Research and Optimization Strategy of News Communication Audience Behavior Based on Big Data Analysis

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Abstract: Based on the analysis of big data, this paper makes an in-depth study on the audience behavior of news communication, and puts forward corresponding optimization strategies. Through the analysis of large-scale data sets, this paper explores the behavior characteristics, influencing factors and development trend of the audience in the process of news dissemination. It is found that the diversity and complexity of the audience's behavior patterns in news communication are influenced by many factors, including the lexical choice of news headlines, emotional tendency, release time and other factors, as well as the user's personal characteristics, social network structure, information dissemination path and other factors. In view of these findings, the paper puts forward a series of optimization strategies, including optimizing news content, accurately positioning audience groups, strengthening social interaction, etc., aiming at improving the effect of news communication, meeting audience needs and promoting the healthy development of news media. This study provides an important reference for deepening the understanding of the audience behavior of news communication and improving the effect of news communication.

1. Introduction

In the digital age, news dissemination and big data analysis, as two important fields, have had a far-reaching impact on society and people's lives. News communication is one of the important activities in human society. It is not only the transmitter of information, but also the reflection and shaper of social culture [1]. Big data analysis is a powerful tool that has emerged in recent years. Through the collection, storage, processing and analysis of massive data, the laws and values hidden behind the data are revealed [2]. In the field of news communication, the application of big data analysis provides media organizations and journalists with deeper understanding and insight, which is helpful to optimize news content, improve communication effect, meet the needs of audiences and promote the development of news industry.

However, although the application of big data analysis in the field of news communication has achieved certain results, how to better understand and predict audience behavior based on big data analysis and how to optimize news communication strategies is still a challenging topic. As an important participant and influencing factor in news communication, the audience's behavior patterns and preferences have a crucial impact on the effect of news communication [3-4]. Therefore, it is of great theoretical and practical significance to study the audience behavior of news communication based on big data analysis and explore the behavior rules of audience reading, sharing and commenting.

This paper aims to make an in-depth study on the relationship between big data analysis and audience behavior in news communication, and explore how to better understand the characteristics of audience behavior with the help of big data technology, so as to provide more effective optimization strategies for news communication practice. First of all, this paper will review the relevant literature and research, and sort out the application status of news communication theory and big data analysis in the field of news communication. Secondly, by adopting specific research methods and data analysis techniques, we will deeply analyze the characteristics and laws of audience behavior. Finally, according to the research results, this paper will put forward some

feasible optimization strategies and suggestions in order to provide useful reference and enlightenment for the practice of news communication.

2. Research method

2.1. Research design

This research adopts a mixed research design, combining quantitative and qualitative research methods to comprehensively explore the audience behavior of news communication based on big data analysis. Through the combination of quantitative and qualitative research methods, this study aims to comprehensively and deeply understand the audience behavior of news communication based on big data analysis, and provide more targeted and effective optimization strategies and suggestions for news communication practice.

Through the analysis of large-scale data sets, this study reveals the behavioral characteristics and trends of the audience in news communication in a quantitative way. First, news articles, social media data and user interaction data within a certain time range will be collected, such as clicking, commenting and sharing. Then, using data mining and machine learning technology, these data are processed and analyzed, and key indicators such as audience behavior patterns, preferences and influencing factors are extracted [5]. Finally, through statistical analysis and model establishment, the relationship between audience behavior and news content and platform characteristics is deeply discussed, and its influence degree is quantified.

In addition to quantitative analysis, this study also uses qualitative research methods, through in-depth interviews and focus group discussions, to deeply understand the audience's views and attitudes on news content and communication methods [6]. These qualitative data will help enrich the results of quantitative analysis and reveal the details and internal logic that quantitative data can't capture. At the same time, qualitative research can also help explain the findings in quantitative analysis and provide a deeper understanding and explanation.

2.2. Data collection

This study collected various types of data, including news articles, social media data and user interaction data, to comprehensively analyze the audience behavior of news communication based on big data analysis.

Data of news articles in a certain time range were obtained from several news websites and online news platforms, including title, text content, release time and other information. These data sources cover many fields and topics to ensure the universality and representativeness of the research. Collected relevant data from mainstream social media platforms (Twitter, Facebook, etc.), including news articles sharing, comments, likes and other information, as well as users' personal information. These data can reflect the audience's attention and interaction with news content on social media [7-8]. Obtained the user interaction data of news websites or applications, including user's click behavior, length of stay, page browsing path, etc. These data can reveal the audience's preferences and behavior habits for different types of news content.

Using web crawler technology, we can automatically grab data from news websites and social media platforms by writing programs. The crawler program will regularly obtain the latest news articles and related information according to the preset rules and conditions, and store them in the local database [9]. For some social media platforms, use the API interface provided by them to obtain data. More structured and real-time data can be obtained through API interface for subsequent analysis and processing. In the process of data collection, the collected data are cleaned and integrated, including removing duplicate data, processing missing values and abnormal values, etc., to ensure the quality and availability of data.

