

Analysis of Risk Index and Early Warning Model Construction of Large-Scale Events

You Li¹, Yun Deng², Yuchuo Chen¹

¹Yunnan Agricultural University, Kunming, Yunnan, 650201, China

²The College of Arts and Sciences Yunnan Normal University, Kunming, Yunnan, 650222, China

Keywords: Large-scale event, early warning model, Identify index

Abstract: In order to effectively warn the risk situation of large-scale sports events, thereby reducing the impact of risks, and successfully achieving the expected goals of risk management of sports events, firstly combining the characteristics of the risks of large-scale sports events, a risk early warning model based on BP neural network is proposed, and The validity of the model was verified. The verification results show that the large-scale sports event risk early warning model based on BP neural network can achieve good early warning effect. Then, on the basis of risk early warning research, for three types of risks in large-scale sports events, namely natural environmental risk, event management risk and social environmental risk and their corresponding risk levels, namely light police, medium police and severe police, establish The event risk response matrix is set to effectively respond to various risk situations that occur in large-scale sporting events and provide a strong guarantee for the smooth realization of the final goal of large-scale sporting events.

1. Introduction

The so-called risk refers to the possibility of unfavorable results and the degree of possible loss in a certain period of time due to the effects of various uncertainties during the course of development. The connotation of risk lies in its possibility of being presented by risk factors, risk accidents and risk results within a certain period of time. Early warning is a process of measuring the strength of a certain state that deviates from the warning line to issue an early warning signal. The operation of large-scale sports events refers to the operation of the main body of the event to plan and optimize the allocation of events and event resource elements (people, finance, time, information, technology and management), and the process of converting input into output is the process of achieving event benefits. During the operation of the event, due to the many factors involved in the operation of the event, each element has the characteristics of inducement, suddenness, and chain. The main body of the event operation is often due to insufficient capacity, and there are many deviations from the actual expectations. It has encountered one or other risk events, which has caused unpredictable losses to the entire event. To this end, it is important to establish a complete and systematic early warning system for large-scale sports event risk operations, so that operators can timely and effectively understand the dynamic running process of events and make corresponding decisions in a timely manner to avoid risks.

2. Definition of Large-Scale Sports Events and Risk Warning

Specifically, a large-scale sporting event refers to a sporting event with a large scale, a large number of stakeholders, a complex operation and organization process, and a far-reaching impact and strategic significance on the venue. Generally speaking, large-scale sports events include international comprehensive sports events, such as the Olympic Games, Asian Games, World Youth Games, World University Games, etc.; important events organized by the world's individual events, such as the World Cup football game, the World Tennis and Badminton Open, the World Formula One Championship, etc. ; Traditional sports events sponsored by world-renowned large enterprises, such as Toyota Cup, International Rally, etc. This article focuses on the discussion of important

events organized by individual events. Early warning theory originated in the military, and has been widely used in various fields such as social politics, macro management, environmental protection, and economy. Early warning refers to the prediction and warning of future adverse events or risks of the system according to changes in the system's external environment and internal conditions. It means pre-warning and early warning. The risk warning of large-scale sports events is based on the actual situation of the event, to determine whether it meets the expected requirements of the event risk management goals, and thus to determine whether the event is in a risk state. It takes the actual activities of the event as the content and the process of the event as the object. Based on the event risk management theory, by using a series of scientific indicator systems and early warning technology, the event management process is monitored. Risk warning for large-scale sports events must first establish an early warning indicator system and set an early warning threshold for the event. When the early warning monitoring indicator breaks through the threshold, the system will send out early warning information and prompt the corresponding pre-warning according to the type, nature and degree of warning information Control measures to provide the necessary information for risk managers of large-scale sports events to make timely and correct decisions.

3. The Establishment of Risk Early Warning Indicators for Large-Scale Sports Events and the Study of Risk Early Warning Models

This article divides the risk early warning indicator system of large-scale sports events into three levels: general risk, risk category, and risk factor. Among them, the risk is generally referred to as a large-scale sports event risk early warning indicator system, and the risk categories include social environmental risk, natural environmental risk and event management risk. After further research, we can see that social environmental risks can be further subdivided into three factors: economy, humanities, and politics; event management risks can be subdivided into the quality of participants, management systems, event information, management measures, organizational methods, management mechanisms, etc. 6 factors; natural environmental risks are mainly affected by factors such as geographic environment, climatic conditions, and natural disasters. The key to risk management of events is to supervise and control these risk factors.

At present, many scholars mainly use the methods of exponential smoothing and multivariate logic to study the risk early warning model. Although these methods have the characteristics of simple calculation, easy to understand and operate, but the object of large-scale sports event risk early warning research is uncertain risk events, which have significant uncertainty and conditionality. There are still some limitations in the application of traditional early warning research methods to the risk warning of large-scale sports events. This is mainly reflected in two aspects: 1) The risk index system of large-scale sports events is composed of many qualitative indicators. The evaluation of qualitative early warning indicators with strong nonlinearity and ambiguity, traditional research methods are difficult to ensure the accuracy and objectivity of early warning results. 2) The risk influencing factors of large-scale sporting events are characterized by variability, and the traditional research methods for early warning are generally definite in the range and early warning lines, do not have time-varying characteristics, and lack self-adaptation and self-learning capabilities. This makes it less suitable for risk warning of large sports events.

