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New Characteristics and Governance Obstacles of Online Public Opinion Dissemination in the Era of Artificial Intelligence and Innovative Regulatory Paths

Jinshuai Qu

School of Education, Yunnan Minzu University, Kunming, 650504, Yunnan, China

Abstract: *The deep penetration of artificial intelligence technology has reshaped the online public opinion communication ecology, triggering systematic changes in communication characteristics and governance models. This paper focuses on the new characteristics, governance obstacles, and regulatory innovation paths of online public opinion in the era of artificial intelligence. Through literature research, case analysis, and comparative research, it is found that at the communication level, online public opinion presents new features such as information production human-machine collaboration, information distribution algorithm dominance, multi-modal public opinion interaction, and non-linear evolution of public opinion; At the governance level, there are obstacles such as technological blind spots caused by algorithmic black boxes, institutional lag caused by ambiguous division of rights and responsibilities, and failure of multi-party collaboration; At the regulatory level, it is necessary to establish a three-dimensional innovation path of "technology system multiple subjects", including promoting algorithm transparency, improving laws and regulations, and building a collaborative governance system. The research aims to provide theoretical reference and practical guidance for solving the problem of disorderly online public opinion in the era of artificial intelligence and improving governance efficiency.*

Keywords: *Artificial Intelligence, Network Public Opinion, Propagation Characteristics, Management of Obstruction, Regulatory Innovation*

1. Introduction

In the current global digital wave, artificial intelligence technology is penetrating into various fields of social life at an unprecedented speed and depth, and the online public opinion field is undergoing unprecedented changes as a result [1]. The application of artificial intelligence technology, from algorithm recommendation to generative AI, from natural language processing to sentiment computing, is profoundly reshaping the dissemination ecology of online public opinion.

This study focuses on the core issue of online public opinion dissemination in the era of artificial intelligence, which has important theoretical and practical value. This study from a theoretical perspective, investigates the new characteristics, governance barriers, and innovative regulatory paths of online public opinion dissemination. It can enrich the theory of public opinion dissemination from the perspective of technological sociology, improve the governance theoretical system in the era of artificial intelligence, and provide new ideas for understanding the interactive relationship between technology and social public opinion. This study, from a practical perspective, deeply analyzes the problems faced by current online public opinion governance, proposes innovative paths, and can provide practical and feasible references for cracking the disorderly phenomenon of online public opinion and improving governance efficiency. These can help create a healthy and orderly online public opinion environment.

Domestic and foreign scholars have conducted extensive research on artificial intelligence and online public opinion [2,3]. Foreign research often focuses on the manipulation risks of algorithms on public opinion, such as phenomena like "over follicles" and "information cocoons", while also paying attention to platform regulatory responsibilities and technical ethical issues. Domestic research focuses on the impact of artificial intelligence on public opinion dissemination patterns, government regulatory challenges, and collaborative governance pathways. However, existing research lacks sufficient exploration of the logical relationship between "spreading new features - addressing obstacles -

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regulating pathways", and the dialectical relationship between "technological empowerment" and "technological empowerment" is not deeply explored. This provides further space for this study to explore.

In this study, artificial intelligence specifically refers to the application of technology in online public opinion scenarios, such as algorithm recommendation, natural language processing, deep forgery, etc; Online public opinion refers to the collection of opinions and interactive processes formed by the public on public affairs through online platforms with the intervention of artificial intelligence technology; Governance obstruction refers to the systemic obstacles that exist in the governance of online public opinion in the era of artificial intelligence, involving multiple levels such as technology, systems, and subject collaboration; The regulatory innovation path is a new governance strategy that breaks through traditional governance models and integrates elements such as technology, institutions, and culture.

This study will take "technological change - evolution of communication characteristics - governance challenges - regulatory innovation" as the logical mainline, and comprehensively use literature research method, case analysis method, and comparative research method. This study constructs a theoretical framework by reviewing relevant literature, selects cases of public opinion events and deep spread of false information caused by algorithm recommendations for analysis, compares domestic and foreign regulatory practices, and draws targeted and innovative research conclusions.

2. New characteristics of online public opinion dissemination in the era of artificial intelligence

2.1 Information production: from "UGC led" to "human-machine collaborative co creation"

The emergence of generative AI, such as ChatGPT and AI painting, has greatly accelerated the speed and scale of content production, greatly reducing the threshold for participation in online public opinion [4]. In the past, ordinary users needed to have a certain level of written expression ability or creative skills to post opinions and content on the internet. Now, with the help of generative AI, even users with limited expression ability can quickly generate seemingly professional text, images, and other content, making it more convenient for them to participate in online public opinion.

