Network Security Situation Prediction Method based on Time Dimension Analysis

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Abstract. With the rapid improvement of productivity and social and economic level, the actual application of computer network and the scope of network information technology are increasing, network security and other related issues have become the current need for us to focus on the object of study. However, the existing prediction methods related to network security cannot make the most correct response and judgment to the desktop and factor values of future network security. In order to better deal with the relationship between network security factors on the impact of Internet security situation. This paper proposes a method to predict and analyze network security situation based on time dimension.

Keywords: network security; security situation prediction; spatial data mining; spatiotemporal dimension.

1. Overview

By analyzing the factors of security situation in each period of time, the most realistic current and future network security situation is obtained. This is the most reasonable way to grasp the future security situation of the network. This can not only provide network security management personnel with safe decision-making guidance and basis, but also provide a relatively stable and safe operating system. This can not only effectively reduce the harm brought by network attack, but also effectively improve the network's active defense performance against danger. This kind of research from the single network security situation to the overall network security situation can effectively predict the future network security situation.

2. Classification of Security Situational Awareness

According to the differences of perceived objects, security situation perception can be divided into the prediction of security situation and the evaluation of security situation, in which the perceived object of the latter refers to the evaluation of the current security situation, which is not covered here. This paper focuses on the former security situation perception and makes security situation prediction. Researchers have effectively solved the problems existing in the prediction process of the overall situation of Afghanistan in the network by proposing a variety of prediction methods, but there is still room for improvement in the following aspects.

Future security situation of the development and change, in fact, related to the future security of element values are closely linked, but more research in the way, just according to the current network and the data of the whole history of the security situation in a wide range of analysis, cannot effectively the security situation for the future of the combination of the relevant factors value effectively, thus ignoring the future of the security situation in related factor value, the impact on the security situation.

Not only that, in the process of perceiving the security situation, there is a lack of favorable analysis and exploration on the influence of security factors on the security situation, thus affecting the own security situation factors and the overall security situation

Therefore, in order to better solve the above problems, researchers put forward a new prediction method -- relevant prediction method of network security situation based on spatio-temporal dimension analysis.

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3. Research on Relevant Work of Security Situational Awareness

3.1 Conceptual Analysis of Security Situational Awareness

Relevant researchers have made the corresponding conceptual analysis of situational awareness at a very early age: it refers to the relevant elements obtained from the perception of the environment in the corresponding two dimensions of time and space, and the comprehensive understanding of the information obtained from the understanding of perception will accurately evaluate the future. In 1999, relevant researchers began to integrate the network complete technology with the situational awareness technology, and based on the different time distribution points of the perceived objects, carried out the relative prediction of the future network security situation and the evaluation of the current network security situation.

In the future, the research on the prediction of network security situation is basically divided into two directions. On the one hand, the prediction of security situation can be realized through the prediction of security and other factors, so as to reflect whether some network conditions are safe or not. On the other hand, the network as a whole is considered, and an effective assessment of the direction of security situation prediction is made. In the related prediction research of the security factor method, the security threat and vulnerability generated by it are mainly predicted and studied at present.

In the aspect of network situation assessment, data fusion is adopted to analyze the overall security situation of the whole network.

As there are many factors influencing the network security situation, as long as there are problems in the network environment, the attacker or the defender, it will affect the changes of the security factors, thus affecting the changes of the network security situation.

3.2 Basis and Algorithm for Predicting Time Dimension of Network Security Situation

Network security situation in the future elements determines the network security in the future development trend, but the network security situational factors on the event is a dynamic change of dimension, the subtle changes and causes of the overall security situation in related changes, how to forecast on the security situation, the dimension of events for effective control, thus the elements of security situation for the best for the future analysis and forecasting.

