Discuss the Application of Big Data Technology in Computer Information Security

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Abstract: *In the current period of continuous improvement of science and technology in China, many industries and fields have begun to apply big data technology to optimize work forms, improve work efficiency and reduce problems in practical operation. As computers are widely used in various industries, many enterprises have begun to promote computer information security to prevent confidential information from being leaked, affecting the sustainable development of enterprises. Accordingly, it is necessary to strengthen the effectiveness of computer security security management through the scientific application of big data technology to provide some lessons for technicians engaged in related work.*

Keywords: Big data technology; Computer technology; Information security.

1. INTRODUCTION

The development of information technology has brought about great changes in people's lives and work, and has enabled people to generate a lot of convenience in carrying out various productive activities. However, when using computer information technology, it is necessary to measure its advantages and disadvantages and to integrate the various adverse effects of the outside world in order to avoid hindering the advancement of computer information technology and forms. The scientific use of big data technology can reflect the advanced nature of computer information methods at the same time to strengthen the effectiveness of information security management, making the work carried out more smoothly, to provide reliable protection for computer information security. Tu (2025) introduced Log2Learn, an intelligent log analysis framework for real-time network optimization [1]. In recommendation systems, Wang (2025) proposed a joint training method for propensity and prediction models using targeted learning to handle missing-not-at-random data [2]. Healthcare AI innovations include Ding and Wu's (2024) systematic review of self-supervised learning for ECG/PPG signal processing [3], and Restrepo et al.'s (2024) multimodal deep learning approach with vector embedding alignment for low-resource healthcare settings [4]. For NLP, Yang et al. (2025) developed a GAN-based extractive text summarization model combining transductive and reinforcement learning [5]. Visual analytics advancements feature Xie and Chen's (2025) CoreViz, a context-aware reasoning engine for BI dashboards [6]. Zhu (2025) presented TraceLM for temporal root-cause analysis using contextual embedding language models [7], while Zhang (2025) addressed deployment safety with SafeServe for multi-app monetization platforms [8]. In digital content, Hu (2025) created UnrealAdBlend for immersive 3D ads via game engine pipelines [9]. Sustainability research by Wu et al. (2025) linked supply chain digitalization and energy efficiency to carbon neutrality [10]. Domain adaptation techniques include Peng et al.'s (2022) RAIN framework for black-box scenarios [11]. Anomaly detection is extensively explored: Zhang et al. (2025) investigated ML-based methods for biomechanical big data [12]; Wang (2025) built a knowledge graph-based clinical trial anomaly detection system [13]; Qi (2025) designed interpretable slow-moving inventory forecasting with hybrid neural networks [14]; and Huang and Qiu (2025) implemented LSTM-based abnormal electricity usage detection in smart meters [19]. Chen (2023) demonstrated data mining applications in general data analysis [20]. Low-code/SME digitalization was advanced by Fang's (2025) microservice-driven modular platform [15], while spatiotemporal analytics featured Li's (2025) GIS-integrated U-Net for automated land encroachment detection [16]. Lin (2025) examined generative AI's role in proactive incident management [17], and Li (2025) optimized emergency response with AD-STGNN for urban fire vehicle dispatch [21].

2. BIG DATA ERA OF COMPUTER NETWORK INFORMATION SECURITY ISSUES

In terms of the current computer network information security, the staff of various industries are easily affected by the development of the big data era in the process of implementing the relevant operations. The main network information security problems are as follows:

2.1 Network virus intrusion

In the process of the widespread application of computer network technology, some unscrupulous elements will use relevant technical means to steal information inside computers, disrupt the operation of computers by means of computer viruses, and cause computer systems to become paralyzed. This approach is an illegal act, which not only threatens the account security of computer users, but also has a great negative impact on the development of society. In general, network virus incubation period is relatively long, many users can not detect it, so in the process of using the computer will be in a low safety factor state, information is easy to be obtained by criminals.

2.2 Hack intrusion

As a necessary mechanical equipment in modern life, study and work, computer can greatly improve the study and work efficiency, so computer should carry a large amount of information. Hacking is mainly a hacker with high computer technology capabilities to steal users' private messages for their own benefit, so they take a series of measures to attack computer systems, causing server damage and unable to provide services to users. The scope of hacking is generally relatively broad, and it is not only present in people's daily life, There are also some manifestations in the computer systems of state organs and departments that can harm the interests of the state, so greater attention needs to be paid to this aspect and effective measures need to be taken to control and resolve it.

