the Northern Song Dynasty has taken shape, i.e. the traditional concept of destiny and of orthodoxy. Scholar's political role had been clear, manifested the emperor's centralization of power, to rule the country with scholars but not the military. Scholar-officials gradually had a concept of "to worry about the world before the world, and to feel joy about the world after the world." Therefore, no matter who they are, they must not exceed their own roles, and they must maintain the policy culture of the country. By concentrating on the maintenance of the "ancestral laws", culturally, they recognize political systems related to the nationality formed by ancestral laws. In addition, they also formed a strong sense of political participation, but at the same time, they saw the disintegration of the past Tang Dynasty due to the dispute between Niu and Li, the Song people were very vigilant about the factional struggle formed by the scholars. Therefore, in the Qingli Era New Deal, Fan Zhongyan fell into the party trap because of the old scholars' opposition, but with weak factional effects. Later in Wang Anshi's reform, the factions supporting the new law are obviously opposed to the factions opposing the new law. The group headed by Sima Guang and Wen Yanbo opposed the new law and believed that the ancestral law could not be abolished.

FC		KL_{noinit}		KL_{init}	
Old	New	Old	New	Old	New
Ouyang Xiu	Wang Anshi	Su Shi	Wang Anshi	Ouyang Xiu	Wang Anshi
Su Shi	Wang Gui	Sima Guang	Ouyang Xiu	Su shi	Wang Gui
Sima Guang	Cai Jing	Huang Tingjian	Wang Gui	Sima Guang	Cai Jing
Huang Tingjian	Zhang Dun	Su Shi	Cai Jing	Huang Tingjian	Zhang Dun
Su Zhe	Fan Chunren	Lv Tao	Zhang Fangping	Su Zhe	Lv Huiqing
Zhang Fangping	Fan Zhongyan	Fan Zuyu	Zhang Dun	Zhang Fangping	Yang Jie
Zheng Xie	Bi Zhongyou	Fan Chunren	Zheng Xie	Zheng Xie	Zeng Bu
Zeng Gong	Han Qi	Bi Zhongyou	Zeng Gong	Zeng Gong	Liu Yan
Lv Tao	Su Song	Su Song	Liu Chang	Lv Tao	Wang Anli
Fan Zuyu	Lv Huiqing	Wen Yanbo	Fan Zhongyan	Fan Zuyu	Cai Que
Liu Chang	Yang Jie	Fu Bi	Liu Ban	Fan Chunren	Hua Zhen
Liu Ban	Zeng Bu	Yang Jie	Han Qi	Liu Ban	Zheng Xia
Wen Yanbo	Liu Yan	Lv Gongzhu	Lv Huiqing	Fan Zhongyan	Lu Dian
Fu Bi	Wang Anli	Fan Zhen	Zeng Bu	Liu Ban	Tang Jie
Lv Gongzhu	Song Qi	Zhao Bian	Liu Yan	Bi Zhongyou	Mao Pang
Fan Zhen	Liu Zhi	Hu Yuan	Wang Anli	Han Qi	Huang Lv
Zhao Bian	Li Gou	Liu Zhi	Han Wei	Su Song	Peng Ruli
Han Wei	Cai Que	Chao Puzhi	Song Qi	Wen Yanbo	Jiang Zhiqi
Hu Yuan	Hua Zhen	Qin Guan	Cai Xiang	Fu Bi	Lin Xi
Chao Buzhi	Lv Gongbi	Han Jiang	Shen Gou	Lv Gongzhu	Chao Zhongshen

Table 2: Results of different community detection methods. FC refers to Fluid Communities Algorithm. KL_{noinit} refers to only using the improved Kernighan-Lin Algorithm. KL_{init} refers to using the pipeline model. The list is in the personal impact order.

