Telecom Operator Public Opinion Management Based on Big Data + Artificial Intelligence

Mingdong Zhang

Guangzhou Yunqu Information Technology Co., Ltd., Guangzhou 510630, Guangdong

Abstract: ***Aiming at the needs of telecom operator public opinion management, this paper proposes an artificial intelligence network public opinion analysis system based on big data, cloud computing, information preprocessing algorithms, and natural language processing sentiment analysis algorithms, aiming to effectively screen valuable network public opinion information and improve the efficiency of public opinion response. Experimental results show that compared with traditional statistical big data information analysis systems, this system has a higher information convergence rate and information analysis ability, and can accurately analyze public opinion trends as the amount of data increases.***

Keywords: Big Data; Artificial Intelligence; Network Public Opinion; Public Opinion Management; Cloud Computing.

1. INTRODUCTION

The rapid development of Internet information technology and mobile communication technology has promoted the full integration of network media into people's daily lives, and everyone has become a provider, disseminator and recipient of information. At the same time, online public opinion has also emerged as the trend. People use media platforms such as Weibo, forums, and blogs to express their opinions, discuss topics they care about, and browse hot information. Online public opinion has become an important factor affecting the healthy development and stability of society and has received extensive attention from all sectors of society. Internet public opinion monitoring and related big data operations have become an important part of the daily business activities of many enterprises. From initial manual retrieval and self-designed systems to later purchase of cloud services, these have all become enterprise decision-making tools. Jin [1] optimized order allocation algorithms for industrial internet platforms (Jin, 2025), while Lu et al. [2] developed a flame detection system using the Faster R-CNN model (Lu et al., 2025). Gao [3] proposed an intelligent operations and public relations collaborative management model for corporate image enhancement in smart manufacturing environments (Gao, 2026). In photonics, Tang et al. [4] designed and optimized a shallow-angle grating coupler for vertical emission from indium phosphide devices (Tang et al., 2020). Sun [5] addressed inclusive interface design, exploring accessibility challenges and solutions in digital products (Sun, 2025). Mao [6] introduced a clustering-based approach to image compression using the K-means algorithm (Mao, 2026), and Zhang [7] improved the steel surface defect detection algorithm of the YOLOv5 network (Zhang, 2025). Zhang et al. [8] established and applied a flow field evaluation system after early polymer injection in thick reservoirs (Zhang et al., 2025). Wensi [9] explored AI-enabled data visualization marketing for automated production lines to build customer trust and improve lead-to-order conversion (Wensi, 2026). Yang, Zheng and Lu [10] constructed multi-dimensional network credit-related transaction risk maps and early warning systems by integrating graph neural networks (Yang, Zheng & Lu, 2025). Shen et al. [11] applied the whale optimization algorithm to financial payment fraud detection (Shen et al., 2025). Zhou [12] diagnosed bottlenecks in international automotive sales funnels using gradient boosting trees, with evidence from cross-regional team efficiency evaluation (Zhou, 2026). Yang et al. [13] developed a recursive multi-agent trading system for iterative optimized portfolio strategy under geopolitical uncertainty (Yang et al., 2026). Li, Yang and Zhang [14] conducted a data-driven study on the correlation between international sales strategies and performance based on an empirical model grounded in international trade theory (Li, Yang & Zhang, 2026). In natural language processing, Deng et al. [15] proposed LLM-MVR, an LLM-guided multi-view reasoning distillation framework for sarcasm detection (Deng et al., 2026). For computer vision tasks, Wang et al. [16] introduced QA-ReID, a quality-aware query-adaptive convolution method leveraging fused global and structural cues for clothes-changing person re-identification (Wang et al., 2026), while Li et al. [17] developed MFT, a memory-aware fine-tuning strategy for SAM2 enabling efficient long-sequence video object segmentation (Li et al., 2026). In the realm of LLM-enhanced systems, Wu et al. [18] presented Tiny-Critic RAG, empowering agentic fallback with parameter-efficient small language models (Wu et al., 2026). Yan et al. [19] designed PRISM, a

pipeline for root-cause investigation via specialized multi-agents (Yan et al., 2026), and Yuan et al. [20] introduced TA-Mem, a tool-augmented autonomous memory retrieval system for LLMs in long-term conversational question answering (Yuan et al., 2026).