The early warning of the risk of large-scale sports events should be based on the application of appropriate methods to scientifically monitor and objectively measure the risk situation. Through a comparative study of existing risk warning methods, artificial neural networks are characterized by their ambiguity, parallel decentralized processing patterns, better pattern recognition capabilities, stronger fault tolerance, high nonlinearity and globality, and good robust fault tolerance. The characteristics of sexual and associative memory functions and good self-adaptive and self-learning capabilities make it possible to overcome the limitations of traditional methods and deal well with the risk warning of large sports events, which has many complex factors, including non-structural and non-structural. Because of the problem of nonlinear system of accuracy rules, this article intends to use artificial neural network theory as the theoretical basis for modeling large-scale sports event risk early warning system. Because BP neural network is considered to be a very ideal neural

network for simulating the relationship between input and output, it has been widely used in actual scientific research and work. Therefore, this paper builds a risk warning model for large-scale sports events based on BP neural network.

The BP neural network model is a complex network system composed of a large number of simple processing units connected to each other. The BP network is a unidirectional multi-layer antecedent network with a neural network of 3 or more layers, which includes the input layer, Hidden layer and output layer. In the BP neural network model, the input layer and the output layer of the network exhibit a highly nonlinear mapping relationship. For example, if the number of nodes in the input layer of the network is n and the number of nodes in the output layer is m , then the network will map the n -dimensional Schematic space maps to the m -dimensional Euclidean space. As for the BP neural network shown in Figure 2, $(x_1, x_2 \dots, x_n)$ is the information input from the outside, and this part of the input information is progressively advanced through the weighted sum of hidden layer neurons and through the activation function mapping. Finally, the output layer obtains the output $(y_1, y_2 \dots, y_n)$ of the entire network. Because there is no coupling between the nodes of the same layer, the output results of the nodes of each layer will only affect the output values of the nodes of the next layer, where each node represents a neuron, and its corresponding transfer function is usually of Sigmoid type. After adjusting the structure of the BP network, problems such as nonlinear classification can be realized, and any nonlinear function can be approximated with any accuracy. After determining the structure of the BP neural network, the input and output sample sets are used to train the network, that is, the threshold and weight of the neural network are learned and adjusted, so as to realize the input and output mapping relationship given by the network.

4. Risk Management Strategies for Large-Scale Sports Events

The risk response of sports events is to put forward corresponding treatment opinions and measures according to various risk situations occurring in sports events. In this article, it refers to the development of specific solutions based on the requirements and early warning results of large-scale sports events after early warning analysis, with a view to reducing the probability of occurrence of event risks and the degree of risk impact. The basic process of sports event risk response is: clarify the event risk response basis; formulate a risk response plan based on the risk response mechanism and constraints; determine whether the risk response plan meets the actual requirements of the event, and if it does not meet the requirements, continue to develop new plan. The basis of risk response for large-scale sports events mainly includes: 1) List of risk factors. Including the analysis of the causes of risk events, the description of risk categories, the nature and characteristics of risks, etc. 2) Risk ranking. Mainly adopt the method of quantitative analysis, sort the risks according to the possibility of occurrence and the severity of the consequences, so as to determine the relative importance of various risks, so as to select the response plan in a targeted manner. 3) Risk warning situation. It is to identify the risk level of the event through the risk early warning model for early warning indicators. 4) Tolerable risk level.

5. Conclusion

The number and quality of model samples will affect the diagnostic accuracy of the model. If the accumulated number of samples is insufficient or unrepresentative, the learning function of the neural network cannot be exerted. Therefore, each department of the event operation should strictly implement the risk management monitoring plan, and submit the risk data and information to be provided by this department in the form of dynamic reports. This process is a dynamic and continuous process, and it should not be careless. 3) Some inherent limitations of the BP neural network lead to certain shortcomings in the network after information fusion. For example, it is not easy to properly determine the number of hidden layers in the network, there is still a certain degree of arbitrariness in parameter selection, and the learning convergence speed is slow. Therefore, the improvement of this model needs further study. 4) The event risk operation warning system is a high-level, complex structure and strong correlation system. Its systematic idea is to evaluate and

monitor changes in the internal and external environment of the event operation, comprehensively, systematically and continuously collect and process risk information, discover and predict risks, and prompt the decision-making layer of the event operation to make corresponding risk countermeasures, so as to ensure that the operation of the event reaches the predetermined The goal is to successfully complete the task of holding the event.

References

- [1] Wang Zhihui, Zhang Liuxia. Early warning mechanism of mass events in large-scale sports events. *Journal of Shanghai Institute of Physical Education*, vol. 37, no. 2, pp. 42-48, 2013.
- [2] Liang Huawei, Yuan Yandong, Xue Hongwei. Risk early warning model of sports events based on BP neural network. *Statistics and Decision*, no. 16, 2018.
- [3] Liang Huawei, Yuan Yandong, Xue Hongwei. Risk early warning model of sports events based on BP neural network. *Statistics and Decision*, vol. 12, no.6, pp. 18-19, 2018.
- [4] Yao Changyan, Wu Shanshan. Construction and Empirical Analysis of Risk Early Warning Model of P2P Network Lending Platform. *Journal of Xi'an University of Finance and Economics*, no. 4, pp. 52-59, 2016.
- [5] Pei Yu, Tang Wenbin. Application of principal component analysis method to vertically build an early warning model of corporate financial risk. *Friends of Accounting*, no. 4, pp. 24-26, 2007.