

Visualization of Social Media Public Opinion Data Based on Intelligent Data Analysis

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Abstract:

Public opinion research plays an important role in crisis public relations, public opinion guidance and other fields. At present, the Internet has become the main position for the public to publish articles and comments. However, how to identify the emotional tendency and the mode of emotional transmission in online education public opinion is a challenge. Especially in the multi-media platform, comparative analysis of the characteristics of education public opinion sentiment is more important Hot spots. In view of this challenge, this paper designs and implements the education public opinion emotion visualization system. Firstly, according to the discussion with the target users, the demand of sentiment analysis of educational public opinion is defined; secondly, the emotion recognition algorithm is used to identify the text emotion, and the emotion propagation algorithm is proposed according to the emotion propagation model; then, multiple interactive views are designed to allow users to carry out comparative analysis of multimedia platform. The experimental results show that the visualization system designed in this paper can meet the needs of users, and can support the media platform selection in public opinion guidance and crisis public relations.

Keywords: Network Public Opinion, Data Fusion, Heat Analysis, Intelligent Discrimination.

I. INTRODUCTION

In the era of mobile Internet, social platforms such as microblog and wechat have won higher psychological cognition of the main body of the social circle with its advantages of wide coverage, close relationship and precise positioning, and its influence has been spread in a wider range with the spread of the crowd. With its wide spread effect, strong star lineup and weak ties, microblog has attracted many followers and formed a huge "support group". WeChat has mobile phone mail list to establish strong social relations, and the official account of the article's hot push and word of mouth publicity has attracted close attention. However, in the process of the evolution of emergencies, the organizational discussion of the circle group has

the characteristics of strong emotional infection and interactive communication, and when a certain emotion is strengthened and amplified under the influence of the circle group, it is easy to produce information distortion, rumors and other information alienation hazards, resulting in the group polarization phenomenon under the network public opinion, which becomes the fuse of social emotional crisis. How to guide the cluster behavior of social groups is conducive to the government's research on supervision and guidance of public opinion, which is also an urgent problem to be solved in the era of mobile Internet.

There are six elements of network public opinion: network, event, netizen, emotion, communication interaction and influence. Therefore, the community calls for more positive energy information on the Internet to build a harmonious network speech environment; on the other hand, party and government organs at all levels should timely understand information, strengthen public opinion monitoring, improve public opinion response ability and governance ability in the new public opinion environment, timely resolve conflicts and handle the relationship between the government and the people [2]. In fact, in addition to government departments, enterprises and institutions also need to pay attention to online public opinion[3].

II. CHARACTERISTICS OF INTERNET PUBLIC OPINION

Compared with the traditional media such as newspapers, radio and television, network media has the comprehensive characteristics of low entry threshold, super large scale information, rapid information release and dissemination, large participation groups and strong real-time interaction. There is no obvious boundary between information providers and publishers. Information network has become a "virtual society" with obvious characteristics of social groups. At the same time, the interaction between "virtual society" and real society is becoming increasingly prominent.

Microblog and wechat, as the main information transmission channels of we media network in China, are still in the initial stage in the research on the propagation law and the evolution mechanism of emergency information. First, there is a lack of systematic research on the influence of subject emotions on information alienation from the perspective of wechat network information ecological chain structure. At present, there are few researches on the subject's emotion in the information chain of social media network, and there is a lack of systematic research on the risk of information alienation of wechat platform from the perspective of subject emotion. Second, the research on the evolution of personal emotions, group emotions and social emotions in wechat platform is not deep enough. After the emergency, the information diffusion of the wechat network platform is a dynamic evolution process of the collective behavior of the subjects in the circle. Clarifying the responsibilities of the service subjects and strengthening their cooperation are related to the construction and improvement of the pension service system. Third, the research on the monitoring and intervention mechanism of group behavior in wechat network is weak. Research on the information influence of different groups in wechat cyberspace is the premise to effectively intervene the occurrence and spread of emergencies on

wechat network. However, due to the privacy of user data collection of wechat platform, there is still a lack of systematic research on the influence of group information of wechat circle group.

The dissemination of emergency information in social media network will be affected by citizenship psychological cognition, emotional response and behavior intention, which will lead to the occurrence of derivative group events. Group emotion has a key impact on the conflict escalation of group events. Therefore, scholars at home and abroad have carried out theoretical and case studies on the evolution of group emotions and public opinion early warning under the social media network in the emergency situation. In the field of sociological research, some scholars believe that the cluster behavior is a spontaneous collaborative behavior that is spontaneously generated by participants and causes unpredictable disruption of normal order in the mutual stimulation among participants. With the penetration of social media into every corner of life, scientific and systematic research is still the focus of attention of all parties, so that technology can really be used for us. In the network environment, the main sources of public opinion information are: news comments, community forums, blogs, microblogs, etc. [4-9].