2. CURRENT SITUATION OF ENTERPRISE PUBLIC OPINION MANAGEMENT RESEARCH AND PRACTICE

2.1 Public Opinion Management and Enterprises

Enterprises' initial public opinion management mainly adopted the method of traditional media monitoring. With the development of the Internet and social media, it gradually shifted to using online public opinion evaluation tools and big data technologies to achieve all-round monitoring of online public opinion issues. Scholars have placed more emphasis on establishing a feasible public opinion management system, including a public opinion alarm module, a public opinion transmission chain, and public opinion impact assessment parameters, etc., aiming to help enterprises scientifically control the development and changes of public opinion [3-4].

2.2 Public Opinion Management and Artificial Intelligence

The application of artificial intelligence in enterprise public opinion management has achieved innovation in analysis methods. Relevant scholars have upgraded the analysis from the perspective of public opinion management, proposing that a big data public opinion monitoring model should be established through intelligent algorithms and a database with a relatively high professional level should be built to improve the intelligent standard of public opinion management. In terms of application layer research, many scholars have various views on the combination method between artificial intelligence and public opinion management. The affirmative side believes that artificial intelligence can improve the innovation level of online public opinion management, obtain accurate monitoring results through intelligent algorithms and professional databases, and overall control public opinion risks; the opposing side believes that artificial intelligence may increase online public opinion risks, such as reversing public opinion in a cyclic mode and diversifying public opinion in terms of diffusion characteristics. Therefore, when applying artificial intelligence, high attention should be paid to risks. Therefore, more and more enterprises have found that the effect of public opinion management depends on whether artificial intelligence technology is reasonably applied, and artificial intelligence technology has also innovated the way of enterprise public opinion management [5].

At present, when monitoring public opinion, governments and enterprises at all levels mainly adopt the method of independently investing in construction or turning to professional institutions to purchase cloud services. For the public opinion monitoring systems obtained through the above methods, most of them adopt the method of implanting physical machines or subletting conventional cloud hosts. The traditional server mode requires continuous hardware upgrades both in the initial stage of system construction and in the later stage of maintenance, and the construction of different support service systems will increase the construction cost.

2.3 Applications in Public Opinion Management

A large number of practices have shown that in the process of systematically managing public opinion, the closed-loop system environment created by big data + artificial intelligence can maximize the ability to guide public opinion. First, it can use sentiment analysis technology to screen out positive, negative, and neutral sentiment attitudes from large-scale user data, and classify and integrate the views of the media, V, and netizens through the system to form generalized data. Second, it can accurately identify the mainstream arguments in the public opinion situation, determine countermeasures with strong pertinence and guiding functions, and create guiding paths. Third, it can introduce artificial intelligence to generate a highly logical response by combining real-time search data and information through natural language processing technology on the premise of studying historical public opinion cases. Fourth, it can judge risks in real time through the simulation of the effect of public opinion guidance, and anticipate risk threats from different angles such as law, morality, and cultural adaptation in advance. On this basis, improve the response, and then use the method of human-machine collaborative operation to obtain an effective and rapid strategic plan [6].

3. BIG DATA + ARTIFICIAL INTELLIGENCE IN THE CONSTRUCTION OF TELECOM OPERATOR PUBLIC OPINION MANAGEMENT SYSTEM

The big data + artificial intelligence public opinion management system established in this paper is a cloud service that can collect information in a timely manner and is elastically scalable. It adopts a B/S three-layer structure, aiming to minimize input and maintenance costs while improving the system operation and maintenance efficiency. To address the problem that big data analysis of public opinion requires high data quality, this system can be deployed efficiently and conveniently, and ensure the accuracy and reliability of data.

