Postprint: Emotion-Driven Data Analysis of Mainstream Media Pandemic Information and Discourse Guidance Strategies

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Abstract

[Purpose/Significance] This study investigates the relationship between netizen attention, emotional fluctuations, and mainstream media discourse guidance in COVID-19 online public opinion data, aiming to provide a new perspective for online public opinion governance and media communication in emergency events. [Method/Process] Utilizing "Zhiwei Shijian" to identify the five events with the highest social impact during the domestic epidemic in the first half of 2020, and based on the Python-based Scrap-Redis crawler framework, SnowNLP sentiment analysis model, and TF-IDF algorithm, this study conducts sentiment analysis on over 40,000 popular user comments on related Weibo posts from three major government-affiliated new media platforms (People's Daily, Xinhua Viewpoint, and Guangming Online) following these five events, and performs sentiment statistics and visualization based on date and related themes. [Results/Conclusion] The analysis demonstrates that mainstream media reporting plays a positive role in alleviating netizen emotions. Through discourse guidance strategies such as leveraging the leading role of opinion leaders, proactively responding to false information, and tracking and reporting on social hotspots, mainstream media can effectively mitigate netizen panic and dissatisfaction, guiding the focus of public information attention back to rationality. Government departments should enhance mainstream media's information response capacity, seize discourse power in information reporting, and strengthen collaborative response capabilities for online public opinion, thereby constructing a systematic and comprehensive digital governance framework for public emergencies and accelerating the establishment of a correctly-oriented public opinion guidance mechanism.

Full Text

Emotion-Driven Data Analysis of Mainstream Media Epidemic Information and Discourse Guidance Strategies

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Abstract:
[Purpose/Significance] This study examines the relationship between netizen attention, emotional fluctuations, and mainstream media discourse guidance using COVID-19 online public opinion data, offering a new perspective for online public opinion governance and media publicity in emergencies. [Method/Process] Using "Zhiwei Shijian" to identify five event groups with the highest social impact during the first half of 2020, we employed the Scrapy-Redis crawler framework based on Python, the SnowNLP sentiment analysis model, and the TF-IDF algorithm to conduct sentiment analysis on over 40,000 popular user comments on related Weibo posts from three major government new media outlets: People's Daily, Xinhua Viewpoint, and Guangming Net. Sentiment statistics and visualization were performed according to dates and related themes. [Result/Conclusion] The analysis demonstrates that mainstream media reports play a positive role in alleviating netizen emotions. Through discourse guidance strategies such as leveraging opinion leaders, actively responding to false information, and tracking social hotspots, mainstream media can effectively calm panic and dissatisfaction while guiding public attention back to rationality. Government departments should build a systematic and comprehensive digital governance framework for public emergencies by improving mainstream media's information response capabilities, seizing discourse power in reporting, and enhancing collaborative response capabilities for online public opinion, thereby accelerating the construction of a correct orientation public opinion guidance mechanism.

Keywords: COVID-19; media information; emotional changes; online public opinion governance; discourse guidance
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President Xi Jinping has pointed out that "the internet has become the main battlefield for public opinion struggle. Whether we can withstand and win on this battlefield directly relates to China's ideological security and regime security" [1]. Ideological struggle, primarily manifested as online public opinion, has become increasingly intense, with major emergencies serving as flashpoints. In terms of defense, we must guard against both ideological infiltration by foreign hostile forces and threats to the public's basic political values from internal public opinion pressure and value polarization [2]. This study examines the diachronic development of COVID-19 online public opinion, analyzing emotional fluctuations among netizens during typical events from January 23, 2020

(Wuhan lockdown) to March 12 (when the National Health Commission announced the epidemic peak had passed). This analysis objectively demonstrates shifts in public attitudes toward epidemic information while clearly outlining how government new media, by playing the role of opinion leaders, actively setting agendas, and tracking social hotspots, influences public attitude transformation. In the post-pandemic era, the discourse strategies of government new media based on epidemic reporting provide theoretical support for relevant departments to grasp public opinion dynamics in real-time, apply propaganda techniques to soothe netizen emotions, and guide the shift in focus, thereby enhancing government capabilities in online public opinion intelligence perception, crisis guidance, and public communication.