III. PUBLIC OPINION MONITORING SYSTEM

3.1 System overview

In recent years, with the rapid development of the Internet, as a new form of information dissemination, network media has penetrated into people's daily life. Netizens' active speech has reached an unprecedented level. Whether it is a major domestic or international event, online public opinion can be formed immediately. Through this network, opinions and ideas can be expressed and ideas can be spread. Thus, huge pressure of public opinion cannot be ignored by any department or institution. It can be said that the Internet has become the distribution center of Ideological and cultural information and the amplifier of public opinion.

The public opinion monitoring system monitors the website information of hot issues and key areas, such as web pages, forums, BBS, etc., for 24 hours, and downloads the latest news and opinions at any time. After downloading, the data format conversion and metadata indexing are completed. The local information is filtered and preprocessed. In order to monitor hot issues and important areas, it is necessary to establish a public opinion monitoring knowledge base through interpersonal interaction to guide the process of intelligent analysis.

The network public opinion monitoring system aims at the emerging media of Internet. Through the network public opinion monitoring system, the relevant departments can timely understand the network public opinion dynamic, pay attention to their own state in the network public opinion, so as to produce network public opinion early warning, timely correct and deal with the negative influence of public opinion on the network, and provide data for the Department's network crisis public relations or brand image marketing.

3.2 System function

The hot topic identification ability can identify the hot topics in a given time period

according to the parameters such as reprint quantity, number of comments, response volume, crisis degree, etc.

The propensity analysis and statistics are used to analyze the opinions and themes of information. In order to provide reference analysis basis. The basis of the analysis can be based on the amount of information reprinted and the time density of feedback information. To identify the development trend of information.

The topic tracking topic tracking is mainly to track the information of hot topics, and analyze their tendency and advantage. The specific content of tracking includes: information source, reprint volume, reprint address, geographical distribution, information publisher and other related information elements. It is based on the analysis of tendency and advantage.

The automatic information summarization function can automatically extract the document summary information according to the document content, and these summaries can accurately represent the content, theme and central idea of the article. Users don't need to view all the content of the article. Through the intelligent summary, users can quickly understand the main idea and core content of the article, and improve the efficiency of user information utilization. Moreover, the length of the intelligent summary can be adjusted according to the needs of users to meet different needs. It mainly includes text information summary and web page information summary.

The trend analysis shows the distribution of monitoring words and time as well as trend analysis through charts. To provide periodic analysis.

There are no more than the following types of emergencies: natural disasters, social disasters, wars, turmoil and accidents, etc. The Internet information monitoring and analysis system is mainly aimed at monitoring and analyzing the Internet information emergencies. The tendency analysis and advantage analysis of hot information are used to monitor the sudden of information. L alarm system alarm system is mainly for public opinion analysis engine system hot information and emergency monitoring analysis, and then according to the information corpus and alarm monitoring information database for analysis. To ensure the healthy development of public opinion of information.

The statistical report generates report according to the result database processed by public opinion analysis engine. Users can browse through the browser, provide information retrieval function, query hot topics and tendency according to specified conditions, and browse the specific content of information to provide decision support. The public opinion monitoring system is shown in Figure 1.



Fig 1: The public opinion monitoring system

3.3 Multidimensional emotion propagation analysis algorithm

In order to analyze the emotional tendency of public opinion texts, this paper uses the method of accumulating the occurrence times of emotional words in the text to grade the documents. At the same time, this paper divides emotions into seven categories, and arranges them from positive to negative under the guidance of domain experts. In addition, in order to improve the accuracy of emotion score, the weight of citation adverb is calculated.

$$\frac{\partial \rho}{\partial t} + \frac{\partial(\rho u)}{\partial x} + \frac{\partial(\rho v)}{\partial y} + \frac{\partial(\rho w)}{\partial z} = 0 \quad (1)$$

In this paper, emotional communication is defined as two categories:

(1) the same kind of emotional communication: the main emotion type of the article and its comments is consistent;

