Journal of Innovation and Development
ISSN: 2958-4752 | Vol. 8, No. 3, 2024

Innovative Application of Big Data Technology in New Media Personalized Service

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Abstract: With the rapid development of big data technology, its application in the field of new media is becoming more and more extensive, especially in personalized service shows great potential. This paper discusses in depth the application, challenges and future development of big data technology in new media personalized service. The following conclusions are drawn: (1) Big data technology plays a key role in new media personalized service Big data technology can construct a refined user profile, realize personalized content recommendation, and improve user satisfaction and loyalty by collecting, analyzing and utilizing user behavioral data on new media platforms. (2) Big data technology faces multiple challenges in new media personalized services. Although big data technology shows great potential in new media personalized service, it still faces challenges in data privacy and security, data quality and accuracy, technology update and algorithm optimization, as well as regulatory compliance and ethics. (3) Innovative applications promote the development of big data technology in new media personalized services. With the continuous innovation and application of big data technology, new media personalized services are also developing and improving.

Keywords: Big data technology; new media; personalized services.

1. Introduction

With the rapid development of information technology, human society has stepped into the era of big data. In the context of this era, data is not only simple numbers or information, but also an important resource to promote social progress, economic development and cultural prosperity. The rise of big data technology has brought unprecedented opportunities for change in all walks of life, among which, the new media field is particularly significant. As an important channel for information dissemination, new media has shown explosive growth in recent years. It has not only changed the way people obtain information, but also profoundly affected people's socialization, entertainment and lifestyle [1]. In the new media environment, users' needs for information are increasingly personalized and diversified, which puts forward higher requirements for new media services. Big data technology, with its powerful data processing and analysis capabilities, provides strong technical support for new media personalized services [2].

As a hot spot in the field of information technology in recent years, big data technology has been the subject of a large number of studies on its definition, characteristics, processing technology and application scenarios [3]. These studies generally agree that big data technology refers to the collection of data that is difficult to capture, manage and process with conventional software in a short time through specific technology processing, and these data are usually characterized by massive, high-speed and diverse. In terms of data processing technologies, distributed storage, parallel computing, data mining, machine learning and other technologies are widely used [4]. In terms of application scenarios, big data technologies have penetrated into many fields such as finance, healthcare, education, media, etc., and become an important force to promote the development of these fields [5].

New media personalized service refers to providing users with customized information and services through technical means according to their interests, needs and behaviors and other characteristics [6]. Research in this field mainly focuses on the construction of user profiles, the design of personalized recommendation algorithms, and the analysis of user behavior [7]. In terms of user portrait construction, researchers have proposed a user portrait method based on multi-dimensional information such as user attributes, behavioral data, and social relationships [8]. In terms of personalized recommendation algorithms, methods such as collaborative filtering, content-based recommendation, and deep learning are widely used [9]. In addition, user behavior analysis is also an important part of new media personalized service, through the analysis of user's clicking, browsing, sharing and other behaviors, it can provide an in-depth understanding of the user's interests and needs, and provide data support for personalized service [10].

With the continuous development of big data technology, its application in new media personalized service has become more and more extensive. Researchers have explored how to use big data technology for the innovative application of user portrait construction, content recommendation, user behavior analysis and other aspects. In terms of user portrait construction, big data technology can integrate multi-dimensional information of users to construct a more accurate and comprehensive user portrait [11]. In terms of content recommendation, recommendation algorithms based on big data can provide users with more personalized and accurate content recommendations. In terms of user behavior analysis, big data technology can monitor and analyze user behavior data in real time, providing real-time user insight and market analysis for new media platforms [12].

Although big data technology has achieved remarkable results in new media personalized services, it also faces many challenges. Issues such as data security and privacy protection, data quality and accuracy, technology update and regulatory compliance are the key issues that need to be solved at present. At the same time, with the continuous development of technology, the application of big data technology in new media personalized services will usher in more opportunities.

