Research and Application of Artificial Intelligence Technology in the Field of Risk Perception

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Abstract. In recent years, the breakthrough of data, algorithms and computing power has made artificial intelligence ushered in the third wave. The rapid development of artificial intelligence will profoundly change human society and the world, promote human understanding, perception and the ability of decision-making in the world. Applying artificial intelligence to disaster risk perception research can improve risk perception and accuracy and effectively avoid risks. Using big data technology, artificial intelligence algorithm and threat intelligence technology to study the construction of information security situational awareness system, the model, architecture and concrete implementation of information security situational awareness system are proposed. This study combines artificial intelligence and risk perception to sort out the application and development trend of artificial intelligence in disaster risk perception in recent years, and proposes factors that affect public disaster risk perception and coping behavior.

1. Introduction
According to the standard of division of artificial intelligence intelligent level, artificial intelligence development is divided into three stages: weak artificial intelligence, strong artificial intelligence and super artificial intelligence. At present, artificial intelligence is still in the early stage of development. It belongs to the stage of weak artificial intelligence. It can only train neural network parameters by learning the marked data set according to the logical framework or rules given by people, and finally can be applied in practice. Therefore, it is unrealistic to over-exaggerate the ability of artificial intelligence at this stage. But even the current weak artificial intelligence has produced all-round effects in the economic, social, military, and political fields. Especially in social science research, the application of artificial intelligence will enhance the level and precision of quantitative research, increase the basis of quantitative judgment, and improve the ability to study the complex evolution of nonlinear social problems. This paper mainly proposes the theoretical framework applied in risk perception and decision management based on the application of weak artificial intelligence technology at the current stage.

At present, disaster risk perception has become a research hotspot for scholars at home and abroad. Risk perception refers to an individual's objective understanding of subjective risks and subjective feelings, including the perception of the risk event itself and the resulting outcome. The uniqueness of disaster risk perception determines the theoretical significance and application value of the research. First, the application of artificial intelligence is applied to the combination of risk and human risk, which lays a theoretical foundation for comprehensive research on artificial intelligence in risk-aware application research. Secondly, from the perspective of artificial intelligence technology, it analyzes the public's new vision of risk perception. This paper focuses on the research of artificial intelligence
technology in the field of risk perception, and combines artificial intelligence with psychology interdisciplinary. In terms of application value, first, there is a big difference between the public and experts in risk perception. How experts can transmit useful information to the public is an important challenge at this stage (Pidgeon & Fischhoff, 2011), which needs to be combined with artificial intelligence technology. Second, the public is the mitigator of risk mitigation. The contradiction between attitude and action is largely due to the perception of risk events, and artificial intelligence technology can measure the public's perception.

2. Basic Information Overview

2.1. Artificial Intelligence

At present, people's production and life have higher and higher requirements for computer technology. If they do not improve their computer application capabilities, they will be eliminated by the society. In order to meet the needs of people's lives, artificial intelligence will appear and be favored by all walks of life. The reason is that artificial intelligence technology combines computer technology and communication technology effectively, through the combination of the two to simulate the human way of thinking, and then apply computer technology to quickly process and integrate data, which can express this energy in a timely, accurate and scientific way. Reaction. Research on artificial intelligence mainly includes robotics, language recognition, image recognition, natural language processing, and expert systems.

In the study of disaster risk perception, people's psychological factors are difficult to measure, and artificial intelligence technology can just effectively handle this kind of uncertain information. Artificial intelligence technology in the application of artificial neural technology refers to the simulation of human thinking processing, the role of nerve cells is the key, through computer science, psychology, linguistics and philosophy and other interdisciplinary simulation of people Thinking, visual, tactile, and auditory, in this way, to understand people's ability to perceive disaster risks.

2.2. Basic Definition of Disaster Risk Perception

Risk perception is a subjective judgment of people on the characteristics and severity of a particular risk, and an important indicator for measuring public psychological panic (Li, 2009). The public's perception of disaster risk includes the perception of the native risk generated by the disaster and the perception of the secondary and induced risks induced by the disaster. Natural disasters are often accompanied by destructive, native risks that are predictable, relatively fixed, and directly at risk, such as earthquakes, tsunamis, volcanic eruptions, forest fires, and other sudden natural disasters. The occurrence of each kind of natural disaster will lead to direct losses in the affected areas. This direct loss is the embodiment of the risk of primary disasters. Public risk perception has become an important research field. It still needs to be traced back to 1960. It was extended from psychology by Harvard University Bauer. It began to explore and analyze consumer purchasing behavior and anticipation psychology, and then gradually expanded to financial risks and society. Risks, Internet consumption, and natural disaster risks. Due to the differences in research objects and subject perspectives between different fields, there are certain differences in the definition angles and methods of risk perception. Disaster risk perception is the direct cause of risk prevention awareness and behavior. It is of great practical significance for individuals to study the level of disaster risk perception.