Sima Guang is best known for his writing of "A General Reflection for Political Administration", who is also very decent personally. He opposed Wang Anshi publicly, yet there is no excessive accusation in personality. Abandoning personal prejudice is a gentleman's behavior and is also a manifestation of the political culture of the Northern Song Dynasty scholars. In fact, many people in the Old Party have similar situations, such as Su Shi, and even some of them in the New Party. They are all typical "spiritual aristocrats", saying, "All the careers are in low status, only learning is the best." In the second round of their conflict, the Old Party and Cai Jing are pure political struggle, that caused substantial personnel changes. Therefore, the old party's "combat power" during the Xifeng period was insufficient, or even can not be called a "party". This is merely an "opposition" for Wang Anshi's ideas. Because the Old Party only appeared for nine years during the period we calculated, this part of the opposition reflects a much lesser relationship with the political mission.

Literary writers and artists have long-term missions. Ouyang Xiu, Su Shi, Zeng Gong, Mi Fu, and Huang Tingjian have left outstanding works of literature and art for later generations, although both Ouyang Xiu and Su Shi have little effect in the struggle between the old and new parties. The children and their sons preserved their work, such as the communication between friends, and even the historical materials of traveling. The literati identity of the Northern Song Dynasty scholars, especially the status during the Qingli and Xifeng years, may be more apparent in the old party. At the same time, their and control in speech made their positive influences stronger. These non-political identities led them to rise in the positive political influence table.

5.2 Party Organizational Capacity

Figure 1 is a personal relationship network table representing the interpersonal influence, corresponding to the left side of Table 1. It can be seen that the new

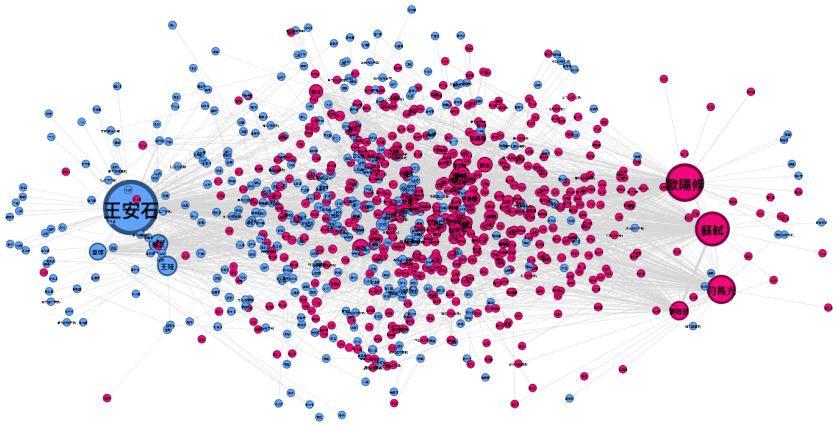

Figure 1: A figure of the result of the pipeline model. The blue dots denotes the new party and the red dot denotes the old party. The size of the dot denotes the personal relation impact of the scholar.

party is dyed in blue and the old party is dyed in red. A circle represents a person. The larger the circles, the greater the impact is and vice versa. Connections indicate an association between the two. The new party is dominated by Wang Anshi's big circle, surrounded by small circles such as Cai Jing, Zhang Wei and Wang Hao. The old party is composed of several middle circles: Ouyang Xiu, Su Shi and Sima Guang. The red circle of the old party is more than the blue circle. According to the above description, it can be verified that Wang Anshi's influence on the New Party is also greater. The old party is more scattered, and Ouyang Xiu, Su Shi and Huang Tingjian have more influence on the influence of the old party on literature than on the political influence. The old party does not have an obvious big circle figure, which matches the fact that their party policy is weaker than the new party.

