Research on the Application of Big Data Technology in New Media Communication (Post-print) Zhang Wei[1], Li Na[2], Wang Qiang[1] [1]School of Journalism and Communication, Tsinghua University, Beijing 100084, China [2]Institute of Media and Communication, Shanghai Jiao Tong University, Shanghai 20024···

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Abstract

With the rapid development of the computer information field, big data technology has been widely promoted across numerous industries, exerting a profound impact on mass new media communication. Meanwhile, as the volume and growth rate of information continue to increase, traditional new media communication models have become increasingly inadequate to meet the demands of contemporary development. Therefore, it is essential to strengthen the effective application of big data technology to revolutionize production models, enrich presentation forms, enhance dissemination efficiency, and further promote the sustainable and healthy development of new media communication. This paper begins by introducing the connotations, characteristics, and key technologies of big data, analyzes the main challenges facing the application of big data technology in new media communication, discusses the application principles of big data technology in this domain, and finally proposes application pathways and explores future trends for big data technology in new media communication, aiming to provide insights for fostering the orderly and healthy development of new media communication.

Full Text

Research on the Application of Big Data Technology in New Media Communication

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Abstract

With the rapid development of computer information technology, big data technology has been widely promoted across numerous industries, bringing tremendous impact to mass new media communication. Meanwhile, as information volume and growth rates continue to increase, traditional new media communication models can no longer meet contemporary development demands. Therefore, it is necessary to strengthen the effective application of big data technology to innovate production models, enrich presentation forms, enhance communication efficiency, and further promote the sustainable and healthy development of new media communication. This paper begins by introducing the connotations, characteristics, and key technologies of big data, analyzes the main problems faced in applying big data technology to new media communication, discusses the application principles, and finally proposes application paths and explores future trends, aiming to provide assistance for promoting the orderly and healthy development of new media communication.

Keywords: computer; big data technology; new media; communication; data explosion

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The rapid development of big data technology has ushered society into an era of explosive data growth, where information data is constantly being produced, transmitted, and stored in daily life. Supported by advanced data processing technologies, the effective utilization of this data can provide valuable information for all walks of life, thereby better seizing development opportunities and gaining advantageous positions in increasingly fierce market competition. In recent years, with the rapid advancement of internet and mobile internet technologies, new media has achieved substantial development and has become a major trend in media development. Simultaneously, the efficient utilization of

advanced technologies has become a prominent feature of new media communication.[1] Faced with the widespread application of big data technology, new media communication should be well-prepared, as the effective application of big data technology is of great practical significance for promoting the sustainable and healthy development of the new media industry.

1.1 Characteristics of Big Data

The characteristics of big data are mainly manifested in the following aspects:

First, massive data scale. In the era of big data, ever-increasing volumes of data are stored in databases daily, allowing people to freely extract this data for practical applications. As the essential foundation of the big data era, data originates from various fields, including both production and daily life data, as well as data from online platforms, all of which can be stored in these databases. According to relevant statistics, global data volume reached 60 ZB in 2020, with China' s data growth rate being particularly prominent. It is projected that by 2025, China' s data volume will reach 48.6 ZB, accounting for 27.8% of the global total.[2]

Second, rich data variety. In the context of the big data era, data types include not only traditional structured data but also various forms of semi-structured and unstructured data stored through file systems.

Third, rapid data processing. Supported by a series of advanced data processing technologies, big data can achieve rapid processing of massive datasets. Simultaneously, with the support of network information technology, real-time transmission of processed information can be realized, thereby ensuring data transmission efficiency.

1.2 Key Big Data Technologies

The key technologies of big data mainly involve the following:

First, data collection technology. As the fundamental prerequisite for big data technology to implement various functions, data collection technology primarily refers to the comprehensive integration of scientific experiments, management systems, and cyber-physical systems to achieve comprehensive data collection, thereby providing strong data support for big data technology applications. Applying data collection technology in the field of new media communication can facilitate the collection and analysis of relevant data, thereby improving the precision of data application.

Second, data storage technology. After data collection is completed, data storage technology is required to achieve comprehensive storage of massive datasets. Since big data technology applications impose stringent requirements on data content, corresponding storage space must be equipped to store various types of data while ensuring data security and stability.[3] In new media communi-

cation, relevant personnel can achieve flexible data invocation based on data storage technology, thereby significantly improving new media communication efficiency.

