Research on Information Dissemination of Public Health Events Based on WeChat: A Case Study of Avian Influenza

Tianyi Luo, Zhidong Cao, Daniel Zeng
The State Key Laboratory of Management and Control for Complex Systems, Institute of Automation,
Chinese Academy of Sciences, Beijing, China
{luotianyi2017, zhidong.cao,dajun.zeng}@ia.ac.cn

***Abstract*—This paper studied the public opinion dissemination mechanism of public health events such as avian influenza on WeChat. We collected 25,572 posts related to "avian influenza" and "H7N9" from WeChat accounts and proposed the NRT model to simulate the spread of avian influenza public opinion in WeChat. Fitting results show that it can well explain the information dissemination process and mechanism within the WeChat public account. Then the influence of model parameters on the propagation of network public opinion is further studied. Our research can provide a theoretical basis for network public opinion prediction and prevention, and has great significance for the stability of the network environment.**

Keywords—public opinion, information dissemination, epidemic, NRT model

I. INTRODUCTION

The public opinion of sudden outbreaks is related to the safety of life and is likely to cause fluctuations and other serious negative effects in the public opinion environment. Studying the mechanism of public opinion transmission in specific social media is necessary.[1-2] constructed propagation models for different scenarios. We proposed a model to explain the laws and mechanisms of popular public opinion dissemination on WeChat platforms. Take the avian influenza data as a case for analysis and model verification. Finally, the model parameters were further analyzed.

II. MODEL AND EXPERIMENT

Data: From the WeChat platform, we collected 25,572 posts from WeChat public accounts related to "avian influenza" and "H7N9" from January 2017 to October 2018.

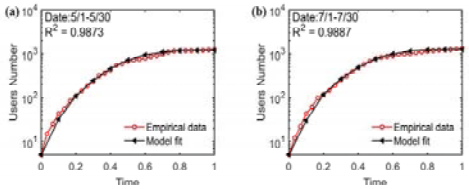

Fig. 1. Total propagation numbers changes over time. The abscissa is the ratio of the current time to the total time.

Experiment: (1) simulation prediction: Performed the simulation on a highly clustered BA scale-free network. After parameter optimization, we expected model results to be consistent with WeChat empirical data. (2) Analyze the impact of the following parameters on the dissemination: initial acceptance of public opinion (θ), public opinion attraction (r), propagation source (seeds).

Nonlinear Resistance Threshold (NRT) model: Based on LT model, NRT model considers the change of the user's acceptance threshold of information in the process of transmission. Activation threshold (θ) is an increasing function of the propagation time, conforming to the logistic growth model. r is logistic growth rate.

III. CONCLUSION

Fig.1 shows the result of the model fitting. The coefficient of determination of fitting results is 0.9873 and 0.9887. Fig.2 shows total propagation numbers changes over time under different model parameters. The results show that our model can well explain the avian influenza information dissemination process and mechanism within the WeChat public account. The greater the people's initial acceptance of public opinions, the slower the decline of epidemic public opinions heat is more conducive to the propagation; and have almost no effect on the early stage of propagation, the middle and late stages of propagation significantly suppressed, causing the spread to stop

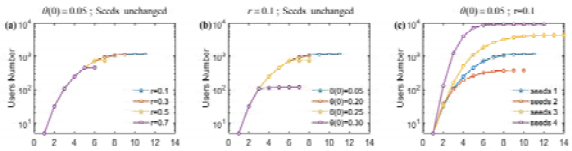

Fig. 2. Total propagation numbers changes over time under different model parameters

quickly. The choice of seed nodes determines the whole propagation scale to a certain extent. The node with the greatest degree among the seed nodes almost dominates the overall propagation trend.

REFERENCES

[1] Z.-M. Zeng and C.-Y. Huang, " Research on Prediction Model of Sudden Infectious Diseases Based on BP Neural Network," Journal of Modern Information, vol. v.38 ; No.323, no. 05, pp. 39-46+54, 2018.

[2] J.-H. Zhao and K.-W. Wan, " Research on the Dynamics Model of Social Network Public Opinion in the Information spreading Model-SIR Epidemic Model," Information Science, vol. V35, no. 12, pp. 36-40, 2017.