For example, by combining artificial intelligence, Internet of Things and other technologies, the intelligence and precision of new media personalized services can be further enhanced [13].

By combing and analyzing the existing literature, it can be found that current research has achieved certain results in the application of big data technology in new media personalized services, but there are still research gaps and future directions. For example, how to better integrate the multi-dimensional information of users to build more accurate user profiles? How to design more efficient and accurate personalized recommendation algorithms? How to balance the relationship between data security and privacy protection? These questions will be important directions for future research.

2. Current Status of The Application of Big Data Technology in New Media Personalized Service

2.1. User Image Construction

User portrait is the foundation of new media personalized service, which integrates and analyzes multi-dimensional information such as basic information, behavioral data, interest and preference of users to form a comprehensive and in-depth understanding of users. Big data technology plays a key role in this process. By collecting and analyzing users' behavioral data on new media channels such as social media, news websites, video platforms, etc., big data technology can build more accurate and comprehensive user profiles. These portraits not only contain the basic attributes of users, such as age, gender, geography, etc., but also contain deep information such as users' interests and preferences, consumption habits, social relationships, etc., which provide valuable user insights for new media platforms.

2.2. Personalized Content Recommendation

Personalized content recommendation is one of the core functions of new media personalized service. By analyzing the user's historical behavioral data, interest preferences and other information, big data technology can recommend content that better meets the user's needs. This recommendation not only improves user satisfaction and loyalty, but also promotes the user stickiness and activity of the new media platform. At present, many new media platforms have adopted personalized recommendation algorithms based on big data technology, such as collaborative filtering, content-based recommendation, deep learning recommendation, etc. These algorithms can provide users with more accurate and personalized content recommendations through continuous learning and optimization.

2.3. User behavior analysis

User behavior analysis is an important part of new media personalized services. Big data technology can monitor and analyze user behavior data on the new media platform in real time, such as clicking, browsing, sharing, commenting and so on. Through the analysis of these data, new media platforms can gain a deeper understanding of users' interests and needs and provide data support for personalized services. Meanwhile, user behavior analysis can also help new media platforms discover potential user groups and market trends, providing a strong basis for product development and marketing strategy formulation.

2.4. Data Visualization and Interactive Data Application

Data visualization is another important application of big data technology in new media personalized services. By transforming complex data into intuitive charts, maps, animations and other forms, new media platforms can more intuitively display user profiles, content recommendation effects and other data, providing decision makers with clearer and more intuitive data support. In addition, interactive data application is also one of the innovative applications of big data technology in new media personalized services. By providing users with interactive data query, analysis and visualization tools, new media platforms can gain a deeper understanding of users' needs and feedback, providing powerful support for the optimization of personalized services.

2.5. Predictive News Reporting and Decision Making Support

Another important application of big data technology in new media personalized services is predictive news reporting and decision support. By analyzing user behavior data, public opinion trends on social media and other information, big data technology can predict future news events and public opinion trends. This predictive capability not only helps new media platforms to layout news reports and public opinion guidance in advance, but also provides powerful decision support for decision makers such as governments and enterprises.

3. Innovative Application of Big Data Technology in New Media Personalized Service

3.1. Deep Learning and Refined Construction of User Image

The traditional construction of user portrait mainly relies on the user's basic information and part of the behavioral data, while big data technology combined with deep learning technology can realize the deep mining and prediction of user behavioral patterns. By constructing complex neural network models, big data technology can analyze the behavioral characteristics of users at different times and in different scenarios, thus generating a more fine-grained and dynamic user portrait. This kind of portrait contains not only the static attributes of the user, such as age, gender, occupation, etc., but also the dynamic behavioral patterns of the user, such as interest preferences, consumption habits, social relationships, etc., which provides a more accurate data basis for personalized services.