1 Research Status

Online public opinion refers to the collection of information regarding emotions, cognition, and evaluations held by netizens—comprising different social groups—about various public affairs of concern to them. It represents a form of public will that conceals undisclosed emotions, attitudes, and opinions, typically presented through clustered discourse. Freud argued that crowds easily release repressed destructive psychology, infect each other, and instinctively obey linguistic suggestions, which constitute "a conviction not based on intuition and reasoning but on love-based contact methods" [3]. Media "discourse" carries obvious tendencies, with its fundamental position being to 宣誓 pursue values, highlight ideology, and serve as an "ideologically saturated object" with certain orientations [4]. As a mapping of social opinion in cyberspace, online public opinion represents a concentrated expression of public emotion that competes with mainstream ideology in network space, seeking optimal positioning amid various discursive contests. Due to existing social risks such as social equity, medical education, and emergencies, shared interests have experienced cognitive differences due to social restructuring, with public questioning creating trust rifts between officials and citizens. However, in public emergencies, trust is a prerequisite for rational individual-society interaction, and its absence inevitably leads to communication barriers and disorder, allowing emotions to take the lead and dominate event development [5]. The information characteristics of online public opinion determine that public opinions, attitudes, and emotions toward events are all presented in the form of data information. Major epidemics directly concern public health and safety, making related opinion events more likely to be drawn into the central vortex of social discourse. Compared with general emergencies, they involve larger information dissemination groups and greater information influence.

COVID-19-triggered online public opinion, as a typical crisis event under abnormal social conditions, has become a hot issue across numerous disciplines. Scholars in journalism and information science have researched opinion formation causes [6], situation assessment [7], sentiment analysis [8], rumor modeling [9], information search [10], and user dissemination [11] from information

security and management perspectives. Public management scholars have focused on the internal mechanisms of opinion evolution in typical events [12], dissemination stages and paths [13], public opinion risk assessment [14], and the two-way interaction between government information disclosure and opinion evolution [15], uncovering deep-seated issues reflected in government crisis response processes and proposing corresponding guidance strategies. Systems science scholars have primarily used data simulation and empirical analysis to construct system dynamics models [16] and viewpoint evolution models [17] for online public opinion dissemination, providing theoretical foundations for effective intervention. Marxist theory, as a foundational discipline for maintaining online public opinion stability and ideological security, has seen scholars study how to effectively address the impact of online public opinion on mainstream cyberspace ideology from perspectives including international opinion response [18], online dialogue communication and discourse order construction [19], mainstream media discourse strategies [20], and value guidance and identity construction, aiming to build a healthy online public opinion ecology.

While scholars from various fields have conducted in-depth discussions on pandemic-related online public opinion and reached consensus on some universal patterns, most studies examine partial characteristics from their respective disciplinary perspectives, lacking comprehensive research on online public opinion evolution patterns and governance strategies from an interdisciplinary fusion perspective. In the information age, constructing an all-around, three-dimensional intelligence perception data source system is the foundation for government departments to achieve normalized public opinion monitoring. Using discourse communication techniques to emphasize certain emotions to motivate the public and using emotional resonance to stimulate value identification are important means for effectively governing online public opinion. Therefore, this study, grounded in the theoretical foundation of cyberspace ideological security and drawing on scientific research methods from communication studies and management, visually demonstrates the role of government new media discourse guidance strategies in alleviating online public opinion pressure, calming netizen emotions, and shifting focus, providing methodological references for enhancing government credibility and mainstream ideological leadership through propaganda discourse techniques, and offering new perspectives for comprehensive cyberspace public opinion ecology governance.

2 Research Approach and Methods

2.1 Research Approach

Weibo is currently the most important and active public opinion arena for social exchange. How mainstream media leads public opinion and enhances influence on this platform is crucial for maintaining the Party and state's image and social stability. Analyzing netizen readership, discussion volume, and comment content related to specific opinion events can effectively reveal how mainstream

media guidance influences netizen attention and opinion tendencies. Some scholars have used Bayesian networks for empirical research, finding that when media attention is adjusted to "high level," the probability of opinion evolving to a higher level increases from 46.8% to 67.8%, confirming the high correlation between media attention and online opinion formation and transformation [7]. Zhiwei Data possesses massive data covering all internet information platforms, and its product "Zhiwei Shijian" can effectively present current hotspot events based on big data technology, annotating events through an established public opinion influence evaluation system [21]. Using "COVID-19" as a keyword and leveraging the Zhiwei Shijian platform's ranking of related events, this study identified five event groups with the highest social impact between December 20, 2019, and June 20, 2020, as shown in Table 1 . Since this study focuses on the impact of domestic primary epidemic events on netizen focus and public emotion, two events with high influence indices—"#Multiple places including Beijing and Shenzhen report imported cases#" and "#COVID-19 outbreak in multiple South Korean locations#"—were excluded.

After identifying the five event groups, distributed crawler technology was used to crawl Weibo posts and popular comments related to these events from three major government new media outlets: People's Daily, Xinhua Viewpoint, and Guangming Net. Corresponding event data experimental corpora were constructed, and semantic and sentiment analysis of user comment texts was conducted using SnowNLP and TF-IDF methods to intuitively reflect emotional fluctuations among netizens during typical events, thereby revealing user acceptance and identification with related mainstream media reports under emotional experience.