At the same time, algorithms began to assist in fact checking and viewpoint extraction, which to some extent affected the professionalism and objectivity of public opinion expression. Algorithms can quickly filter and analyze massive amounts of information, providing users with factual evidence and different perspectives. However, the biases or limitations that algorithms themselves may have can also lead to biased content, which in turn affects the direction of public opinion. For example, there has been a public opinion storm caused by AI generated fake news. A certain AI tool generated a false report about negative news about a celebrity. Due to the seemingly true content and rapid spread, it attracted a large number of netizens' attention and discussion, causing adverse effects on the parties involved.

2.2 Information distribution: From "editor led" to "algorithm precision push"

The algorithm recommends an information distribution model based on user profiles to achieve a "thousand people, thousand faces" approach, which not only enhances the convenience of user information acquisition, but also exacerbates the phenomenon of "information cocoon" and "group polarization" in the public opinion field [5]. Users have long been in an information environment where algorithms push information based on their preferences, and are exposed to increasingly narrow perspectives, gradually forming information cocoons and lacking understanding and tolerance for other different voices and viewpoints. On some controversial topics, users with similar views gather together under the push of algorithms, reinforcing each other's views and making the phenomenon of group polarization more apparent.

The formation of hot topics has also undergone a transformation, shifting from the previous "manual setting" to "algorithm prediction+user interaction", which greatly shortens the cycle of public opinion fermentation. Algorithms can quickly predict potential hot topics based on user views, likes, comments, and other data, and push them to more users. Combined with user interaction behavior, hot topics can quickly heat up in a short period of time, triggering widespread public attention. A certain social platform once experienced the "fueling" effect of algorithms on sudden public opinion. After a sudden event occurred, the algorithm quickly captured relevant information and pushed a large amount of it. In a short period of time, the event became a hot topic on the platform, and public opinion quickly fermented in a short period of time.

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2.3 Public opinion interaction: From "one-way dissemination" to "multimodal real-time interaction"

The application of emotion computing technology has gradually tilted online public opinion interaction towards "emotion driven". By capturing users' emotional changes, such as emotional expressions in bullet comments and interactive feedback with AI virtual anchors, the platform can push corresponding content based on users' emotional states, guide users' emotional direction, and thus influence the interactive atmosphere of public opinion.

The linkage between cross platform public opinion fields is increasingly intensified, such as the resonance of public opinion between short video platforms and social platforms, which undoubtedly increases the difficulty of public opinion guidance. After a piece of information attracts attention on one platform, it is easy to spread to other platforms through user sharing and forwarding, and users from different platforms participate in discussions, forming a cross platform public opinion field. Due to differences in user group characteristics and dissemination rules across different platforms, the development of public opinion is more complex and varied, posing greater challenges to public opinion guidance work. For example, after a certain social event sparked a heated discussion on short video platforms, it quickly became a focus of discussion on social media platforms. Users from two platforms expressed their opinions from different perspectives and influenced each other, making it difficult to control the public opinion situation.

2.4 Evolution of public opinion: From "linear diffusion" to "nonlinear mutation"

The application of artificial intelligence technology has accelerated the "viral spread" of public opinion, allowing some false information or extreme views to quickly spread in a short period of time, which can easily trigger an "information epidemic". The precise push of algorithms and the dissemination characteristics of social networks enable rumors and other negative information to accurately reach target users and quickly spread through users' forwarding and sharing, causing negative impacts on social stability and public awareness.

The emergence of deepfake technology has further blurred the boundary between "truth" and "falsehood", leading to a crisis of public trust. Videos, audios, and other content produced through deepfake technology can be mistaken for real, making it difficult for the public to distinguish their authenticity. The abuse of this technology has led to the proliferation of false information on the internet, and the public's trust in online information has gradually decreased. When truly important information appears, suspicion may also arise due to previous experiences of being deceived, affecting the normal formation and development of public opinion. There have been cases of deepfake videos causing public cognitive confusion and public opinion reversal. A processed celebrity speech video was spread online, causing strong public dissatisfaction. Subsequently, the truth was exposed, leading to a huge reversal of public opinion and causing a serious impact on social public opinion order.

3. Obstacles to the governance of online public opinion in the era of artificial intelligence

3.1 Technical aspects: governance blind spots of algorithmic black boxes and technological loss of control

The opacity of algorithms has led to the phenomenon of "regulatory lag". The algorithm logic of platforms is often in a hidden state, making it difficult for governments and regulatory agencies to accurately understand their operating mechanisms, and thus unable to effectively regulate the implicit manipulation of public opinion that algorithms may cause. Algorithms are like black boxes, where the outside world can only see the input and output, and knows nothing about the internal computational process. This often makes regulatory measures unable to keep up with the speed and depth of the impact of algorithms on public opinion.

