

# Research on the Application of international Relations Network based on Text Mining

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**Abstract.** In the innovation and development of communication systems and information technology, information exchange and dissemination in various fields are becoming more and more convenient, which not only expands the depth of communication on a global scale, but also connects countries in the world closely together, forming a huge and complex network of international relations. In this context, researchers hope to analyze the network structure through the network method, clarify the influence of different relations on the international situation and the composition of hotspot events, and explore the development law of relations between different countries, so as to provide an effective basis for the construction and development of economic globalization. Therefore, based on the understanding of international relations in recent years, the network application research status quo, on the basis of using text mining methods to study international relations, fast in a complicated information system to obtain valuable content, finally in the large text to build international relations network, expand the practice research of data source, solve the problem of network information explosion. The final results show that the application of international relations network based on text mining has achieved good results.

**Keywords:** Text mining; (ii) International relations; Network technology; Relationship between characteristics

## 1. Introduction

The research of international relations network refers to the transformation of the relations between countries into networks, so as to analyze the development and change of national relations. Nowadays, with the continuous development of computer technology and communication technology, the connection between the whole society is increasingly close, and a diversified relationship network has gradually formed. In this context, social network research has become a hot topic discussed by scholars from all walks of life. Because the social relations and their interactions are very complex, if can be transformed into an intuitive relationship network, using the mature mathematical network analysis method for research, can be effectively solve the social problems of the conclusion. Social networks, for example, in research, to master the formation process of the social network, development, structure characteristics, information dissemination, etc, in the international relation network can be through research network structure, according to the relationship between different impact on the international situation and hot issues, quickly found hidden crisis, can put forward effective solution. The essence of the international relations network study is to use formal technical means to understand the complex and meaningful non-formal activities of human beings. Throughout history, the techniques that humans have created for analysis, processing and computation are formal techniques, because they can only rely on machines to sense changes in form. Since human activities are non-formal and abstract, formal means cannot directly deal with abstract content. Therefore, it is necessary to focus on how the human brain realizes the reciprocal transformation of form and content. Only in this way can machines be used to deal with non-formal problems. Among them, Professor Zhong Yixin proposed the first kind of information conversion principle in his research, which revealed this problem to a certain extent. The specific principle structure diagram is shown in Figure 1 below:[1.2]

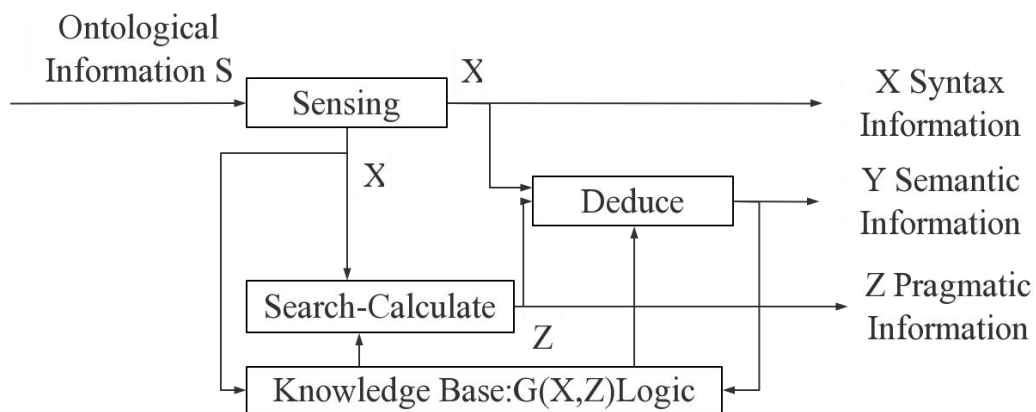


Fig. 1 Schematic diagram of the first type of information transformation

According to the above analysis, as long as the system has clear goals, bright knowledge and simple logical deduction ability, it can complete the transformation from form to content. At the same time, if machines can be used to realize basic functions such as sensors, bright-colored knowledge memory systems, and information retrieval systems, then from a theoretical point of view, machines will have the ability to convert form into content.[3.4]