2.2 Research Methods

SnowNLP is a Python library for Chinese natural language processing based on TextBlob. It can perform sentiment analysis on Chinese texts according to its processing functions, offering simple operation and easy implementation, but with relatively low accuracy. It can only provide overall sentiment scores for comments and cannot reflect the importance of sentiment words within comments, resulting in low discrimination accuracy for comments with unclear sentiment tendencies.

TF-IDF is a commonly used text feature weight representation method that primarily evaluates the importance of a feature word in a document within a dataset or corpus [23]. The core idea is that if a specific word or phrase appears frequently in a document (high TF) but rarely in other documents, the word has strong document attribute discrimination capability and is suitable for document classification. The TF-IDF calculation formula is shown in (1):

$$\omega_i(d) = \frac{(tf_i(d))^2 \times \log_2\left(\frac{N}{n_i} + 0.01\right)}{tf_i(d)\log\left(\frac{N}{n} + 0.01\right)}$$

In formula (1), TF represents term frequency, t is the frequency of document d, N represents the total number of documents, n represents the number of documents containing term t, and n_i is the number of documents including t_i.

As research progressed, scholars discovered that conclusions drawn using the TF-IDF formula were sometimes inaccurate. Assuming term t appears m times in a certain class of documents C and q times in other documents, with $n = m+q$ representing all documents containing t, when m is large, n is also large, and the IDF value obtained from the formula becomes smaller, indicating that term t has weak document class discrimination ability—a conclusion that contradicts reality [24]. Some studies point out that when term t frequently appears in a certain class of documents, it indicates that the word can well represent the characteristics of that class. The calculation should not only consider relationships between documents but also relationships between terms and classification, and the weight of such terms in the calculation process should be increased. Therefore, TF-IDF was improved by uniformly processing term weights and controlling adjustment weights within [0,1]. The improved formula is TF-IDF = TF × IDF × $\frac{M}{n_i}$. The calculation formula is as follows:

$$W_i(d) = \frac{tf_i(d) \times \log\left(\frac{N}{n_i} + 0.01\right) \times \frac{M}{n_i}}{(tf_i(d))^2 \times \log_2\left(\frac{N}{n_i} + 0.01\right)}$$

In formula (2), M represents the number of documents using t_i for sorting.

3 Experimental Process and Analysis

3.1 Data Collection

3.1.1 Raw Data Using the Scrapy open-source framework developed in Python and introducing the Redis open-source framework to implement multi-machine distributed crawling [27], this study directly crawled related user statements and comment data under blog posts (positive emotion texts such as “safe New Year,” “do a good job in prevention and control,” “trust the country,” “salute to angels in white,” and negative emotion texts such as “I’m not going to Wuhan anymore,” “scary,” “would you say it’s uncontrollable when it’s out of control”) and stored them as excel files with one comment per line. The study obtained a total of 44,633 related Weibo comments on the five events with highest social impact, as shown in Table 2 .

Since the event “#Wuhan and other places outbreak of novel coronavirus#” had the highest influence index and the most user data collected (15,230 comments), this study focuses on analyzing this event, with the remaining four events serving as sample training set data.

3.1.2 Data Cleaning Data obtained from Weibo often contains large amounts of webpage tag information, special symbols, emojis, images, and

videos, requiring text data cleaning, Chinese word segmentation, stop-word filtering, and part-of-speech tagging. Comments with contradictory or unclear emotional expressions were removed, as were repeated posts and spam posts [28]. The processed data were then stored as txt files, with each line corresponding to one comment, creating a corpus for short-text sentiment analysis.

3.2 Data Analysis

3.2.1 Preliminary SnowNLP Analysis Since the SnowNLP model cannot analyze long sentences, they need to be broken into short phrases such as "very good," "Wuhan jiayou," and "future is promising." Text sentiment training and prediction are based on the Bayesian principle of "document-topic-word." As SnowNLP's built-in corpus contains limited and lagging comment categories, direct application would affect sentiment prediction accuracy. Therefore, this study invited professionals to classify the polarity of basic words in the corpus, extracting words with clear sentiment tendencies as seed sentiment words. Using jieba's load_{userdict} function to obtain synonyms and near-synonyms of each sentiment word in the seed set, the existing word segmentation corpus was optimized to enhance segmentation accuracy [29]. Subsequently, prepared standard positive and negative samples (i.e., positive emotion samples, negative emotion samples, and neutral samples) were saved separately. Using these sample models, processed short texts were sentiment-trained in SnowNLP according to the sample models to achieve the most suitable algorithm model for the sample text library, with the new algorithm model saved in the sentiment folder.