Meanwhile, the iteration speed of technology is much faster than the improvement of governance capabilities. Generative AI, deep forgery and other technologies are constantly being updated and upgraded, and their dissemination and influence are becoming increasingly complex. Traditional governance methods, such as manual review, are no longer able to cope. Faced with massive amounts of information and constantly evolving technological means, manual auditing appears inadequate, unable to timely detect and handle bad information, resulting in blind spots in governance.

ISSN 2706-6827 Vol. 7, Issue 5: 54-59, DOI: 10.25236/IJFS.2025.070509

3.2 Institutional level: Fuzzy division of rights and responsibilities and legal lag

The unclear boundary of platform responsibility is an important issue faced at the institutional level. In the era of artificial intelligence, there is a conflict between the technological neutrality of platforms and their obligation to review content. As algorithm recommendation is the core technology of the platform, there is currently no clear definition of whether the platform is responsible for the public opinion guidance caused by algorithm recommendation. This often leads to platforms using technological neutrality as an excuse to evade responsibility when public opinion issues arise, and regulatory authorities find it difficult to effectively hold them accountable.

The gap in legal regulation has also brought difficulties to the governance of online public opinion. There are still deficiencies in the existing laws and regulations such as the Cybersecurity Law and the Data Security Law regarding the ownership of AI generated content and the accountability for false information. The copyright ownership of AI generated content is unclear, making it difficult to determine responsibility when issues such as infringement arise; The existing legal provisions also lack specific punishment standards for the use of AI technology to create and disseminate false information, resulting in low illegal costs and difficulty in effectively curbing the occurrence of such behavior.

3.3 Main body level: Failure of diversified collaborative governance mechanism

Government regulation oscillates between 'overstepping' and 'absence'. On the one hand, some local governments excessively intervene in the regulation of online public opinion, restricting technological innovation and normal expression of public opinion, which is not conducive to the healthy development of the online public opinion ecology; On the other hand, in some emerging technology application fields and hot public opinion events, there is a lack of regulation by the government, which fails to take effective measures to guide and regulate in a timely manner, leading to a loss of control over public opinion.

The insufficient media literacy of the public is also an important factor affecting the effectiveness of governance. In the era of artificial intelligence, the ways and contents of information dissemination are more complex and diverse, and the public's ability to distinguish information generated by AI is generally weak, making it easy to be misled by false information and even become "tool people" for public opinion manipulation. Many users lack a basic understanding of AI technology and are unable to recognize the characteristics of AI generated content. When faced with seemingly authoritative information, they often easily believe and spread it, exacerbating the chaos of public opinion.

In addition, the degree of participation of technology enterprises and social forces in governance is insufficient. At present, there is a lack of effective incentive mechanisms to promote enterprises to open up algorithm data and participate in public opinion governance. Enterprises often focus more on their own commercial interests and are not proactive enough in taking on social responsibilities. At the same time, the role of social forces such as NGOs in online public opinion governance has not been fully utilized, and there is a lack of channels and platforms for participation, resulting in difficulties in the effective operation of diverse collaborative governance mechanisms.

4. Innovative regulatory paths for online public opinion in the era of artificial intelligence

4.1 Technological governance innovation: using technology to overcome technological barriers

Promoting algorithm transparency and interpretability is an important direction of technological governance. We can learn from the experience of the EU's Algorithm Accountability Act, establish an algorithm filing system, and require platforms to publicly disclose key information such as recommendation logic. Through algorithm registration, regulatory authorities can better understand the operational mechanism of platform algorithms, and promptly identify and correct potential biases and issues in the algorithms. At the same time, publicly disclosing algorithm logic can enhance the public's understanding and trust in algorithms, reducing the negative impact of algorithm black boxes.

Developing intelligent governance tools is an effective means of addressing technological challenges. Utilizing AI technology to monitor false information, such as developing a deep forgery recognition system, can quickly identify and intercept false videos, audio, and other content, reducing the spread of false information. In addition, building emotional tendency prediction models and other public opinion risk warning tools can timely detect abnormal changes in public opinion, provide a basis for regulatory authorities and platforms to take response measures, and improve the initiative and pertinence of public

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opinion governance.

Establishing an "Algorithm Ethics Committee" can standardize the application boundaries of AI in the field of public opinion. The committee can be composed of technical experts, ethical scholars, legal experts, etc., responsible for formulating ethical guidelines and application norms for AI in public opinion dissemination, such as prohibiting the use of algorithms to create group conflicts. This study ensures that the application of artificial intelligence technology in the field of online public opinion is in line with social ethics and public interest through the supervision and guidance of an ethics committee.