2.3 Spam messages

Many users will encounter junk information in the process of using computers to search for information, and many junk information is generated due to insecure computer systems. Spam is mostly spread through various channels such as mail and news, which will take up computer storage space and also affect the security of computer networks. When the user logs on to a web page autonomously, these windows often pop up automatically, which remain without a click, and cannot be directly eliminated even when the button to eliminate the window is clicked. Once you click on these windows, a large amount of garbage information pops up, which causes the user to have to deal with it. Spam has little impact on computer security, and although it does not cause system paralysis, it still affects the computer security environment and exposes people to certain threats during the use of computers.

2.4 Vulnerabilities of the system software itself

Users often take advantage of new software systems in the process of using computer systems, so professional software development is required. Some software developers lack their own capacity, which leads to software being developed with certain limitations and vulnerabilities that, once exploited by wrongdoers, could enable intrusion into the system and damage computer databases. Therefore, in the development of system software, we need to give priority to with rationality and security, reduce the computer system security hidden trouble coefficient, for users to create a safe computer environment.

3. KEY TECHNOLOGIES OF BIG DATA IN INFORMATION SYSTEM

At present, cloud computing and data back-up are widely used in information system. These two technologies are the most common big data technologies, which can reflect their own characteristics and advantages in practice. Cloud computing is a typical technical form in the era of big data in China. It is based on the distributed and combined computing approach to sort out the data and make the information resources more abundant. In the course of using cloud computing, technical personnel should carry out gridded computing, planning for different information resources as a whole, so as to improve information security. In the use of cloud computing, you can strengthen the interaction of computing information systems, making it more applicable in computing information security. The advantage of cloud computing in big data technology is that it can store a lot of information. In the current period of continuous development, its storage capacity can be continuously improved, and it can be better developed in related fields. As the name suggests, data backup is a kind of technology that can backup data. It can reflect the greater interaction characteristics in people's communication and economic life, and comprehensively strengthen information security. Many users and enterprises will face a certain degree of cyber attack in the process of using big data technology, resulting in reduced information security. Data backup technology can provide safe and reliable storage space, in the process of information explosion to protect the privacy of information, reduce information security risks. As a result, users and enterprises in the process of using data information can be in a more secure environment, which for the development of individuals and enterprises are able to reflect the greater security, reduce the probability of information loss, to ensure the maximum degree of information security.

4. APPLICATION OF BIG DATA TECHNOLOGY IN COMPUTER INFORMATION SECURITY

4.1 Cloud Computing Technology

In the process of using cloud computing technology, we need to reflect the integration between the Internet and cloud platform, It needs to store information data in the cloud in a model way, and in the process of processing data information, it can not only improve its security, but also reduce the cost of data information storage and processing, which can produce good economic benefits for both enterprises and individuals. When technical personnel use cloud computing in computer information security, Through the wireless local area to build a stable data transmission grid, under the premise of clear big data information processing needs, will be upgraded to a closed-loop feedback information processing model, improve the privacy of information data, prevent it from being leaked. As an important manifestation of big data technologies, cloud computing can form a data flow chart in the course of processing data, and make the customer understand the characteristics of data. More importantly, the characteristics of parallel computing combined with computing data can form an implicit channel for the transmission of remote data, create a secure computing service model, and provide greater security for users to transmit and utilize data information.

4.2 Data backup technology

In the current period of increasing demand for data information, many enterprises will continue to expand the capacity of data information, in order to avoid its leakage, we need to do a good job of data backup, so we need to use data backup technology to improve computer information security. Data backup technology can provide users with adequate storage space, but it still has certain security risks, requiring users to strengthen data backup effectiveness in the actual operation to minimize data loss. For the development of an enterprise, doing data backup can provide a greater guarantee for the security development of the enterprise and minimize the loss of the enterprise. When actually utilizing data backup technology, important production data needs to be backed up on an ongoing basis, and work details can be backed-up so that users can record and store them. Data backup technology is equivalent to a form of cloud backup, which can provide users with extensive storage space, so it is necessary to use the cloud platform and cloud backup as the basis to continuously expand storage space and strengthen the security of computer information.