The processed sample text library was input into the trained model, and the Bayesian model was used to predict the P value. The calculation formula is as follows:

$$P(c_1|w_1,\dots,w_n) = \frac{P(w_1,\dots,w_n|c_1)\cdot P(c_1)}{P(w_1,\dots,w_n|c_1)\cdot P(c_1) + P(w_1,\dots,w_n|c_2)\cdot P(c_2)}$$

This expression can be simplified to:

$$P(c_1|w_1,\dots,w_n) = \frac{1}{1+\exp[\log(P(w_1,\dots,w_n|c_2)\cdot P(c_2)) - \log(P(w_1,\dots,w_n|c_1)\cdot P(c_1))]}$$

P represents the calculated sentiment threshold for a text. The sentiment was divided into 66 segments in the [0,1] interval. When $P \in [0, 0.33)$, the text shows negative tendency; when $P \in [0.33, 0.66)$, the text shows neutral tendency; and when $P \in [0.66, 1]$, the text shows positive emotion [30]. Here, random event c_1 represents the positive/negative probability of sample sentiment class, and w_n represents the probability of a certain feature word w appearing in the test

sample. When calculating the positive/negative sentiment of each sentence, the prior probability is multiplied by the conditional probability of each attribute feature word to obtain the sentiment probability value, with the larger positive/negative sentiment value taken as the sentence's sentiment tendency.

3.2.2 TF-IDF Algorithm Calibration Results After using the SnowNLP model to determine the basic sentiment scores of sentiment words in each comment text, the improved TF-IDF algorithm was applied to assign certain sentiment weight scores to each sentiment word according to its importance in the comment text. The sentiment scores of sentiment words and entire comment texts were calculated, and sentiment change graphs were drawn using matplotlib according to dates and related themes to more clearly reflect netizen emotional changes after events. The "#Wuhan and other places outbreak of novel coronavirus#" event was selected for display, as shown in Figure 1 [Figure 1: see original paper].

3.2.3 Analysis and Discussion Based on the existing data, the sentiment analysis results using SnowNLP and TF-IDF algorithms can clearly outline the relationship between mainstream media public opinion guidance and netizen emotional fluctuations in the "#Wuhan and other places outbreak of novel coronavirus#" event:

Phase 1: Before January 19, 2020, as COVID-19 began to outbreak on a large scale, the three major government new media outlets' Weibo news reports on the novel coronavirus increased daily. However, since most released information consisted of case data reports, virus origin analysis, virus gene sequences, and related treatment protocols without obvious subjective guidance intent, the public showed no significant difference in attitudes toward COVID-19 during this stage.

Phase 2: From January 20-21, 2020, Zhong Nanshan's explicit statement that the novel coronavirus had "human-to-human transmission" became a turning point in public and media attitudes toward the epidemic, with attention surging dramatically. For example, Xinhua Net's "#Wuhan establishes epidemic prevention and control headquarters#" received over 12 million views, and audience attention to epidemic information and emotional expression reached its first peak. The state also adopted a series of positive measures including relevant medical policies and accelerated scientific research. Mainstream reports focused on promoting the government's active anti-epidemic measures with obvious guidance tendencies, and positive public emotions remained mainstream.

Phase 3: From January 22-23, 2020, as the epidemic broke out in provinces and cities nationwide and Wuhan was locked down, overwhelming information flooded cyberspace. False information and online rumors such as "novel coronavirus is artificially synthesized," "novel coronavirus fears alcohol, so people should drink more white liquor," and "multiple layers of masks are needed to prevent the virus" spread rampantly, creating an "infodemic" that disrupted public

perception. The intensity of onlooker attention and public pressure impacted online order, and public emotions gradually shifted to negative dominance amid panic and complaints, with sentiment attitude scores showing an upward trend.

Phase 4: From January 24-26, 2020, on New Year's Eve (January 24), epidemic information attention was diverted by the Spring Festival, reducing COVID-19 information attention. On Spring Festival day (January 25), the Political Bureau of the CPC Central Committee Standing Committee held a meeting with Xi Jinping presiding and delivering an important speech, inspiring national determination and confidence to fight the epidemic. Epidemic attention began to rebound with positive public emotions dominating. For example, the topic "#Epidemic concerns people's hearts, safety depends on human effort#" attracted over 10 million views that day. On January 26, Premier Li Keqiang chaired a meeting of the Central Leading Group for COVID-19 Response, with the state introducing a series of extraordinary measures and major decisions to address the epidemic, once again drawing high netizen attention and reaching a climax. People's Daily, Xinhua Viewpoint, and other government new media actively set agendas, with mainstream reports such as "Race against time! #Wuhan Huoshenshan Hospital's first ward completed#" and "Win this epidemic prevention battle with the national system!" strongly occupying headlines across platforms, setting the overall tone of public opinion. Except for the negative impact caused by the January 31 event "Shanghai Institute of Materia Medica and Wuhan Institute of Virology jointly discover that Shuanghuanglian oral liquid can inhibit novel coronavirus," public emotions were generally positive.