Third, data representation, retrieval, and access. In the practical application of big data technology, given the actual characteristics of big data, data extraction needs to be realized through keyword retrieval in databases. Because the retrieval process is often conducted in parallel, retrieval results are highly likely to contain vulnerabilities, affecting the smooth progress of data retrieval. To address this situation, the Hadoop Distributed File System can be utilized to implement random access data retrieval functions, thereby ensuring the smooth execution of related operations.

Fourth, data application and deep mining. Faced with massive datasets, data application and deep mining can achieve rapid extraction of target data and obtain corresponding data from databases. With the support of this technology, the excessive proliferation of data applications can be effectively prevented, significantly enhancing the scientific nature of data judgment and selection.

2. Main Problems in Applying Big Data Technology to New Media Communication

As previously mentioned, the rapid development of big data technology has ushered society into an era of explosive data growth, where information data is constantly being produced, transmitted, and stored in daily life. Meanwhile, with the continuous development and application of new media, the low threshold for information publication, combined with massive data volumes, enables people to freely produce and disseminate information through new media. This has resulted in uneven information quality on new media platforms, with a large amount of false and misleading information flooding these channels. This situation undoubtedly poses great challenges for new media communication in information screening and processing. How to efficiently and accurately filter massive amounts of information while respecting citizens' freedom of speech and preventing the rampant spread of false information is an important issue that needs to be addressed by the new media industry and society as a whole.

2.2 Incomplete Legal and Regulatory System for New Media Communication Supervision

Both the new media communication field and the promotion of big data technology are still in developmental stages, and a complete and supporting legal and regulatory system has not yet been established. This not only poses a significant threat to the vital interests of the public but also provides opportunities for profit-seeking businesses. For example, building television, a new form of new media communication widely promoted in commercial office buildings in major cities, currently lacks clear legal provisions regarding its information dissemination authority. This allows most building television systems to arbitrarily

disseminate information through looped commercial advertisements, enabling some businesses to conduct product promotion and profit from it, thereby infringing upon public interests. Therefore, how to effectively apply big data technology under an imperfect legal and regulatory system is another important issue facing new media communication.

2.3 Frequent Occurrence of Cyber Violence

Cyber violence is a behavior that emerges alongside network media communication, involving wanton personal attacks and infringement upon others' legitimate rights and interests through online platforms using anonymous methods, which may lead to immeasurable consequences. With the continuous development and application of new media, people' s dependence on and frequency of using new media continue to increase, exposing their private information to a great extent in the network environment. This allows malicious individuals to collect relevant information about network users through various channels and arbitrarily subject them to cyber violence. Additionally, because major new media platforms provide the public with a platform to anonymously express their opinions, some individuals, without "worries about consequences," vent their emotions and recklessly publish various irresponsible remarks, infringing upon the rights and interests of others to varying degrees.

3. Application Principles of Big Data Technology in New Media Communication

3.1 Standardization Principle

In the practice of new media information communication, the effective application of big data technology holds significant importance for promoting the development and innovation of new media communication. In new media communication practice, the standardized construction of information transmission processes and links is still in its infancy and requires further reform and innovation to seek scientific and complete new media operation and management models. Strengthening the standardized application of big data technology can effectively enhance new media communication effects.

3.2 Systematization Principle

In today's information age, big data technology has been widely promoted across an increasing number of industries, including new media communication. Faced with people' s growing demands for new media applications and increasingly severe network information security situations, how to utilize big data technology to improve the overall effectiveness of new media communication while ensuring the security of new media information transmission is an important issue that needs to be studied and resolved by relevant personnel in the new media industry.[4] Big data technology plays a crucial role in promoting the innovative development of new media communication. To further bring its role into full

play, information system construction should be strengthened, including not only hardware and facility construction but also the establishment of scientific and comprehensive information systems to provide reliable technical support for the innovative development of new media communication.