3. Research Trends of Artificial Intelligence in Disaster Risk Perception

3.1. Redefinition of Risk

Since risk is a measure of the development trend of things, and things are always in constant change and evolution, such as flowing water generally has dynamic evolution characteristics. The risk factor evolves adaptively with the development of the situation. The risk evolution in a complete cycle consists of four stages: “risk identification”, “strategic combination”, “strategic interaction” and “risk evolution”. As people's demand for risk assessment applications continues to increase, it is not only
necessary to know the overall risk situation, but also to understand the dynamic evolution of risk landscapes over time and space. This requires that the assessment of risk in the future is both real-time and holistic. The complicated situation in the field of risk perception is changing rapidly, and it is necessary to use the innovative risk assessment method to study the rapid evolution of the situation.

3.2. Artificial Intelligence Technology Applied to Risk Assessment

The traditional method of perceptual evaluation mainly relies on senior experts in related fields, and can accurately evaluate the accumulation of years of experience in a certain field and timely tracking of dynamics. This type of assessment is often constrained by the limited resources of experts, and the dynamic assessment is weak. In addition, the evolution of risk is systematic and non-linear. It is difficult for a single domain expert to observe and evaluate the systemic effects such as the emergence of risks and chaos in the overall dimension. With the development of operations research, the American operations researcher proposed the analytic hierarchy process (AHP) in the 1970s to conduct multi-objective decision analysis through the combination of qualitative and quantitative. Using the AHP method in risk assessment, multiple experts' assessments can be combined to arrive at a relatively average judgment. However, this method still lacks dynamics, and some "risk singularities" are easily ignored. With the wide application of statistics, scholars built statistical models based on variable relationships to predict future changes in the dependent variables. Some scholars applied the Probit model to statistical regression analysis of the alliance from 1816 to 1992; the US government funded American universities in 1994. Scholars established the "Political Instability Task Force" to establish an evaluation and early warning system for global political stability, mainly using statistical regression analysis to calculate the probability of high-intensity political turmoil. For the case where the variables are too complicated, the time series analysis avoids the causal relationship between the independent variables and the dependent variables, and directly predicts the future from the history of the time series.

With the advancement of computer simulation technology, the use of simulation modeling methods to carry out crisis early warning and decision-making began to appear. The "Comprehensive Crisis Early Warning System (ICEWS)" project carried out by the Lockheed Martin Advanced Technology Laboratory has adopted a large number of actor modeling methods; the US Naval Analysis Center has established a combat simulation system EINSTein based on multiple agents; Some scholars in China have carried out a large number of practices in the international political ecological evolution model by using the agent modeling method. Professor Tang successfully predicted the election of the leaders of Taiwan in China in 2016 by establishing the ABM (Agent-Based-Model) model. With the rapid development of computing science, new technologies such as big data and artificial intelligence have brought new ways for risk assessment. Turing Award winner J. Greg believes that the Big Data era will form the Fourth Paradigm of data-intensive scientific research, that is, scientific research in the era of big data will no longer require models and assumptions. Instead, use supercomputing capabilities to directly analyze massive amounts of data and discover relevant relationships to gain new knowledge. From the current international and domestic related research, it can be seen that under the impetus of big data and artificial intelligence technology, computing social science is collecting and utilizing data for social science research services in an unprecedented depth and breadth.

3.3. Applying Artificial Intelligence to the Basic Path of Risk Perception

The use of artificial intelligence for risk perception assessment has two main paths: one is the modeling and simulation of complex systems; the other is the correlation identification of big data risk factors. Both methods need to be based on big data resources, and both need to introduce artificial intelligence machine learning mechanism. The difference is that the core of the former is scene modeling, and the core of the latter is to discover associations.

(1) Complex system modeling simulation method

In the complex system modeling simulation method, experienced experts first abstract the actual international problem into a conceptual model, then convert the conceptual model into a mathematical model, then convert the mathematical model into a computer model, and then bring a large amount of data into the computer model. Simulation calculus, through machine learning mechanism,
continuously compares with historical data, determines model parameters, and finally trains models that can be used to calculate (predict) risk perception. In the modeling of complex systems, the role of artificial intelligence is mainly to train the original model based on historical data. At the micro level, the strategies of each actor in the system are determined and optimized according to the training data. Using artificial intelligence learning mechanism, the system parameters are determined according to historical data until the prediction accuracy reaches the application requirements, and then the trained model is used to bring in new data into the simulation experiment. The crucial and challenging task in the modeling process of complex systems is that experts need to transform real-world strategies, policies, and situations into scientific theoretical models, which is the key to ensuring accurate or interpretable calculation results. The method of modeling and simulation of complex systems is easy to find the conduction process and evolution mechanism of risk perception. It is easy to examine the risk anomaly factors from the whole process in practical practice. However, its shortcoming is that the modeling is difficult, complicated and cumbersome, and the accuracy of the simulation of a certain problem depends largely on the conceptual model abstracted by the experts. Therefore, it is subjective and easy to ignore some factors.