4 Research Conclusions and Recommendations

4.1 Research Conclusions

The discourse guidance strategy of government new media Weibo reporting is a public opinion guidance matrix centered on government new media with participation from other communication entities. Throughout the entire process of netizen emotions and online public opinion evolution across the five social events, netizen attention (public opinion evolution) and government discourse guidance showed periodic synchronization with a two-way interactive relationship. On one hand, epidemic events causing netizen emotional fluctuations promote government information disclosure and optimization of public opinion guidance strategies. On the other hand, information disclosure and strategy optimization can further eliminate public panic from lack of information and unfounded speculation, curbing the growth of rumors and negative emotions. Through content analysis of government new media network reports after each sudden epidemic event, we found that each government new media responded to related matters based on extensive intelligence facts within the first moment of each event and tracked hotspot events to release exclusive information. After clarifying facts, they published motivational videos, images, etc., to alleviate adverse effects on public emotions caused by emergencies, fully playing the role

of "trust intermediary." In essence, they reshaped public trust and committed to maintaining and building a "trustworthy government" image. Analysis of epidemic information data from mainstream government new media reveals the following characteristics of their online public opinion (netizen emotion) guidance:

4.1.1 Government New Media Holds Information Dissemination Advantages and Easily Becomes Opinion Leaders

The authenticity of mainstream media information reporting and positive emotion guidance is a significant feature in emergency online public opinion dissemination. Government new media, leveraging their unique political resources and information advantages, on one hand collaborate with regulatory departments to obtain real-time intelligence, assess public opinion situations, and determine phased information reporting themes [17]; on the other hand, they continuously seek resource integration with internet media platforms to obtain comprehensive support for mainstream reporting information and expand mainstream media attention and influence [32]. Except for a few Weibo users with significant influence, the public and other media mostly play the role of disseminators in public opinion information transmission, while mainstream media, as information distribution platforms, social mobilization platforms, and public opinion guidance platforms, hold absolute advantages and become opinion leaders. They release authoritative information and provide effective suggestions, playing important roles in resolving public crises. For example, the "Snowstorm Epidemic Fighter" series (130 million reads, 11,000 comments), " 'Hand' Guards the People" (373,000 cumulative plays), and "National Action Epidemic Illustrated Handbook" (85.31 million reads, 7,237 discussions) attracted widespread public attention, bridging trust rifts between officials and citizens, prompting consensus between mainstream media and public opinion fields, attracting more information dissemination entities to promote official topics, and enhancing the topic heat of official information and mainstream reporting to help more of the public understand the truth, trust the government, and strengthen confidence.

4.1.2 Proactive Government Transparency Responds to False Information to Achieve Value Guidance

People's Daily and other government new media rely on official information sources to proactively disclose various data and information on major epidemic issues, filling information gaps. On January 21 alone, they released 25 pieces of epidemic-related information, achieving "daily routine reports and weekly special reports." They used data-based, visual methods to clearly, comprehensively, and thoroughly explain epidemic knowledge and prevention measures, striving to be "first definers." Since January 31, they have fully utilized 5G, AI, and other new technologies to continuously broadcast special programs such as "Fighting the Epidemic" and "Joint Epidemic Fight," inviting frontline medical staff and experts into the studio to answer public questions and using patients' personal treatment and recovery documentaries to reduce public fear of the novel coronavirus, with cumulative views exceeding 10 billion. Through comment text analysis of the "#Beijing discovers novel coronavirus infection

pneumonia cases#" event, "Fighting the Epidemic" episode "Wuhan Jinyintan Hospital 20 COVID-19 patients discharged collectively" (January 31) triggered heated online discussion. After declining on January 26, sentiment values continued to climb, approaching 600, strengthening public confidence in defeating the epidemic and enabling the public to shift emotionally from anxiety to resilience.