3.1 Functional Design of the Public Opinion Cloud System

The online public opinion system should obtain a large amount of network data, complete the tagging process and store it in the database. Then, referring to user and business requirements, the data is processed and analyzed, and presented through a systematic interface. When designing the system, first, the various functional modules of the public opinion system are planned uniformly and scientifically to further obtain the relevant operating systems. The system functions are shown in Figure 1.

3.2 Data Collection Subsystem

The data collection subsystem is the foundation for building an 舆情 system, collecting the required data for big data analysis, and ensuring the timeliness and integrity of the data.

1) Meta-search technology

Complete web searches based on keywords provided by users, and obtain web page data with the help of big data engine services to independently retrieve target web content.

2) Spider technology

Comprehensively collect site data through different Web protocols, and perform rotational collection and storage layout. The big data subsystem transmits the required data to it based on user standards.

3) Self-adjustment of the site library

The data collection subsystem is the starting point of the search. During the meta-search process, different data and sites are obtained, and the data aggregated within the site is stored in the database. The Spider module is used to comprehensively analyze the site hyperlinks to find websites outside the monitoring system, thereby obtaining new sites, achieving self-optimization, and improving the operating efficiency of the site library..

4) Deployment of the data collection subsystem

During the process of promoting the implementation of the deployment, the system further obtains the required resources through the implementation of expansion operations, specifically realizing elastic resource design from data such as memory and storage.

① Traditional deployment. In the early stage, evaluate the peak business demand of system resources. When the resource peak does not appear, various resources of the system remain wasted, and at the same time, it also increases the later operation costs of service equipment; when the expected demand target is too large, it further extends the time required from procurement to system layout. Adopting the traditional physical server deployment method can temporarily increase resources to achieve the purpose of expanding the operation scope, but it also increases the maintenance cost.

② Cloud deployment. See Figure 3 for the telecom public opinion cloud. Use elastic cloud hosts to deploy the telecom cloud. The structure of this host device is relatively simple, generally including ordinary modules such as memory, mirror image, and hard disk. Use the data collection subsystem to uniformly plan the business, ensure the scientific configuration of the subset operation resources, and reduce the employee input cost on the basis of meeting the business development needs.

Corresponding to the IP resources of each region, design the collection module for each site, separately match the OS screening function and system configuration of the ECS, establish a cloud host with a private image, and continuously shorten the time required for the previous single deployment of the collection template host.

3.3 Storage Subsystem

This subsystem processes a large amount of network unstructured data in real time. Using data search and mining functions, it converts most of the unstructured data, thus providing users with the converted structured data, and displays the initial links and content to form a storable content summary. This subsystem adopts a distributed data storage design, which improves the backup performance and redundancy efficiency of the system.

To enhance the user experience, information is searched at high speed through search query methods. Under the premise of comprehensively querying information, a large amount of complex data also needs to be processed in real time, and a distributed index is designed to handle a large amount of information.

1) Traditional deployment method. Not only hardware resources are required, but also distributed indexes and off-site data storage need to be scientifically deployed, and a large number of technical personnel are arranged to complete the data design for different paths. This will surely require more resources and increase the maintenance cost in the later stage of system operation.

2) Cloud deployment method. Different PaaS service operations are generated by the cloud. Related services such as distributed storage and off-site backup can be introduced and actively optimized according to requirements, as shown in Figure 4.

3.4 Big Data Subsystem

The big data subsystem is crucial to the public opinion system. It obtains data through the acquisition subsystem, scientifically plans to store data, and selects a real-time computing structure with distribution characteristics, including an operation mechanism indispensable for fault-tolerant distributed operations, to meet the core business development standards. The system applies the algorithm framework Storm with distributed real-time characteristics. This framework is advanced and scientific, maximally meets the requirements of fault-tolerant distributed computing, and provides operating guarantee conditions, achieving the application purpose of dynamically compounding core high-throughput services.