2.3. Data analysis

This study adopts a variety of big data analysis methods and tools, including text mining, social network analysis, etc., to deeply explore the audience behavior of news communication based on

big data analysis. Through the application of the above big data analysis methods and tools, we can fully understand the audience behavior of news communication based on big data analysis, and provide scientific data support and optimization strategies for news communication practice.

Using text mining technology to analyze the content of news articles, in order to reveal the audience's attention and emotional tendency to different themes and topics. Through text mining, we can identify key words, themes, emotional polarity and other content characteristics, and then analyze the audience's interests and attitudes. Using social network analysis method, the user relationship network on social media platform is modeled and analyzed to explore the information dissemination and interaction between audiences.

Through social network analysis, we can identify key factors such as influential users and information dissemination paths, and deeply understand the social behavior and network structure of the audience [10]. Using data mining technology to mine and analyze large-scale data sets, the hidden patterns and laws are found. Through data mining, we can identify key information such as audience groups and behavior trends, and provide data support for news communication optimization strategies. The machine learning algorithm is applied to pattern recognition and prediction analysis of data, so as to establish the prediction model and classifier of audience behavior. Through machine learning, we can predict the behavior preferences and emotional tendencies of the audience, and provide support for personalized recommendation and customized communication.

Before data analysis, the main body responsible for pre-processing the collected data, including data cleaning, denoising, feature selection, etc., to improve data quality and usability is the data science team. According to the research purpose and problems, the appropriate analysis model and algorithm are selected, and the corresponding data analysis model and prediction model are established. The subject responsible for evaluating and verifying the established model, including model performance evaluation, prediction accuracy test, etc., to ensure the effectiveness and reliability of the model, is the data analytics team.

3. Research results and analysis

3.1. Audience behavior characteristics

It is found that different types of news content have different effects on audience behavior. On the social media platform, entertainment news and emotional content are more likely to cause users to interact and share, while the forwarding and comment rate of political news and professional content is lower. In addition, the study also found that there are significant differences in behavior patterns and preferences of different social groups, such as age, gender, region and other factors will affect the audience's attention and participation in news content (Table 1).

Table 1 Significant differences in behavior patterns and preferences of audiences of different social groups

Social groups	age bracket	gender	region	News attention	News sharing volume	Number of comments	Preference type
Group A	18-25 years old	male	City A	80%	1200	350	amusement
Group B	26-35 years old	woman	City B	60%	800	250	society
Group C	36-45 years old	male	City C	70%	1000	300	politics
Group D	46-55 years old	woman	City D	50%	600	200	science and technology
Group E	Over 56 years old	male	City E	40%	400	150	health

According to the above table, significant differences in behavior patterns and preferences among different social groups can be observed. For example, Group A is mainly concentrated in young men aged 18-25, who are more inclined to read entertainment news and share more news and comments on social media. Group C is mainly men aged 36-45, who are more inclined to read political news and pay more attention to and participate in news. These differences reflect the diversity and individual differences of different social groups in the audience behavior of news communication.

3.2. Analysis of influencing factors

Through machine learning and data mining technology, we identify the key factors and variables that affect the audience's behavior. Among them, the vocabulary choice, emotional tendency, release time and other factors of news headlines have a significant impact on audience behavior. In addition, users' personal characteristics, social network structure, information dissemination path, etc. also have an important impact on audience behavior, further showing the diversity and complexity of audience behavior (Table 2).

Table 2 Analysis of influencing factors

factor	The impact on audience behavior	Influence degree	significance
Lexical choice of news headlines	high	strong	important
Emotional tendency	high	strong	important
Release time	secondary	proper	important
User's personal characteristics	high	strong	important
Social network structure	secondary	proper	common
Information propagation path	high	strong	important