According to the practical investigation and research, the construction of international relations network is a relatively weak link, which can be regarded as a key step in the formalization of international relations, and also the basic content of practical research. Without a reliable and secure network of international relations, it is difficult to follow up in an orderly manner. Because of international relations is complex, under the current technology theory of constraints, the network structure of international relations mainly structured or unstructured data, the use of expert experience for manual or semi-manual mode to build, need to consume large amounts of time and energy, dealing with large-scale data information, so many problems in such aspects as both consistency and timeliness. With the rapid development of Internet technology, the network is gradually integrated into People's Daily life and work mode. Especially with the development and maturity of Web2.0, the interaction between people and the Internet is becoming more and more close, which makes the network information show an explosive growth rate. According to the China Internet Network Information Center, the number of Internet users in China reached 86.6 billion at the end of December 2011, an increase of 44.3 percent over the previous year. The text mining technology is put forward under the background of Internet information explosion, which can facilitate people to obtain the information they need. Therefore, this paper mainly studies the application of international relations network with text mining as the core.[5.6]

## 2. Method

### 2.1 Text Mining

Text mining, also known as enabling text knowledge discovery, refers to the discovery and mining of useful knowledge in text combination, such as rules, trends, models, etc. As a borderline interdisciplinary field, text mining originates from the traditional data mining, which includes data mining, active learning, natural language processing, artificial intelligence and many other research fields. Compared with the traditional data mining technology, the biggest feature of text mining lies in the different processing objects. The object of data mining is the structured data from database, while the object of text mining is the semi-structured or unstructured text carried by natural language. According to the accumulated experience in recent years, the composition process of text mining can be regarded as two parts, one is text preprocessing, the other is result mining, as shown in Figure 2 below:

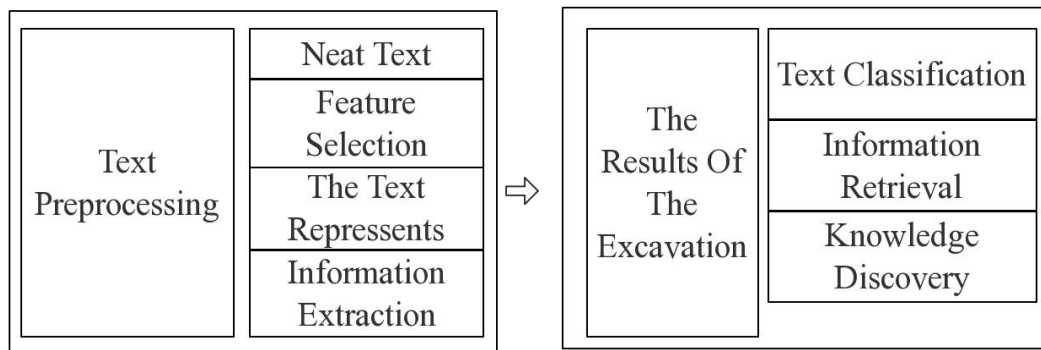


Fig. 2 Flow chart of text mining

## 2.2 Network of International relations

Network event various entities in international relations, international relations such as countries, organizations and institutions as a point, the complex relationship between these entities, such as diplomatic relations, trade relations, such as the abstraction process, this will form into a network of international relations, ultimately through the network analysis method to understand the development and change of international relations. The development history of network research in international relations is closely related to the development of social network analysis. Social network analysis originated in the 1930s. Sociometric analysts mainly investigated the emotional relationships and interactions between people. In 1954, for example, anthropologists first used the concept of social networks to study the social structure of a Norwegian fishing village. In the late 1960s and early 1970s, researchers led by White at Harvard University further explored mathematical models of social networks; In 1978, the International Network Analysis King Organization was formally established, which represents the formal birth of social network analysis norms; Since the 1990s, with the continuous improvement of social network analysis, more and more studies have been conducted on the international relations network. In the accurate description of network structure, the interaction between the influence of network on state relations has made excellent achievements in the aspects of global governance. The study of international relations network should follow the flow chart shown in Figure 3 below:[7.8]