4.2 Institutional regulation innovation: Building a legal and policy system adapting to technological change

Improving laws and regulations is the foundation of institutional regulation. This study clarifies the legal attributes of content generated by artificial intelligence, determines its copyright ownership and liability standards. At the same time, it strengthens the algorithm governance responsibility of the platform, clarifies the obligations and responsibilities of the platform in content review, public opinion guidance, and other aspects. In addition, it adds liability clauses for deepfake information, increases penalties for the production and dissemination of deepfake information, increases the cost of illegal activities, and curbs the occurrence of such behavior.

Establishing a dynamic regulatory mechanism can better adapt to the rapid iteration of technology. In response to the continuous development of artificial intelligence technology, a regulatory framework of "principle+flexibility" is formulated, and new regulatory methods such as sandbox regulatory mode are adopted. Sandbox regulation allows enterprises to test new technologies and business models in a controllable environment, and regulatory authorities can promptly identify problems and formulate corresponding regulatory rules in this process, which not only encourages technological innovation but also effectively prevents risks.

Strengthening data governance is crucial for regulating online public opinion dissemination. To standardize the collection and use of public opinion data, clarify the scope and authority of data collection, and protect user privacy and data security. At the same time, it is necessary to prevent algorithms from manipulating public opinion based on data bias, strictly review the quality and sources of data, ensure the objectivity and impartiality of algorithm training data, and reduce the impact of algorithm bias on public opinion.

4.3 Diversified collaborative governance innovation: Consolidating governance efforts

Building a collaborative system of "government platform public academia" is the key to achieving diversified governance [6]. The government should play a leading role in legislation and regulation, formulate relevant policies and regulations, and provide institutional guarantees for the governance of online public opinion. As an important carrier of information dissemination, platforms should bear the main responsibility, strengthen content review and algorithm governance, and actively cooperate with government regulatory work. The public should improve their media literacy, actively participate in public opinion supervision, and express their opinions rationally. The academic community should provide theoretical support, conduct in-depth research on the laws and methods of online public opinion governance, and provide guidance for practice.

Improving public digital literacy is a fundamental project for enhancing governance effectiveness. This study aims to promote knowledge of artificial intelligence technology and enhance the public's ability to distinguish information generated by artificial intelligence through educational activities. AI technology and media literacy can be added to school education, community promotion, and other activities to cultivate the public's critical information consumption ability, such as skills in identifying AI generated content. Only when the public has strong media literacy can they better participate in online public opinion, resist false information, and maintain a healthy public opinion environment.

Encouraging industry self-discipline can promote enterprises to actively fulfill their social responsibilities. This study guides enterprises to focus on social benefits while pursuing commercial benefits by promoting Internet enterprises to formulate the Convention on Algorithm Ethics and establishing internal public opinion governance standards in the industry. It also strengthens communication and cooperation among enterprises through industry associations and other organizations, forming a self regulatory force in the industry and jointly regulating the order of online public opinion dissemination. At the same time, it establishes incentive mechanisms to recognize and reward enterprises

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that have shown positive performance in public opinion governance, enhancing their enthusiasm and initiative in participating in governance.

5. Conclusion

This study analyzes the new characteristics, governance obstacles, and regulatory innovation paths of online public opinion dissemination in the era of artificial intelligence, and draws the following main conclusions:

In terms of spreading new features, in the era of artificial intelligence, online public opinion presents core manifestations such as information production human-machine collaborative co creation, precise information distribution algorithm push, multimodal real-time interaction of public opinion, and nonlinear mutation of public opinion evolution. These new features are concrete manifestations of technological changes in the field of online public opinion, profoundly changing the ecology and pattern of online public opinion.

In the treatment of obstruction, it mainly involves three dimensions: technology, system, and subject. There are governance blind spots at the technical level, such as algorithmic black boxes and technological loss of control; At the institutional level, there is a problem of vague division of rights and responsibilities and lagging laws; At the subject level, it manifests as the failure of diverse collaborative governance mechanisms. These obstacles are intertwined and jointly constrain the effectiveness of online public opinion governance.

In terms of regulating innovation paths, the core logic is the governance model of technology system culture synergy. Through technological governance innovation, we aim to overcome technological barriers with technology; Establishing a legal and policy system that adapts to technological changes through institutional regulation innovation; Through diversified collaborative governance innovation, we can consolidate governance synergy. The three cooperate with each other to form a systematic regulatory innovation system, providing direction and ideas for solving the problem of online public opinion governance in the era of artificial intelligence.

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