4.1.3 Tracking and Reporting Social Hotspots to Lead Public Attention

On one hand, People's Daily and other government new media, in collaboration with telecommunications departments and other self-media platforms, constantly monitor the implementation of epidemic prevention and control measures, comprehensively using graphics, videos, AR, livestreaming, and other presentation methods to form a full media reporting matrix. Through netizen emotion analysis of the "#Wuhan builds hospital in 'Xiaotangshan model'#" event, since January 23, Xinhua Net, CCTV.com, and other media have livestreamed the construction of Wuhan Huoshenshan and Leishenshan hospitals in 24-hour high definition, metaphorically presenting the institutional superiority of concentrating resources to accomplish major tasks. The hospital construction became a hot topic for some time, playing a positive role in releasing public pressure and strengthening victory beliefs. On the other hand, they tracked the latest epidemic developments in real-time, occupying the forefront of public opinion and disseminating anti-epidemic positive energy. On March 10, when 21 provinces and cities nationwide downgraded emergency response levels and epidemic prevention achieved phased victory, Xinhua Net launched the micro-documentary "Spring Comes to Wuhan City." On March 15, it released "#Xi Jinping replies to encourage 90s party members of Peking University medical team aiding Hubei#." Both reports triggered heated online discussion again, with citizens' positive emotions continuing to rise until the "#National support medical team for Hubei begins evacuation on 17th#" event, reaching the emotional peak in March with sentiment scores as high as approximately 2,300, several times higher than negative emotions.

4.2 Countermeasures and Recommendations

Represented by People's Daily, government new media leveraged their information advantages during the pandemic to effectively alleviate netizen emotional fluctuations caused by emergencies through discourse strategies such as authentic information reporting and positive emotion guidance. Future management departments should learn from this pandemic's government new media discourse guidance strategies to improve emergency response mechanisms for online public opinion in sudden incidents.

4.2.1 Strengthen Technical Support to Improve Information Response Capacity

The speed, scope, diversity, multi-domain nature, and richness of online public opinion dissemination in emergencies are testing governments' emergency intelligence perception and response capabilities. A major reason for negative

online public opinion in the early stages of emergencies is insufficient official information supply that cannot meet public information needs, triggering public questioning of the government and psychological panic. Therefore, mainstream media's response time becomes crucial after emergencies occur. To ensure reliable information can be released within the first moment, it is necessary to continuously optimize information intelligence acquisition technology, improve an all-around, three-dimensional intelligence perception data source system, enhance the "speed" of online public opinion intelligence information collection, and guarantee the timeliness of information disclosure. Specifically, opportunities should be seized through smart government construction to break information barriers, build a government big data infrastructure platform, and ensure smooth data source channels. Using intelligence perception, construct normalized online public opinion monitoring, early warning, coordination, and emergency response systems to maintain cyberspace information dissemination order, block the spread of false information, erroneous information, and foreign force information, thereby continuously improving government departments' response capacity to online hotspot information.

4.2.2 Enhance Mainstream Media Social Trust and Seize Discourse Power in Information Reporting

According to the primacy effect, when different evaluations and various information about the same person or thing are mixed together, people always tend to accept the earlier information—a psychological tendency in first impression formation [33]. Therefore, official media should leverage their platform and dissemination advantages to actively voice, respond to concerns, report positively, and guide emotions within the first moment, eliminating public panic and questioning from lack of information, preventing further rumor diffusion and negative emotion spread, and pulling discussion topics back on track. Relevant information disclosure in news reporting should be comprehensive, objective, and factual, without avoiding important issues or concealing information, and should objectively and impartially convey real event situations to the public to gain public trust in mainstream media. Simultaneously, mainstream media reporting should continuously innovate in content production, extracting "down-to-earth" information from online public opinion to produce "weapons" for guidance [34]. They should break away from the original grand narrative framework, fully consider audience acceptance habits and interest preferences, achieve a transformation from the current solemn and serious stylized reporting to a civilian narrative perspective, and use intelligent algorithm recommendation systems to employ emotional elements as connection points, guiding with discourse methods that netizens "can understand, remember, and are willing to listen to," thereby enhancing the appeal of mainstream discourse and enabling audiences to generate emotional resonance, thus seizing discourse power in emergency reporting.

4.2.3 Promote "Government + Media" Cooperation to Enhance Collaborative Response to Online Public Opinion

The 19th CPC National Congress report pointed out that we should "strengthen

internet content construction, establish a comprehensive internet governance system, and create a clear cyberspace" [35]. In the social media era, when public health emergencies occur, various public opinion ecosystems such as rumor public opinion, questioning public opinion, and help-seeking public opinion easily form in online media. The government role is no longer an omnipotent controller; it must effectively cooperate with other information dissemination entities to achieve transformation from management organization to co-constructing positive dialogue network ecology. In this emergency response, the cooperation between mainstream media and other information dissemination entities such as online influencers, opinion leaders, and local media effectively expanded the dissemination scope and attention heat of positive information, widely disseminating some official information throughout society within the first moment, prompting consensus between officials and citizens, promoting iterative updates of communication themes, and effectively maintaining cyberspace order and netizen emotional stability. Therefore, mainstream media should strengthen cooperation with relevant stakeholders including self-media platforms, opinion leaders, netizens, and internet enterprises in the future, achieve organic integration of government issues, media reporting, and public opinion, establish an online public opinion balance and hedging mechanism, provide traffic support for positive reporting information such as expert voices, anti-epidemic hero deeds, and major national actions, actively disseminate positive energy, master public opinion dominance, thereby continuously enhancing the information influence of mainstream ideology and guiding online public opinion in directions conducive to event handling, providing theoretical support for modernizing the cyberspace governance system and capabilities.