Table 1. Analysis of factors affecting Security situation

Security Elements	Influencing Factors
Assets	The changes of number, position, importance degree,etc
Business	The changes of number, using frequency, business process,etc
Topology	The changes of nodes number, connecting relations,etc
Defense Policies	The changes of number,access control rules, security configurations,etc

4. Optimize the Spatial Dimension Mining Method of Spatial Data

4.1 Analyze Network Situation Effectively from the Time Dimension

According to the corresponding network security situation elements as the basic basis, through the network situation related elements to make targeted extraction of information, can provide a strong data support for the future network security situation. By the change of the observation time node, the network security situational factors and the network environment of attack and defense of alert detailed analysis and effective prediction, and related experiment and the actual network environment and use, thereby further on the time dimension as important foundation of network security situation make pertinent to ascend, and clear next time dimension test time and related analysis target. And then gradually improve the accuracy and quality of network situation.In the process of practical analysis forecast, due to the frequent sequence attack, makes the base with the change of the vulnerability, in general, network professionals to take measures to effectively solve the network situation, so we need to effectively use the dimension of time is analyzed, and the forecast of network security situation.

4.2 Analyze the Network Security Situation from the Spatial Dimension

Mining the data of spatial dimension can not only conduct corresponding data analysis on the influence of conditions related to the elements of network security, but also make accurate cognition and judgment on the network security situation within the time node. Spatial data mining, is generally effective and topological structure analysis, common terms processing medical images, traffic control and environmental protection and other aspects. Due to the characteristics of large corresponding space range, network data can be effectively applied in network security and other related fields.

In the adoption of this approach in China, we should pay attention to the process of judging and predicting the network security situation, and ensure the effective selection of the practical dimension of analysis time and relevant practical worries, and ensure that the time of the two is synchronous and consistent. Only in this way can the time prediction process not be affected by the characteristics of the time dimension, and then more accurate. In the process of adopting this method, the theory of spatial data mining should be taken as the most basic carrier to analyze and calculate the prediction of security situation through the basic dimension of space. Finally, the actual structure and the results for the time dimension are combined to obtain the closest security situation value.

5. Intelligent Technology Analysis of Farmers in Network Security Situation

5.1 Strengthen the Importance of Network Security Situation Prediction

The network security environment is the network security situation. This is closely related to the operation of network devices and network users. At present, the importance of network application is becoming more and more prominent, and the security problem of network environment has become the concern of many Internet users. Increasing the scope of network management work, strengthening the security of network management, and the network security situation for a certain judgment and prediction, so as to take a scientific way to protect network security, is our daily production and life has a role that cannot be ignored.

5.2 Matters Needing Attention in the Process of Network Security Situation Prediction

In the prediction process of network security situation, it is likely to be affected by the corresponding environmental factors and security factors. If the accurate budget is not used to predict the network security situation, it will have a certain impact on the predicted results. Not only that, the vulnerability of the prediction algorithm will appear network security situation random and inaccurate. Therefore, the adoption of holi's measures to improve the accuracy of prediction can increase the stability of the increasingly complex network environment. Therefore, only by strengthening the

prediction of network security situation and paying attention to details can the normal development of network be promoted.

6. Conclusion

To sum up, under the current complex network environment, relevant network managers need to improve their professional quality to better keep pace with the pace of the Internet era, strengthen their understanding of network situation security, and improve their professional skills. Moreover, the prediction of network security situation should be analyzed and judged comprehensively based on the time dimension, which is not only an important measure to ensure network security, but also an important development goal and security measure in the future Internet development process. Therefore, in the prediction of network security situation, only grasp the corresponding scientific methods, can better guarantee the development of the network in the future.

References

[1]. ruifang. Shi A brief analysis of the prediction method of network security situation based on spatio-temporal dimension analysis [J]. Network security technology and application, 2015 (11): 82-83.

[2]. yu, Wang weiguozhang, et al. Estimation method of dynamic situation of air combat based on improved evidence network [J]. Acta aeronautica sinica,2015,36(12):3896-3909.

[3]. Yuling Liu, dengguo, feng yifeng, lian et al. Prediction method of network security state potential based on spatio-temporal dimension analysis [J]. Computer research and development, 2014,51 (8):1681-1694.

[4]. da, Peng dongdong, guo, xmei,ing et al. Pre-measurement method of network security situation based on spatial and temporal dimension analysis [J]. Communications world,2015(22):36-36.