(2) Big data risk perception factor correlation identification method

This method first needs to determine the problem target, determine the dependent variable data set and the independent variable data set, and then divide the data into training sets and test sets. Then select the appropriate machine learning algorithms according to different problems, such as neural network, support vector machine, random forest and deep learning algorithms. By training the model with a large amount of training data, the model can be put into predictive calculation after the test. It is critical in this process to have large and accurate data as a sample of model learning. This method can be applied to solve a variety of problems by avoiding complex modeling processes, and it is easy to identify and discover some new risk anomalies (monitoring anomalies). However, whether the final result of the method can meet the practical application still requires the expert to “check” because there are many variables selected for a specific problem, and it is easy to mix a large amount of “noise” and interfere with the correct identification of the “signal”; and the method often cannot trace the result. The reason, because the machine learning model is a "black box", can't be examined.

In the big data risk factor correlation identification method, the role of artificial intelligence is mainly reflected in two aspects: First, when there are no direct observation indicators for real problems, it is necessary to find alternative indicators, but the search for alternative indicators is full of challenges and Difficulty, using artificial intelligence to conduct correlation detection can find strong correlation alternative indicators, thus saving a lot of time costs of relying on human trial and error. Secondly, artificial intelligence is used to build the relationship between risk factors and indicators, and the anomalies and risks of the historical data of the indicators are matched to improve the risk perception and recognition ability of the model.

The core of risk assessment is the cognition of the law of social operation. Exploring the law of social operation is extremely complicated, and it is always full of huge challenges and limitations of cognition. However, the application of big data and artificial intelligence in the field of risk assessment will greatly enhance the ability of human beings to understand the world. It will also make human cognition more broad, and look more into the future. It will be more powerful in coping with the crisis and adapting to the changing times.

(3) Continuously improve the hierarchical classification of information

The network information data platform is a collection of countless data, and the amount of information involved in its operational process is enormous. Therefore, if the context of clear information cannot be achieved, and various types of information can be integrated and then classified hierarchically, then the problem of finding a needle in a haystack will arise when some data information is needed. Although some information data platforms already have the function of quick search, they cannot be searched in batches. Therefore, if the keywords are different, but the information with certain relevance is difficult to find. Therefore, it is necessary to let the relevant information management personnel develop the habit of sorting and sorting, and understand the classification skills. A separate data information management platform can be established separately, and the branch of information management should be rationally designed to ensure that the
corresponding information can be selected more quickly according to different branches when searching for information, and the batch processing function should be emphasized. Perfect, batch search, batch processing (bulk deletion, batch transfer, batch download, etc.) to ensure that the process of information search and processing is as simple as possible, in order to achieve the goal of improving work efficiency. Under the current informationization trend, the slow efficiency of risk-aware factor search will affect the whole research progress. Therefore, as mentioned above, in addition to the security elements, we must constantly improve the information management work to ensure that the information needed can be used. The first time is found, so as to ensure that the time for information search and processing is as short as possible without affecting the quality of work.

4. Conclusions and Discussion
Based on the theory of artificial intelligence and risk perception, this paper expounds the research progress of artificial intelligence and disaster risk perception. Through the design and deployment of the system, it can realize the effective discovery, threat perception, risk judgment and threat traceability of information security threats. Improve disaster risk perception and provide effective technical support for the handling of security incidents. The continuous iterative development of artificial intelligence technology will also promote the level of decision management. Advances in artificial intelligence technology will improve the matching of decision-making schemes. The use of natural language processing techniques in decision-making matching will lead to major breakthroughs in natural language processing in the future, which will greatly improve the accuracy of matching decision-making schemes from decision-making case bases. High-precision "fast decision making" in the future will become feasible. Intelligent decision management will be applied in a wider range of areas. Artificial intelligence will promote human beings into intelligent society. Intelligent decision management will also be widely applied in all aspects of human life, such as smart city, business strategy decision management, quantitative trading strategy, social wisdom management, Internet of Things dispatch management, transportation power, etc. Comprehensive scheduling of large-scale infrastructure, control of social public opinion, intelligent military strategic decision-making, control of risk events, and even foreign policy decisions. Artificial intelligence will promote the operation and management of human society into a new stage of civilization.

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