References

[1] Central Committee of the Communist Party of China Publicity Department. Reader of General Secretary Xi Jinping's Important Speeches [M]. Beijing: Learning Press, 2016: 204.
[2] Li Junqing, Zhang Zeyi. Representation, Security Risks, and Prevention of China's Ideology under the Internet Background [J]. Leading Journal of Ideological & Theoretical Education, 2016(10): 85-89.
[3] Freud, Xu Yang. On Civilization [M]. Beijing: International Culture Publishing Corporation, 2000.
[4] Peng Jian. Political Communication Discourse: Concept Definition and Innovative Expression [J]. Editing Friends, 2021(1): 66-69, 80.
[5] Jiang Mingmin. Governance Strategies for Online Public Opinion in Public Emergencies from an Emotional Perspective [J]. Jiangxi Social Sciences, 2020(12): 190-198.
[6] Xing Pengfei, Li Xinxin. Research on Formation Mechanism and Guidance Strategies of Online Public Opinion in Major Epidemic Prevention and Control—Qualitative Analysis of Online Public Opinion Texts During COVID-19 [J]. Journal of Intelligence, 2020(7): 67-74, 158.
[7] Liu Ji, Wu Mengjiao. Analysis of Online Public Opinion Situation Assess-

ment Based on Bayesian Network—Taking "COVID-19 Epidemic" Event as an Example [J]. Journal of Intelligence, 2021(3): 187-192, 103.
[8] Du Yixian, Xu Jiapeng, Zhong Linying, et al. Multi-dimensional Feature Analysis and Visualization of Online Public Opinion Situation and Sentiment—Taking COVID-19 Epidemic as an Example [J]. Journal of Geo-information Science, 2021(2): 318-330.
[9] Cui Jindong, Chen Siyuan, Li Chenyu. Empirical Research on Multi-type Online Rumor Quelling Methods Based on Big Data—Taking "Rumors During COVID-19" as an Example [J]. Information Studies: Theory & Application, 2021(2): 1-15.
[10] Wang Xinyue, Liu Chang. Research on Influencing Factors of Public Information Seeking Behavior in Major Public Health Emergencies [J]. Library and Information Service, 2020, 64(21): 77-89.
[11] Zeng Xiangmin, Zhang Zixuan. Field Reconstruction and Mainstream Reshaping: User Media Information Contact, Cognition, and Dissemination in Epidemic [J]. Modern Communication (Journal of Communication University of China), 2020(5): 65-74, 83.
[12] Zhuang Muni, Li Yong, Tan Xu, et al. Online Public Opinion Evolution Simulation of COVID-19 Based on BERT-LDA Model [J]. Journal of System Simulation, 2021(1): 24-36.
[13] Hu Feng. Research on Evolution Mechanism and Cross-border Governance of Major Epidemic Network Public Opinion—Based on "Four Points and Four Stages" Evolution Model [J]. Information Studies: Theory & Application, 2020(6): 23-29, 55.
[14] Zhang Xin, Tian Xuecan, Liu Xinya. Research on Online Public Opinion Risk Assessment Index System from Recurrent Perspective [J]. Library and Information, 2020(6): 123-135.
[15] Liu Xiaojuan, Wang Chenlin. Research on Information Disclosure and Public Opinion Evolution Based on Government Weibo—Taking COVID-19 Case Information as an Example [J]. Information Studies: Theory & Application, 2021(2): 57-63.
[16] Qi Kai, Wei Xiaoyu, Zheng Rui. Dynamic Evolution Analysis of Government Short Video Online Public Opinion Based on System Dynamics Model [J]. Information Studies: Theory & Application, 2021(3): 115-121, 128.
[17] Cao Shujin, Yue Wenyu. Topic Mining and Evolution Analysis of Public Health Emergency Weibo Public Opinion [J]. Journal of Information Resources Management, 2020(6): 28-37.
[18] Liu Jian, Feng Hongjiao, Yao Lulu. International Online Public Opinion Analysis and Response Under Public Health Emergencies—Taking COVID-19 as an Example [J]. Media, 2020(16): 91-93.
[19] Zhu Jiaxin, Li Yunfeng. Discourse Disorder and Its Governance in Emergency Online Public Opinion [J]. Theory Guide, 2020(7): 112-118.
[20] Zhang Wei. Research on Discourse of Government New Media Public Opinion Response in Public Health Emergencies—Taking COVID-19 as an Example [J]. Jianghai Academic Journal, 2020(2): 12-17.
[21] Xie Wenshi. Sociopathological Research on Online Rumors—Analysis

