

Association for Information Systems

AIS Electronic Library (AISeL)

WHICEB 2023 Proceedings

Wuhan International Conference on e-Business

Summer 5-28-2023

Study on Spatio-temporal Topic-sentiment Synergy Model and Visualization of Online Public Opinion on Public Health Emergency

Yuhan Lu

Wuhan University, Wuchang District, Wuhan 430072, Hubei, China

Ziming Zeng

Wuhan University, Wuchang District, Wuhan 430072, Hubei, China, zenzeng1977@aliyun.com

Follow this and additional works at: <https://aisel.aisnet.org/whiceb2023>

Recommended Citation

Lu, Yuhan and Zeng, Ziming, "Study on Spatio-temporal Topic-sentiment Synergy Model and Visualization of Online Public Opinion on Public Health Emergency" (2023). *WHICEB 2023 Proceedings*. 65.
<https://aisel.aisnet.org/whiceb2023/65>

This material is brought to you by the Wuhan International Conference on e-Business at AIS Electronic Library (AISeL). It has been accepted for inclusion in WHICEB 2023 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.

Study on Spatio-temporal Topic-sentiment Synergy Model and Visualization of Online Public Opinion on Public Health Emergency

Lu Yuhan¹ and Zeng Ziming¹

¹ Wuhan University, Wuchang District, Wuhan 430072, Hubei, China

zmzeng1977@aliyun.com (Zeng Ziming)

1. INTRODUCTION AND RESEARCH QUESTIONS

In 2021, the Delta variant was rampant in the world, and occasional outbreaks in China were promptly contained. During the epidemic, Weibo, short videos and other social media are important platforms for the generation and dissemination of public opinion and public sentiment due to their fast propagation, timely control and guidance of such platforms can avoid the consequences of public unrest and the loss of government credibility. Some studies have shown that there is a correlation between the differences and evolution trend of public opinion and geographical distribution [1]. However, most of the current studies on public health emergencies focus on the evolution trend of topics and sentiment over time, and lack of studies considering spatial factors.

Therefore, this paper will take microblogs posted by users during the epidemic as the research object, and use a topic mining model, quantitative sentiment analysis, sentiment map and other research methods to try to address the following questions: ① How to build a topic-sentiment synergy model based on topic mining and sentiment cognition theory, combining temporal and spatial factors? ② How to carry out visual analysis of topics and sentiments for public health emergencies in different times and spaces? ③ Based on the spatio-temporal visual analysis of public health emergencies, how to provide suggestions and decision-making basis for public opinion guidance concerning geographical and temporal factors?

2. THEORY AND RESEARCH FRAMEWORK

This paper selects public health emergencies with different locations and certain time intervals as research cases, and takes the short text data published by Weibo users as the research content. The overall research framework is shown in Figure 1, which consists of three major parts: corpus collection, topic analysis model construction, and sentiment analysis. In the first part, get the microblogs on the timeline by a crawler, select the corpus containing the specific region, and process the noisy raw data. In the second part, the improved LDA topic model is used for topic mining and topic heat analysis. In the third part, the sentiment evolution of emergencies under different times and space is analyzed by SnowNLP lib, and the sentiment intensity under different periods is visualized using sentiment map.

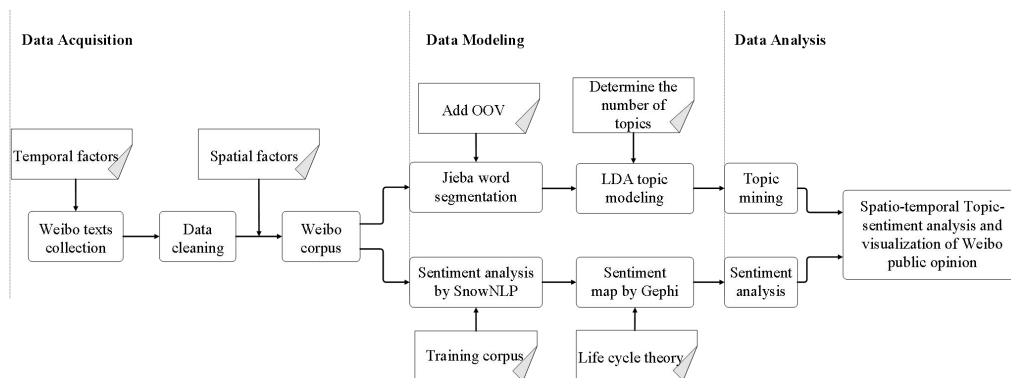


Figure 1. Research framework

This paper first proposes an analysis scheme combining qualitative research and quantitative analysis. Secondly, a synergistic model of topic and sentiment is constructed, and graph visualization technology is utilized. Finally, the validity of the model is verified by specific events. In this paper, public health emergencies in Shijiazhuang, Ruili and Nanjing are taken as research objects. Through topic mining, quantitative sentiment analysis and map visualization, the spatio-temporal online public opinion topics and evolution characteristics of sentiments are revealed. This study can provide a theoretical and practical basis for online public opinion feedback, preplanning proposal, grasping the trend of public opinion, and governing online public opinion.

According to the daily release of epidemic information, we selected the period from the first confirmed case to one week after the zero-COVID of each city, and crawled the raw text of microblogs with the keyword "COVID-19", and then removed duplicate items and filtered by city name.

3. RESULTS AND MAJOR FINDINGS

During the epidemic period, positive sentiment showed a trend of decreasing first and then rising, with Shijiazhuang and Nanjing having neutral to positive sentiment the whole time, and Ruili having a higher proportion of negative sentiment. Public sentiment can reflect the local efforts in epidemic control, which differs from the level of supplies, economic conditions and the optimism of the public about the epidemic response. Since the outbreak in Shijiazhuang was near the Spring Festival, the negative sentiment was more than that of Nanjing, which was also affected by the controls. Due to the long-term pressure of border control, the source tracing and control of the epidemic in Ruili cannot be as timely as in cities with ample economy, and the sentiment expressed on social platforms such as Weibo will be more negative than inland cities, while also reflecting the severity of the epidemic to some extent. In terms of monitoring and management, it is suggested that cities with high sentiment scores and stable trends can appropriately reduce manual intervention, while cities with large sentiment fluctuations and a high proportion of negative sentiment should achieve timely warnings and appropriate guidance, and establish initiatives to deal with negative sentiment as soon as possible.

4. CONTRIBUTIONS

At the theoretical level, this paper verifies the feasibility of exploring the evolutionary analysis of public opinion topics and sentiments from the spatio-temporal perspective, and verifies the influence characteristics of regional differences on the development of public opinion. At the practical level, this paper analyzes the evolution trends of key topics of public opinion and the tendency of sentiment evolution in different periods and geographical areas, combined with specific cases and visualization studies, which can provide targeted basis and decision reference for government departments in monitoring public opinion, predicting public opinion and guiding the trend of public opinion in public health emergencies.

REFERENCES

1. Howe, PD, Mildenberger, et al. Geographic variation in opinions on climate change at state and local scales in the USA[J]. NAT CLIM CHANGE, 2015.
2. Lai Kaisheng, Fu Hong, et al. Geographical Public Opinion: A New Approach of Public Opinion Research in Big Data Era [J]. Information Studies: Theory & Application,2020,43(08):64-69.
3. Blei D M, Ng A Y, Jordan M I. Latent Dirichlet Allocation[J]. The Annals of Applied Statistics, 2001.