3.2. Personalized Recommender System Based on Reinforcement Learning

The traditional personalized recommendation system mainly relies on methods such as collaborative filtering and content-based recommendation, which can improve the accuracy of recommendation to a certain extent, but it is often difficult to deal with the dynamic changes in user interest and cold start problems. In contrast, big data technology combined with reinforcement learning technology can build a personalized recommendation system that is capable of self-optimization and self-learning. The reinforcement learning model gradually finds the optimal recommendation scheme

by constantly trying different recommendation strategies and adjusting the strategies based on user feedback (e.g., clicking, browsing, purchasing, etc.). This recommendation system can not only improve the accuracy of the recommendation, but also better adapt to the changes in user interests and enhance the user experience.

3.3. Real-time data analysis and dynamic content push

Another innovative application of big data technology in new media personalized service is real-time data analysis and dynamic content push. Through real-time collection and analysis of user behavioral data on the new media platform, big data technology can discover the changes in user interest and demand trends in a timely manner, so as to dynamically adjust the content pushed. This real-time nature not only improves the relevance and effectiveness of content push, but also enhances the interaction between users and the new media platform. For example, in news information applications, big data technology can dynamically adjust the order and content of news information push according to users' real-time browsing behavior and interest preferences, providing users with a more personalized reading experience.

3.4. Cross-platform data integration and multi-dimensional user insights

With the diversified development of new media platforms, the behavioral data of users on different platforms is also characterized by fragmentation. Through cross-platform data integration, big data technology can correlate and analyze users' behavioral data on different platforms to generate more comprehensive and multi-dimensional user insights. This kind of insight not only helps new media platforms understand users' needs and preferences more deeply, but also provides powerful data support for cross-platform marketing and personalized services. For example, on social media platforms, big data technology can recommend friends and groups that better meet users' needs by analyzing their social relationships, interests and preferences on different platforms.

3.5. Innovative Application of Privacy Protection and Data Security Technology

In the process of applying big data technology to new media personalized services, privacy protection and data security are always an issue that cannot be ignored. In order to protect users' privacy and data security, big data technology needs to combine advanced encryption technology, anonymization technology, data desensitization technology and other means to protect users' sensitive information. At the same time, it is also necessary to establish a perfect data security management system and regulatory mechanism to ensure the legal and compliant use of data. The application of these innovative technologies not only helps to enhance users' trust and satisfaction with the new media platform, but also provides a strong guarantee for the sustainable development of big data technology in new media personalized services.

4. Challenges and Countermeasures of Big Data Technology in New Media Personalized Service

Although big data technology shows great potential and value in new media personalized services, it still faces a series of challenges in the process of practical application. In order to overcome these challenges, effective countermeasures are needed.

4.1. Challenges

(1) Data Privacy and Security

With the wide application of big data technology, users' personal information and behavioral data may be improperly collected and used, leading to privacy leakage; security problems such as hacking, data tampering, and data leakage occur from time to time, posing a huge risk to new media platforms; the amount of data generated on new media platforms is huge and complex, with a large amount of invalid, redundant, or erroneous data interspersed with it; due to a variety of reasons, such as users failing to fill out complete information, equipment failure, etc., resulting in missing data and affecting the accuracy of analysis.

(2) Technology Update and Algorithm Optimization

Big data technology and algorithms are updated rapidly, and new media platforms need to continuously invest resources to adapt to technological changes; personalized recommendation algorithms need to be optimized continuously to improve accuracy, but the optimization process is complex and time-consuming; there are different laws and regulations on data collection, use and protection in different countries, and new media platforms need to ensure compliance; and the application of big data technology in personalized services may lead to ethical and moral disputes such as whether users are being over-monitored or manipulated.

4.2. Countermeasures

(1) Strengthen data privacy and security

Improve the privacy policy, clearly inform users of the rules for data collection, use and protection, and obtain their consent; adopt encryption technology to encrypt the storage and transmission of sensitive data to prevent data leakage; establish a security management system, strengthen network security protection, and carry out regular security inspections and vulnerability repair.