3.3 Precision Principle

In new media communication, ensuring precise information transmission is an important principle to follow for the effective application of big data technology. With the continuous development of the social economy and rapid advancement of science and technology, the modern new media information system is showing a trend of continuous development and transformation. The requirements and connotations of new media communication work have also undergone significant changes. Under these circumstances, relevant personnel in the new media industry must keep pace with the times, promote precise communication relying on big data technology, improve the precision level of information transmission, meet the demands of the times, and truly bring the guarantee and service functions of big data technology into play.[5]

4. Application Paths of Big Data Technology in New Media Communication

4.1 Optimizing and Integrating New Media Resources

In new media communication, efforts should be made to optimize and integrate new media resources according to the actual needs of audiences, deeply extract valuable information, and satisfy people' s diverse demands. Simultaneously, big data technology can be relied upon to collect and integrate relevant information, and data mining technology can be used to conduct information analysis and extraction, ensuring information timeliness and meeting people' s information needs. With the continuous increase in new media information volume in recent years, higher requirements have been placed on the information screening capabilities of new media communication personnel. If new media communication personnel lack these capabilities, various types of harmful information can easily run rampant across networks, adversely affecting the orderly conduct of new media communication. To address this situation, big data technology can be introduced to effectively supervise and review various harmful information, effectively curbing the spread of such information. This can, on the one hand, purify the new media communication environment and, on the other hand, promote the smooth development of new media communication.[6] On this basis, social supervision forces can also be utilized to improve information review mechanisms. For example, Tencent' s WeChat platform has introduced a user reporting function, allowing users to report and review those who spread false information or fraudulent content through WeChat, thereby effectively handling such cases and preventing the large-scale diffusion of harmful information to a certain extent.

4.2 Building Scientific and Comprehensive Databases

Given the advantageous characteristics of big data, which are clearly incomparable to individual cognitive levels and social experience, major new media platforms in China have already established highly reliable data analysis model mechanisms with the support of big data technology, creating great convenience for information analysis in different fields. For instance, significant application results have been achieved in areas such as rankings and user distribution.[7] Based on this, comprehensive and in-depth professional analysis can also be conducted, including corresponding horizontal analysis combined with peer data, to timely identify existing problems and adopt effective solutions, thereby enhancing market competitiveness. Taking the popular Bilibili website among younger audiences as an example, the platform has gathered a large number of young users. Based on big data technology, it can be understood that approximately 85% of its user group holds bachelor' s degrees or higher, and the content published is primarily entertainment-related.

4.3 Establishing and Improving Laws and Regulations for the New Media Industry

To achieve the effective application of big data technology in new media communication, laws and regulations related to the new media industry should also be established and improved. In this process, the development environment faced by big data technology and new media communication in China should be fully considered. By establishing and improving these laws and regulations, reliable legal support can be provided for the application of big data technology in new media communication. For example, implementing corresponding network real-name authentication policies, conducting strict supervision of groups with significant influence on online platforms, setting stricter entry thresholds, and promoting the orderly and healthy development of new media communication.

4.4 Enhancing Digital Information Security

First, strengthen the innovation and research of security protection technologies, introduce more reliable firewalls, and develop various digital information security protection software to enhance the security of new media communication at the technical level. Second, effectively utilize big data technology to conduct comprehensive screening and batch analysis of network digital information, effectively filter out harmful information existing in new media communication, clearly mark dangerous digital information, and establish a more comprehensive digital information framework for new media communication.[8]

5. Application Trends of Big Data Technology in New Media Communication

Based on the influence of new media communication thinking, big data technology will gain broader development space and present the following application

trends in new media communication:

First, building decentralized user communication experience centers. With the continuous promotion of new media communication methods, people' s information transmission is no longer constrained by time and space and can be realized through networks and smart terminals. During the era of traditional media dominance, information communication centers were primarily physical institutions such as radio and television stations and newspaper offices. In the new media environment, such communication centers are becoming increasingly decentralized and can even be specific to individuals, thereby bringing people entirely new communication experiences.[9]

Second, the promotion and application of cloud computing. As an important component of big data technology, cloud computing possesses outstanding advantages in transmission efficiency and data processing quality. With the continuous development and maturation of cloud computing, integrating cloud computing into new media communication can more accurately analyze users' information preferences and actual needs, collect more comprehensive and sufficient user-related information, and further provide more personalized and differentiated services for users.[10]

Third, personalized development and application in new media communication. With the rapid development of new media in recent years, to further enhance new media communication effectiveness, it is necessary not only to provide more diverse and abundant data resource support but also to establish more scientific and feasible development strategies. Promoting the personalized development of major new media platforms will be an important development trend for the application of big data technology in new media communication.

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Note: Figure translations are in progress. See original paper for figures.