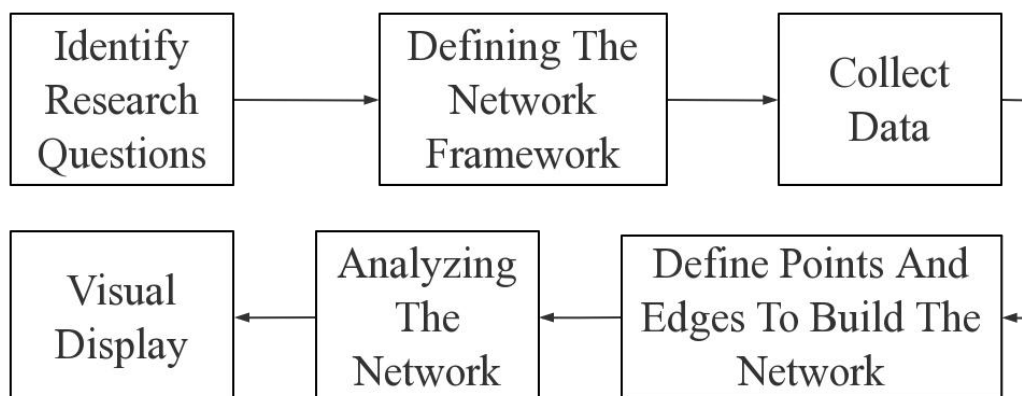


Fig. 3 Study flow chart

## 2.3 System Scheme

At present, with text mining method as the core, the program flow of constructing international relations network is shown in Figure 4 below:

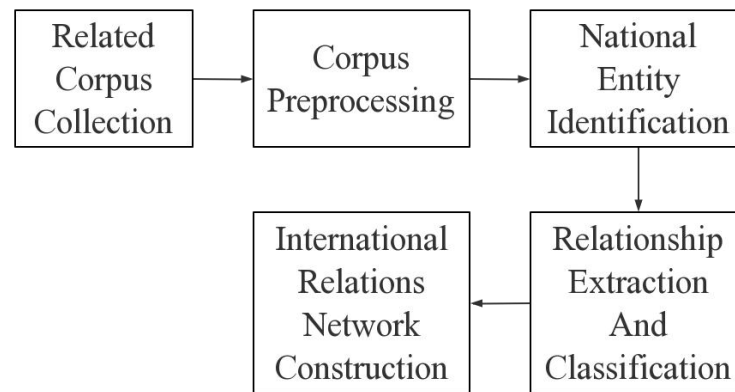


Fig. 4 Flowchart of the system scheme

Based on the above analysis, we can see that the specific operation involves the following points: First, the collection of corpus related to international relations requires the corpus information to be normative and reliable, which can fully show international relations; Second, after collecting corpus, we should conduct preprocessing, such as word segmentation and clause segmentation, etc., and then identify national entities from the expectation and extract points in the international network. Third, effective classification should be carried out on the basis of extraction of relations to determine which countries have relations and extract the corresponding characteristics of relations, which can directly reflect the essential characteristics of international relations and have a positive impact on subsequent research work. Fourthly, it is necessary to effectively classify the relationships according to their characteristics, and complete the construction of the international relations network after the integration of extraction points.[9.10]

## 2.4 System Improvement

In this paper, on the basis of clarifying the original system structure, the corpus scope is extended to the network news text obtained in real time. According to the characteristics of network news text, the system structure is effectively improved, and the text content information fusion and conflict resolution modules are added. According to the improved system flow chart shown in Figure 5 below, on the one hand, the web crawler in front of Baibu news search should be used as a data acquisition tool to improve the practicability of system operation. On the other hand, fuzzy function should be used to express the relationship features, and SVM method should be used to complete the relationship classification.