(2) The heterogeneous emotional communication: the main emotion type of the article and its comments is inconsistent. If the main emotion score of the article is less than that of the comment, it is incremental communication, otherwise it is reduced communication. The emotional value $k - \varepsilon$ model equation is expressed as:

$$\frac{\partial(\rho k)}{\partial t} + \frac{\partial(\rho k u_i)}{\partial x_i} = \frac{\partial}{\partial x_j} \left[\left(\mu + \frac{\mu_t}{\sigma_k} \right) \frac{\partial k}{\partial x_j} \right] + G_k - \rho \varepsilon - \left| 2\mu \left(\frac{\partial k^{1/2}}{\partial n} \right)^2 \right| \quad (2)$$

$$\begin{aligned} & \frac{\partial(\rho \varepsilon)}{\partial t} + \frac{\partial(\rho \varepsilon u_i)}{\partial x_i} \\ &= \frac{\partial}{\partial x_j} \left[\left(\mu + \frac{\mu_t}{\sigma_\varepsilon} \right) \frac{\partial \varepsilon}{\partial x_j} \right] + \frac{C_{1\varepsilon} \varepsilon}{k} G_k |f_1| - C_{2\varepsilon} \rho \frac{\varepsilon^2}{k} |f_2| + \left| 2 \frac{\mu \mu_t}{\rho} \left(\frac{\partial^2 u}{\partial n^2} \right)^2 \right| \end{aligned} \quad (3)$$

$$\mu = C_\mu |f_\mu| \rho \frac{k^2}{\varepsilon} \quad (4)$$

The mathematical expressions of the coefficients about f_1 , f_2 and f_μ are as follows:

$$f_1 \approx 1.0 \quad (5)$$

$$f_2 \approx 1.0 - 0.3 \exp(-\text{Re}_t^2) \quad (6)$$

$$f_\mu = \exp\left(-2.5/(1 + \text{Re}_t/50)\right) \quad (7)$$

$$\text{Re}_t = \rho k^2 / (\eta \varepsilon) \quad (8)$$

3.4 Experiment and discussion

In this paper, the case analysis method is used to analyze the public opinion data in 2019. First, the user is shown how to use the system. Then, according to the research questions raised by the user, the appropriate case is selected for analysis. Finally, the user's feedback is recorded and the user's analysis results are discussed. In the network public opinion mood in 2019, the theme of campus violence is the most in the related public opinion events, and the overall mood tends to be evil. However, there are still different emotions between articles and comments. There are 28.57% good emotions in articles and 14.28% in sadness; however, in comments, evil accounts for 85.71% and good accounts for 14.28%, and there is no sad mood.

For the above situation, experts in the field believe that the reason for this situation is: "the expression of media platform must be objective and neutral, so emotional expression is more restrained, but users can freely comment, and negative topics such as campus violence show bad comments." in addition, there is a significant positive topic in the figure, namely "student entrepreneurship". Because in 2019, the state issued a series of policies to encourage students to start their own businesses. The comparison chart of public opinion analysis data is shown in Figure 2.

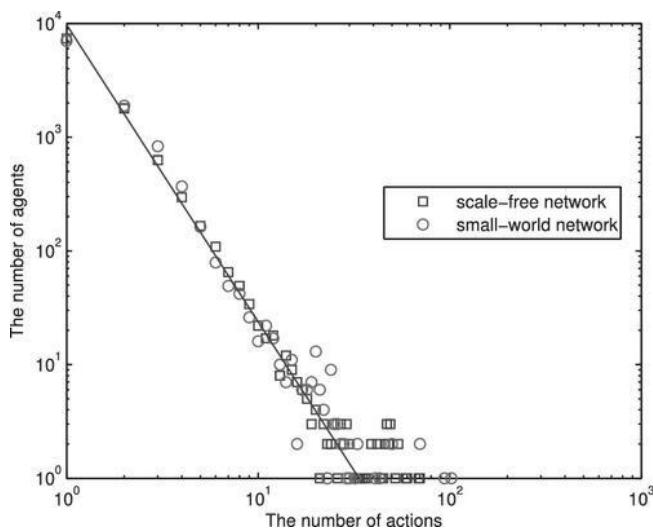


Fig 2: The comparison chart of public opinion analysis data

IV. CONCLUSION

Firstly, through the user-centered design process, the author summarizes the specific objectives and design principles in the field of public opinion sentiment analysis. Secondly, it analyzes the emotion of online public opinion texts and defines the type of emotional

communication from articles to comments. Thirdly, a visual platform based on public sentiment is designed and developed. The platform shows the emotional tendency of public opinion and the emotional communication mode of different media platforms, helping users choose the appropriate media platform to publish and obtain information. Finally, the case analysis proves the usability of the system, which provides a new possibility for the cross field of public opinion sentiment analysis, media comparative analysis and visualization. The following research will consider improving the accuracy of text emotion recognition algorithm, and real-time analysis and display public opinion sentiment.

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