of 235 Rumors Based on "Zhiwei Shijian" in 2018 [J]. New Media Research, 2019(19): 5-9, 13.
[22] Zhiwei Shijian [EB/OL]. [2021-03-07]. https://ef.zhiweidata.com/.
[23] Zhao Ruijie, Shi Yong, Zhang Han, et al. Webshell File Detection Based on TF-IDF [J]. Computer Science, 2020(S2): 363-367.
[24] Zhang Yufang, Peng Shiming, Lü Jia. Improvement and Application of TF-IDF Method Based on Text Classification [J]. Computer Engineering, 2006(19): 76-78.
[25] KUANG Q, XU X. Improvement and Application of TFIDF Method Based on Text Classification [C]//International Conference on Internet Technology and Applications. Wuhan: IEEE, 2010.
[26] Gao Xiang, Zhao Jingsheng, Song Mengxue. Short Text Comment Sentiment Analysis Based on Fusion Algorithm [J]. Information Technology and Informatization, 2019(11): 180-184.
[27] Bai He, Tang Dibin, Wang Jinlin. Research and Implementation of Distributed Multi-theme Web Crawler System [J]. Computer Engineering, 2009(19): 13-16, 19.
[28] Ding Xiaoyang, Wang Lancheng. Research on Optimization Method of Feature Word Weight Calculation in Online Forum Texts [J]. Information Studies: Theory & Application, 2021(5): 187-192.
[29] Chen Xingshu, Chang Tianyou, Wang Haizhou, et al. "COVID-19" Sentiment Analysis and Spatiotemporal Analysis of Public Opinion Evolution Based on Weibo Data [J]. Journal of Sichuan University (Natural Science Edition), 2020(2): 409-416.
[30] Zhou Huan, Ma Haonan, Liu Jia. Film and Television Recommendation Algorithm Integrating Sentiment Analysis and Probabilistic Language [J]. Information Studies: Theory & Application, 2020(6): 180-186.
[31] Zhao Xueqin, Cai Quan, Wang Qingqing. Research and Reflection on Network Public Opinion Communication Mechanism of Major Public Health Emergencies—Taking COVID-19 as an Example [J]. Shanxi Library Journal, 2020(6): 1-8, 34.
[32] Zhang Zhian, Peng Lu. Mixed Emotion Communication Mode: Research on Short Video Content Production of Mainstream Media—Taking People's Daily TikTok Account as an Example [J]. News and Writing, 2019(7): 57-62.
[33] Liu Xiaoguang, Yang Naiding. Research on Primacy Effect in Emergency Decision-making [J]. China Safety Science Journal, 2013(11): 170-176.
[34] Zhao Xue. Analysis of Online Ideological Public Opinion Guidance Mechanism in the New Era [J]. Journal of Northeast Normal University (Philosophy and Social Sciences Edition), 2021(2): 97-102.
[35] Xi Jinping. Secure a Decisive Victory in Building a Moderately Prosperous Society in All Respects and Strive for the Great Success of Socialism with Chinese Characteristics for a New Era—Report at the 19th National Congress of the Communist Party of China [M]. Beijing: People's Publishing House, 2017: 8.

Author Contributions:

Zhang Dong: Conceptualized the topic, designed the outline, and revised the paper;
Wei Junbin: Collected and analyzed data, wrote and revised the paper.

Abstract: [Purpose/significance] Using COVID-19 online public opinion data to study the relationship between netizen attention, mood swings, and mainstream media discourse guidance can provide a new perspective for online public opinion governance and media publicity in emergencies. [Method/process] Using "knowing the little things and seeing" to determine five groups of events with the highest social impact of domestic epidemic in the first half of 2020, the Scrapy-Redis crawler framework based on Python language, the SnowNLP sentiment analysis model, and the TF-IDF algorithm were used to sentiment analyze more than 40,000 popular user comments reported by the three major government new media of People's Daily, Xinhua Viewpoint, and Guangming Net after the occurrence of these five groups of events, and sentiment statistics and visualization were performed according to dates and related topics. [Result/conclusion] The analysis shows that mainstream media reports play a positive role in alleviating netizen emotions. By using discourse guidance strategies such as playing the leading role of opinion leaders, actively responding to false information, and tracking and reporting social hotspots, mainstream media can effectively calm netizen panic and dissatisfaction and guide the focus of public information attention back to rationality. Government departments should build a systematic and comprehensive digital governance pattern for public emergencies by improving the information response ability of mainstream media, seizing the discourse power of information reports, and enhancing the collaborative response ability of online public opinion, and accelerate the construction of a public opinion guidance mechanism with correct orientation.

Keywords: COVID-19; media information; emotional changes; network public opinion management; discourse guidance

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