(2) Improve data quality and accuracy

Data cleaning and pre-processing, cleaning, de-weighting, completing and other pre-processing operations on the collected data to improve data quality; data verification and calibration, using a variety of methods to verify the accuracy and consistency of the data to ensure that the analysis results are reliable.

(3) Continuous technology update and algorithm optimization

Tracking technology dynamics, paying close attention to the development trend of big data technology and algorithms, and introducing new technologies in a timely manner; algorithm iteration and testing, continuously iterating and optimizing personalized recommendation algorithms, and evaluating algorithm effects through A/B testing and other methods.

(4) Compliance with laws, regulations and ethics

Strengthen compliance awareness, understand and comply with the data protection laws and regulations of each country to ensure legal and compliant operation; establish an ethical review mechanism, set up an ethical review committee, and conduct ethical review on the application of big data technology in personalized services to ensure compliance with social ethical and moral standards.

(5) Enhance user trust and participation

Transparent operation, disclosing the process of data collection, use and protection to users, and enhancing user trust; providing feedback on personalized services, allowing users to understand the principles and effects of personalized services, and encouraging users to participate and provide feedback to jointly optimize services.

5. Conclusion and Outlook

5.1. Conclusion

Through the above in-depth study of big data technology in new media personalized service, we have come to the following main conclusions:

(1) Big data technology plays a key role in new media personalized services Big data technology is able to construct a refined user profile, achieve personalized content recommendation, and improve user satisfaction and loyalty by collecting, analyzing and utilizing user behavioral data on new media platforms. At the same time, big data technology is also able to monitor and analyze user behavior in real time, provide decision-making support for new media platforms, and optimize product development and marketing strategies.

(2) Big data technology faces multiple challenges in new media personalized service. Although big data technology shows great potential in new media personalized services, it still faces challenges in data privacy and security, data quality and accuracy, technology update and algorithm optimization, as well as regulatory compliance and ethics. These challenges need to be overcome by new media platforms through measures such as strengthening data protection, improving data quality, continuous technical updates and compliance with laws and regulations.

(3) Innovative applications promote the development of big data technology in new media personalized services. With the continuous innovation and application of big data technology, new media personalized services are also constantly developing and improving. For example, innovative applications such as deep learning and refined construction of user profiles, personalized recommendation system based on reinforcement learning, real-time data analysis and dynamic content push provide more intelligent, refined and real-time solutions for new media personalized services.

5.2. Outlook

(1) Technological integration and innovation will promote the upgrade of personalized services. In the future, with the in-depth integration and innovation of big data technology with artificial intelligence, Internet of Things, blockchain and other technologies, new media personalized service will achieve a more intelligent, precise and personalized service experience. For example, by combining artificial intelligence technology, more intelligent dialogue systems and virtual assistants can be realized to provide users with more convenient and personalized services.

(2) Data privacy and security will become an important issue. With the wide application of big data technology in new media personalized services, data privacy and security will become an increasingly important issue. New media platforms need to continuously strengthen data protection and security to ensure the security and privacy of user data. At the same time, the government and the community also need to strengthen the regulation and standardization of big data technology to promote the healthy development of big data technology.

(3) Personalized services will pay more attention to user experience. New media personalized services will pay more attention to user experience, and improve user satisfaction and loyalty by providing content and services that are more in line with users' needs and interests. At the same time, the new media platform also needs to continuously optimize the user interface and interaction design to improve user convenience and comfort.

(4) Cross-platform data integration and multi-dimensional user insights will become a trend. With the diversification of new media platforms and the fragmentation of user data, cross-platform data integration and multi-dimensional user insights will become an important trend of new media personalized services in the future. By integrating user data on different platforms, a more comprehensive and multi-dimensional user profile can be generated, providing more accurate data support for personalized services.

6. Conflicts of Interest

The authors declare that they have no conflict of interest.

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