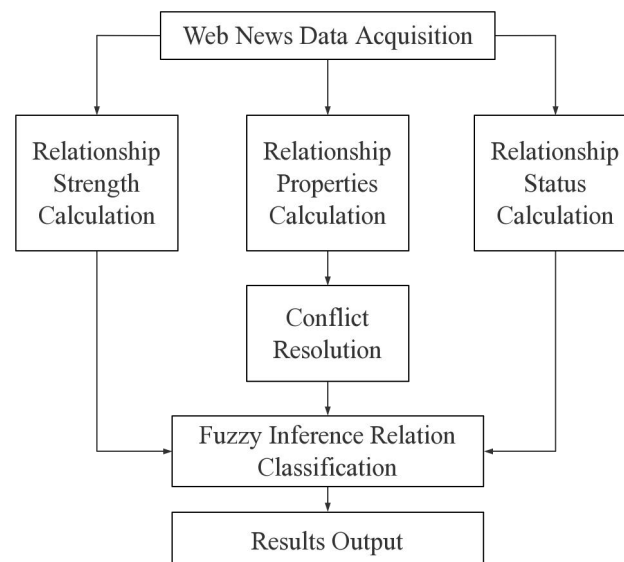


Fig. 5 Flowchart of improving the system

### 3. Result analysis

According to the above 5 improvement system flow chart analysis shows that the rapid development of Internet technology, web has gradually replaced the radio and television news media such as transmission channel, become the most critical media, the new era of development in the study of international relations can be used as a data source, improving the practicability and efficiency of the system.

At the same time, from the perspective of conflict resolution and information fusion, as the scope of data sources has been expanded to Internet news, the coverage of related state relations is also larger than that of the original system. The relationship between the same country is likely to have a variety of subtle and complex contradictions. Therefore, when analyzing these contradictions and conflicts, researchers propose to use a content classification method to correctly distinguish different aspects of the relationship described by the news, so that users can make a reasonable judgment of international relations based on their own needs. At the same time, A method of information fusion is also proposed to comprehensively deal with the distinction of previous news semantics, so as to obtain the overall evaluation of the nature of the relationship. From the perspective of practical research, the factors affecting the final relationship evaluation by news content are classified as follows in Table 1:

Table 1 Classification results of influencing factors

News category	1 the political
	2 military
	3 the economic
	4. St. Lo Tour
	5. Teaching style
	6 other
Semantic credibility	1 A reliable
	2 teach reliable
	3 don't reliable
Words and Actions	1 action
	2 comments

Based on the above analysis, it can be seen that the key to resolve conflicts lies in how to classify news content according to the above factors, so as to clarify the different categories of news. At present, the research on text classification has been very mature, and the relevant rules have been gradually formed. Researchers have also put forward a variety of technical methods, such as naive Bayes, neural network, decision tree and so on.

Combined with the above analysis, it can be seen that with the continuous increase of the number of training samples, the classification accuracy will also improve. When the training sample reaches about 2000, the accuracy curve changes little, which proves that the training is sufficient. The best accuracy of each classification system is close to or above 0.8, and the final result is ideal. At the same time, the fuzzy reasoning is carried out on the fuzzification of relation features, and the validity of the classification algorithm of state relation is verified. It can be seen that the membership value is regarded as a feature, and more satisfactory classification results can be obtained. The improved algorithm of relation classification based on fuzzy reasoning has the research value.

### 4. Conclusion

To sum up, in the context of information explosion and networking, network technology has closely connected the whole world, forming a unique network of international relations in the

mutual influence and restriction, and generating a large amount of text information to show the communication and interaction between countries. How to use these texts for effective management is the main issue discussed by scholars in various countries at present. Through the use of text mining technology, the international relations network can be constructed, which can be directly implemented, comprehensively and reliably reveal the relations between countries. It can deeply mine the potential international relations data, discover the emotional relations between entities, and provide an effective basis for the economic construction and development of various countries. Therefore, when studying international relations network, we should continue to discuss text mining technology and application direction.

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