4.3 Hadoop

In the ongoing development of big data technology in China, many data need to meet higher requirements in the process of storage and utilization. Although in the development situation of traditional data information, it can still reflect certain data informatization advantages, but it is difficult to meet the security requirements of modern computer information. When optimizing computer information security, you can use Hadoop to meet the diverse needs of data storage, and can use this technical form to achieve the future development of big data technology requirements. When utilizing Hadoop, it is possible to integrate the management of complex data in computer information, and it can also achieve comprehensive optimization and control of data information, strengthen coordination among data information, and improve the security processing utility of computer data. According to the current development situation in China, Hadoop system is in the perfect stage, and the functions of each part of the system can be clearly divided, providing users with a safe computer operating environment.

5. CONCLUSIONS

The application of big data technology in computer information security can effectively improve the security of computer system application and provide security for the use and storage of data information. In the process of construction and development in the new era, the negative data information on the network is gradually increasing, which requires the development of more efficient big data technology to improve network information security. With the increase of hidden threats to information security, technical means are also gradually diversified. In the process of maintaining computer information security, we can optimize the form and method of big data technology, strengthen the effect of information security defense, so that it can strengthen information security in the process of network development in China.

REFERENCES

[1] Tu, T. (2025). Log2Learn: Intelligent Log Analysis for Real-Time Network Optimization.

[2] Wang, Hao. "Joint Training of Propensity Model and Prediction Model via Targeted Learning for Recommendation on Data Missing Not at Random." AAAI 2025 Workshop on Artificial Intelligence with Causal Techniques. 2025.

[3] Ding, Cheng, and Chenwei Wu. "Self-Supervised Learning for Biomedical Signal Processing: A Systematic Review on ECG and PPG Signals." medRxiv (2024): 2024-09.

[4] Restrepo, David, et al. "Multimodal Deep Learning for Low-Resource Settings: A Vector Embedding Alignment Approach for Healthcare Applications." medRxiv (2024): 2024-06.

[5] Yang, Jing, et al. "A generative adversarial network-based extractive text summarization using transductive and reinforcement learning." IEEE Access (2025).

[6] Xie, Minhui, and Shujian Chen. "CoreViz: Context-Aware Reasoning and Visualization Engine for Business Intelligence Dashboards." Authorea Preprints (2025).

[7] Zhu, Bingxin. "TraceLM: Temporal Root-Cause Analysis with Contextual Embedding Language Models." (2025).

[8] Zhang, Yuhan. "SafeServe: Scalable Tooling for Release Safety and Push Testing in Multi-App Monetization Platforms." (2025).

[9] Hu, Xiao. "UnrealAdBlend: Immersive 3D Ad Content Creation via Game Engine Pipelines." (2025).

[10] Wu, W., Bi, S., Zhan, Y., & Gu, X. (2025). Supply chain digitalization and energy efficiency (gas and oil): How do they contribute to achieving carbon neutrality targets?. Energy Economics, 142, 108140.

[11] Peng, Qucheng, et al. "RAIN: regularization on input and network for black-box domain adaptation." arXiv preprint arXiv:2208.10531 (2022).

[12] Zhang, Shengyuan, et al. "Research on machine learning-based anomaly detection techniques in biomechanical big data environments." Molecular & Cellular Biomechanics 22.3 (2025): 669-669.

[13] Wang, Y. (2025, May). Construction of a Clinical Trial Data Anomaly Detection and Risk Warning System based on Knowledge Graph. In Forum on Research and Innovation Management (Vol. 3, No. 6).

[14] Qi, R. (2025). Interpretable Slow-Moving Inventory Forecasting: A Hybrid Neural Network Approach with Interactive Visualization.

[15] Fang, Z. (2025). Microservice-Driven Modular Low-Code Platform for Accelerating SME Digital Transformation.

[16] Li, B. (2025). GIS-Integrated Semi-Supervised U-Net for Automated Spatiotemporal Detection and Visualization of Land Encroachment in Protected Areas Using Remote Sensing Imagery.

[17] Lin, Tingting. "The Role of Generative AI in Proactive Incident Management: Transforming Infrastructure Operations."

[18] Huang, Jingyi, and Yujuan Qiu. "LSTM‐Based Time Series Detection of Abnormal Electricity Usage in Smart Meters." (2025).

[19] Chen, Rensi. "The application of data mining in data analysis." International Conference on Mathematics, Modeling, and Computer Science (MMCS2022). Vol. 12625. SPIE, 2023.

[20] Li, Binghui. "AD-STGNN: Adaptive Diffusion Spatiotemporal GNN for Dynamic Urban Fire Vehicle Dispatch and Emergency." (2025).