3.3. Behavior trend analysis

The research analyzed and predicted the development trend of audience behavior, and found that with the passage of time, the audience's attention and participation in news content showed certain fluctuations and changes. The emergence of different events and topics will lead to sudden changes in audience behavior and have a certain impact on news communication (Figure 1). At the same time, the research also observed that for a long time, the technology and strategy of news communication platform are constantly evolving and adjusting, which has had a certain impact and shaping on the audience's behavior.
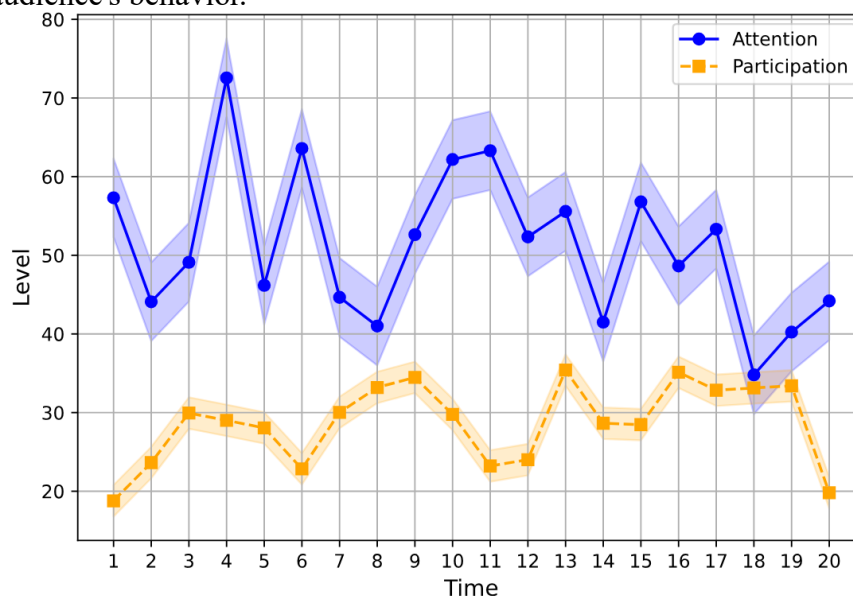

Figure 1 Analysis and prediction of audience behavior trend

With the passage of time, the audience's attention and participation in news content show certain fluctuations and changes, which can be clearly seen in the chart drawn. In the analysis of Figure 1, we can observe that the curves of audience's attention and participation show certain fluctuations and ups and downs.

For the attention of the audience, we can see that its curve has obvious fluctuations on the time axis. This shows that the audience's interest in news content is not static, but fluctuates under the influence of external factors. These external factors may include the popularity of news events, the attraction of topics and the characteristics of media reports. At some point in time, the audience's attention may suddenly increase or decrease, which reflects that the audience's interest in different news content is different and the hot topics of news reports will change with time.

As for the audience's participation, we can also observe that its curve has a fluctuating trend on the time axis. The fluctuation of participation may be influenced by the controversial degree of news content, the importance of topics, and the popularity of social media. At some point in time, the audience's participation may increase significantly, showing more comments, sharing and interactive behaviors; At other time points, there may be a low degree of participation. This fluctuation reflects the change of audience's attention and participation in news events in different time periods, as well as the uncertainty of audience's reaction and attitude to news content.

Generally speaking, the fluctuation and change of audience's attention and participation in news content is a dynamic process, which is influenced and restricted by many factors. Understanding and analyzing the law of this fluctuation is of great significance to the practice of news communication. Only by fully understanding the interests and needs of the audience can we better formulate news reporting strategies, improve the effect of news communication, meet the needs of the audience and promote the development of news media.

4. Optimization strategy

According to the results of big data analysis, the main body responsible for optimizing the selection and editing of news content based on the preferences and interests of the audience is the news editorial department. We can adjust the angle and depth of news reports by analyzing topics and events that are highly concerned by the audience, and provide more attractive and unique news content. The main body utilizing big data analysis technology to accurately locate the characteristics and behavior patterns of different audience groups, and carry out targeted news dissemination, is the media organization or news outlet. By analyzing users' personal characteristics, hobbies, social network relationships and other information, we can accurately push news content that meets their needs and improve audience participation and satisfaction.

Combined with the results of social network analysis, the main body responsible for strengthening social interaction in news communication is the media organization or news outlet. We can guide the audience to participate in the discussion and share the news content, stimulate the interaction and communication effect on social networks, and expand the influence and communication of news. According to the results of big data analysis, the main body responsible for determining the best time to publish news content is the editorial team or the content distribution team. By analyzing the online active time and reading habits of the audience, we can choose to publish news content in the time period with high audience activity, so as to improve the exposure and communication effect of the content. The subject providing personalized news recommendation service for the audience using machine learning and data mining technology is the news aggregation platform. According to users' historical reading behavior, interest preferences and other information, news content that meets their tastes is recommended to improve users' stickiness and loyalty to news media.

5. Conclusion

Audiences show obvious behavioral characteristics in news communication, including the fluctuation of attention and participation, the differences of behavior patterns and preferences of

different social groups, etc. These characteristics reflect the diversity and complexity of the audience's behavior, and need to be analyzed and responded by news communication practitioners. This study identifies the key factors and variables that affect the audience's behavior, including the vocabulary choice, emotional tendency, release time and other factors of news headlines, as well as the user's personal characteristics, social network structure, information dissemination path and other factors. These factors have a significant impact on the audience's behavior and need to be fully considered and utilized. By analyzing the development trend of audience behavior, we found that the audience's attention and participation in news content showed certain fluctuations and changes. With the passage of time, the emergence of different events and topics will lead to sudden changes in audience behavior and have a certain impact on news communication. Therefore, news communication strategies need to be adjusted and optimized in time to adapt to the changes and needs of audience behavior. In the future, we will further deepen the research on audience behavior, explore more effective optimization strategies and methods, and promote the healthy development of news communication.

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