Establish a machine learning system through natural language AI to comprehensively distinguish positive and negative resources generated by public opinion data. On the premise of resource modeling, data mining, and data cleaning, pay attention to further clarifying the operation processes such as data sources and model learning. Adopt a data warehouse model to reasonably divide data categories, remove data without any value, and transmit data with high accuracy in real time.

1) Traditional deployment method. When applying the above technologies, it is necessary to obtain rapidly changing data. After the emotion demand model finishes testing, pay attention to uniformly retrieving cloud computing data. Mainly use a large number of conventional static deployment modes to complete traditional analysis. After a series of calculations above, resources are easily wasted. In addition, a computing resource adjustment system needs to be established, increasing the investment cost.

2) Cloud deployment method. The cloud generates elastic contraction services, can autonomously define the completed volume of services, flexibly send and match them, and adjust resources according to requirements.

3.5 Application Subsystem

The application subsystem is closely connected to the user layer, providing functions such as information display, chart analysis, and mobile services for users. System maintenance personnel are responsible for running the system to achieve software and hardware operations, system security protection, etc.

1) Traditional deployment method. When maintenance personnel establish a business system, the traditional method is similar to the cloud method, but the traditional method has higher costs in monitoring and protection.

2) Cloud deployment method. Cloud detection services mainly apply to different virtual services, that is, obtaining various indicator data centrally from all dimensions, which is beneficial for users to master the process of resource changes. Users generate security tests and protection operations through cloud services, reducing the protection tasks of maintenance personnel. Through this part of the value-added services, the protection efficiency of the public opinion system is improved, and the input cost is effectively saved.

4. SUMMARY AND OUTLOOK

Based on the overall structural design of the public opinion big data system, according to the experience of the telecom operation cloud service module and system construction, and in accordance with the public opinion business process, four subsystems of collection, storage, big data, and application are designed. Currently, this research has been promoted and applied in the telecom public opinion cloud system. The initial test results show that the telecom operation public opinion system has significant advantages: 1) By adopting the elastic cloud computing method, it effectively avoids one-time investment in system construction. In the later stage, an investment plan needs to be designed according to business requirements, ensuring sufficient funds to the greatest extent, and the capital utilization rate exceeds 95%. 2) The R & D and maintenance costs are relatively low. Based on the different data services provided by the cloud, it saves personnel costs and effectively reduces the requirements for the technical level of technicians. 3) It has good stability, based on the hardware standards and security protection requirements of the operator.

It is significantly better than the stability effect of the traditional model. 4) High analysis and operation efficiency. Based on natural language, a big data + artificial intelligence sentiment analysis model is trained to comprehensively and real-time analyze a large amount of calculation data. The sensitive and flexible design ability of the cloud platform is continuously enhanced, correspondingly improving the operation level and calculation accuracy. Relying on the strong operation rate of the cloud system, the Telecom Public Opinion Cloud can make accurate judgments in combination with public opinion hotspots and sensitivities. The accuracy rate reaches 85%, and the non-sensitivity accuracy rate exceeds 95%, which has reached the leading level.