5.3 Regionality

In the new party, Wang Anshi is a southerner, Lu Huiqing, Zeng Bu, Zhang Wei and later Cai Jing are also southerners; Sima Guang is a northerner, Fuyu, Cheng Hao and Liu Wei are all northerners. The cultural conflicts that existed and evolved into political disputes between the North and the South, and evolved into disputes between the old and new parties. Mr. Qian Mu concluded: "The new party has a large rate of southerners, and the opposition is a big man." "Wang Anshi is in power. It seems that some places represent a new and radical smell of intellectuals in the south, and Sima Guang seems to be Some places represent a traditional and steady attitude in the wisdom of the North at the time." It can be counted that Wang Anshi was mostly removed from the North. After the change of Yuanyou, most of the people who were arrested were southern scholars, such as Cai Zheng and Zhang Wei. After Zhezong's pro-governance, he re-raised the southerners. When Cai Jing was in the country, the southerners regained momentum. "And the northern scholars sighed again and again."

6 Conclusion

This paper constructs a graph based on the relationships of the Northern Song Dynasty Xifeng parties from the CBDB database, on which a community detection method is used. We first use BFS and constraints to construct the graph, and then use the Page Rank algorithm to estimate the impact of different views. We propose a two-step pipeline method that uses the results of the Fluid Communities algorithm to initialize an improved Kernighan-Lin algorithm, so that the new community detection method can consider different types of relations at the same time and automatically learn the size of the communities. Our experiments show that such serial pipeline algorithm can get better results than the two methods seperately, and the experimental results of the two-step algorithm confirms many historical views about parties and factional conflict.

References

Guangming Deng. 2005. The Articles of Deng Guangming, 1907-1998. Hebei Education Press.

Xiaonan Deng. 2006. The Law of the Ancestral Temple. Beijing Sanlian Bookstore.

Aric Hagberg, Pieter Swart, and Daniel S Chult. 2008. Exploring network structure, dynamics, and function using networkx. Technical report, Los Alamos National Lab.(LANL), Los Alamos, NM (United States).

Brian W Kernighan and Shen Lin. 1970. An efficient heuristic procedure for partitioning graphs. Bell system technical journal, 49(2):291–307.

Changxian Li. 2000. Sima guang's biography. Journal of Nanjing University (Philosophy, Humanities and Social Sciences), (1):120.

Qian-ying LIU, Qi-yao WANG, and Wen-ding CHEN. 2018. An analysis of xi feng parties in the northern song dynasty through complex network algorithms. DEStech Transactions on Computer Science and Engineering, (ammms).

Fusheng Liu. 1999. The evolution of the "factional conflict" in the northern song dynasty and the confucianism revival movement[j].

Changfan Luo. 2011. Research on Factional conflicts and Party Inscriptions in the Northern Song Dynasty [D]. Huazhong Normal University.

Edward F Moore. 1959. The shortest path through a maze. In Proc. Int. Symp. Switching Theory, 1959, pages 285–292.

Lawrence Page, Sergey Brin, Rajeev Motwani, and Terry Winograd. 1999. The pagerank citation ranking: Bringing order to the web. Technical report, Stanford InfoLab.

Ferran Parés, Dario Garcia Gasulla, Armand Vilalta, Jonatan Moreno, Eduard Ayguadé, Jesús Labarta, Ulises Cortés, and Toyotaro Suzumura. 2017. Fluid communities: a competitive, scalable and diverse community detection algorithm. In International Conference on Complex Networks and their Applications, pages 229–240. Springer.

Wang Rongke. 1999. Political culture of the northern song dynasty and wang anshi's reformation. Journal of Nantong University (Philosophy and Social Sciences), (6):114–119.

Gengyu Tian. The theory of the controversy between the chinese and western niu and li dynasties and the new and old factional conflicts in the northern song dynasty[j]. Journal of Southwest University for Nationalities, Humanities and Social Sciences, 2003, 24(1): 145-151.

Shili Yang. 2010. Officials drop and political culture in the Northern Song Dynasty [M]. Zhongzhou Ancient Books Publishing House.

Yushao Zhou. 1996. On huang tingjian and the factional conflict in the northern song dynasty. Social Science Research, (2):55–59.