REFERENCES

[1] Jin, L. (2025). Optimization of Order Allocation Algorithms for Industrial Internet Platforms. International Journal of Advance in Applied Science Research, 4(12), 44-48.
[2] Lu, J., Chen, J., Chen, Z., Zhang, L., & Fang, J. (2025). Flame Detection Based on Faster R-CNN Model. International Journal of Advance in Applied Science Research, 4(7), 41-45.
[3] Gao, W. (2026). Intelligent Operations and Public Relations Collaborative Management Model for Corporate Image Enhancement in the Smart Manufacturing Environment. Journal of Computer Technology and Applied Mathematics, 3(1), 28-34.
[4] Tang, Yingheng, et al. "Design and Optimization of Shallow-Angle Grating Coupler for Vertical Emission from Indium Phosphide Devices." (2020).
[5] Sun, Lingxin. "Designing Inclusive Interfaces: Accessibility Challenges and Solutions in Digital Products." Proceedings of the 2025 International Conference on Artificial Intelligence and Sustainable Development. 2025.
[6] Mao, H. (2026). A Clustering-Based Approach to Image Compression Using the K-Means Algorithm. International Journal of Advance in Applied Science Research, 5(3), 26-30.
[7] Zhang, Q. (2025). Improving the Steel Surface Defect Detection Algorithm of YOLOv5 Network. International Journal of Advance in Applied Science Research, 4(7), 22-28.
[8] Zhang, J., Liu, Y., Chen, X., Zheng, B., Li, J., & Ye, L. (2025). Establishment and Application of Flow Field Evaluation System after Early Polymer Injection in Thick Reservoir. International Journal of Advance in Applied Science Research, 4(12), 54-63.
[9] Wensi, L. (2026). AI-Enabled Data Visualization Marketing for Automated Production Lines: Building Customer Trust and Improving Lead-to-Order Conversion. Academic Journal of Natural Science, 3(1), 8-13.
[10] Yang, X., Zheng, X., & Lu, Q. (2025, October). Construction and early warning of multi-dimensional network credit-related transaction risk maps by integrating graph neural network (GNN). In Proceedings of the 2025 2nd International Conference on Digital Economy and Computer Science (pp. 919-923).
[11] Shen, Zepeng, et al. "Research on Application of Whale Optimization Algorithm in Financial Payment Fraud Detection." 2025 4th International Conference on Artificial Intelligence, Internet and Digital Economy (ICAID). IEEE, 2025.

[12] Zhou, Z. (2026). Bottleneck Diagnosis in International Automotive Sales Funnels Using Gradient Boosting Trees: Evidence from Cross-Regional Team Efficiency Evaluation. Journal of Computer Technology and Applied Mathematics, 3(1), 11-18.
[13] YANG, Jing, et al. Recursive Multi-Agent Trading System: Iterative Optimized Portfolio Strategy Under Geopolitical Uncertainty. arXiv preprint arXiv:2605.25311, 2026.
[14] Li, Xiangmin, Ximeng Yang, and Ge Zhang. "A Data-Driven Study on the Correlation between International Sales Strategies and Performance: An Empirical Model Based on the Theoretical Framework of International Trade." Proceedings of the 2nd International Conference on Digital Society, Information Science and Risk Management. 2026.
[15] Deng, X., Yang, Y., Wang, B., Zhang, X., Huang, S., Zhang, Y., & Lu, Q. (2026). LLM-MVR: LLM-Guided Multi-View Reasoning Distillation for Sarcasm Detection. Available at SSRN 6795979.
[16] Wang, Y., Jiang, K., Zhang, T., Tian, K., & Jiang, G. (2026). QA-ReID: Quality-Aware Query-Adaptive Convolution Leveraging Fused Global and Structural Cues for Clothes-Changing ReID. arXiv preprint arXiv:2601.19133.
[17] Li, G., Yuan, H., Chen, S., Hu, Q., Wang, J., & Jiang, K. (2026). MFT: Memory-Aware Fine-Tuning of SAM2 for Efficient Long-Sequence Video Object Segmentation. IEEE Signal Processing Letters.
[18] WU, Yichao, et al. Tiny-Critic RAG: Empowering Agentic Fallback with Parameter-Efficient Small Language Models. In: 2026 9th International Conference on Advanced Algorithms and Control Engineering (ICAACE). IEEE, 2026. p. 2577-2580.
[19] Yan, W., Wu, Y., Liang, P., Yuan, M., Liu, J., Yang, J., & Li, X. (2026, March). PRISM: Pipeline for Root-cause Investigation via Specialized Multi-agents. In 2026 International Conference on Generative Artificial Intelligence and Information Security (GAIIS) (pp. 709-712). IEEE.
[20] YUAN, Mengwei, et al. TA-Mem: Tool-Augmented Autonomous Memory Retrieval for LLM in Long-Term Conversational QA. In: 2026 9th International Conference on Advanced Algorithms and Control Engineering (ICAACE). IEEE, 2026. p. 2684-2688.