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The Role and Influence of Social Media in Crisis Communication: An Analysis with Twitter as An Example

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Abstract: Nowadays, social media has become an indispensable part of information dissemination, and its role and influence are constantly shaping the information ecology of today's society. At the same time, the attention of crisis events on social media continues to increase, which is of great significance for crisis management and response. This paper aims to take Twitter as an example to explore the role and influence of social media in crisis communication, and to analyze its role in instant transmission, information transmission speed, public opinion guidance, public relations channels and emotional connection in crisis events through literature review and case analysis. This paper aims to reveal the function mode, communication effect and coping strategy of social media in crisis communication and provide theoretical support and practical reference for improving public crisis awareness and crisis coping ability. At the same time, this paper provides reference for establishing an effective crisis communication management mechanism, which is helpful to improve the public's cognition and understanding of crisis events.

Keywords: Twitter, crisis communication, social media, human emotion

1. Introduction

In today's era of social media, Twitter is playing an increasingly important role as one of the most influential social platforms. Especially in crisis communication, Twitter is not only a channel for information transmission, but also an important meeting point of public opinion, emotion and public opinion. Therefore, it is of great significance to study the role and influence of social media represented by Twitter in crisis communication for understanding and coping with crisis communication phenomenon.

This study will start from the attention of crisis events, select crisis events on Twitter, collect and analyze the data related to their attention, and observe their trends from the past to the present. Then, a comparative analysis of recent classic cases of Twitter is carried out to further explore the role of Twitter in non-official information dissemination, public opinion guidance and emotional expression in crisis events, and to analyze its influence and effect in crisis communication. In addition, this study will also select informal cases for discussion to further study the role of social media in this process. It is hoped that this study will not only expand the understanding of the role and influence of Twitter in crisis communication, but also provide theoretical and practical reference for the future application of social media in crisis communication.

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This study collected about 20,000 Twitter tweets containing keywords such as "novel coronavirus", "COVID-19", "virus detection", "vaccination", "free vaccine for all" and the following user comment data for keyword analysis and sentiment analysis. Before analyzing the extracted Twitter data, the study preprocessed the data to remove Twitter data involving personal privacy, sensitive information, violent or hateful content, commercial advertisements, symbols that could not be analyzed, and completely irrelevant content. In the end, a total of 18,145 tweets were used as target data for analysis.

2. Literature Review and Research Questions

2.1. Sources of Crisis Information

The channels through which people get crisis information are diversified. Jin Xianlin's research maps the online information flow of crisis communication during hurricane lda [1]. The findings show that news media is still the primary source of information for social media users. Social media and news media tend to exchange crisis information, which enables social media to quickly, timely, and even real-time access to the latest crisis information, and at the same time publish the information in the user's vision. This means that Internet users no longer rely only on newspapers, TV and other traditional ways to get news, they may only need to turn on their mobile phones and click on their social media anytime and anywhere to get the freshest crisis news.

On this basis, this study will explore the more far-reaching impact of social media in the communication of crisis events and the role of information transmission among users.

2.2. Emotional Transmission

A large number of tweets on social media contain the emotions and attitudes of the people who post them. Arnd Florack et al. studied more than 3,000 tweets written by politicians and suggested that the emotional content of messages on social media (Twitter) is the driving force of social communication in the online world [2]. In more detail, tweets that intended to evoke an emotion with high arousal were retweeted more often than tweets intended to evoke an emotion with low arousal. In addition, tweets that contain positive emotions are more likely to be retweeted than tweets that evoke negative emotions.

On this basis, this paper will study whether the characteristics of information and emotional transmission are applicable to other fields, such as the crisis topic we pay attention to. And this study will broaden the emotional analysis of crisis events to find their unique emotional transmission patterns.

3. Case Analysis

3.1. Earthquake Quick Report

Taking the number of likes and views of disaster warning posts published by the Twitter account "Earthquake Quick Report" as an example, this study compared the data of tweets published by the account in four periods, respectively selecting three events of the same type in each period, that is, real-time earthquake disaster broadcast events, to observe the "heat" of these Twitter events in the four periods (Figure 1 and Figure 2).

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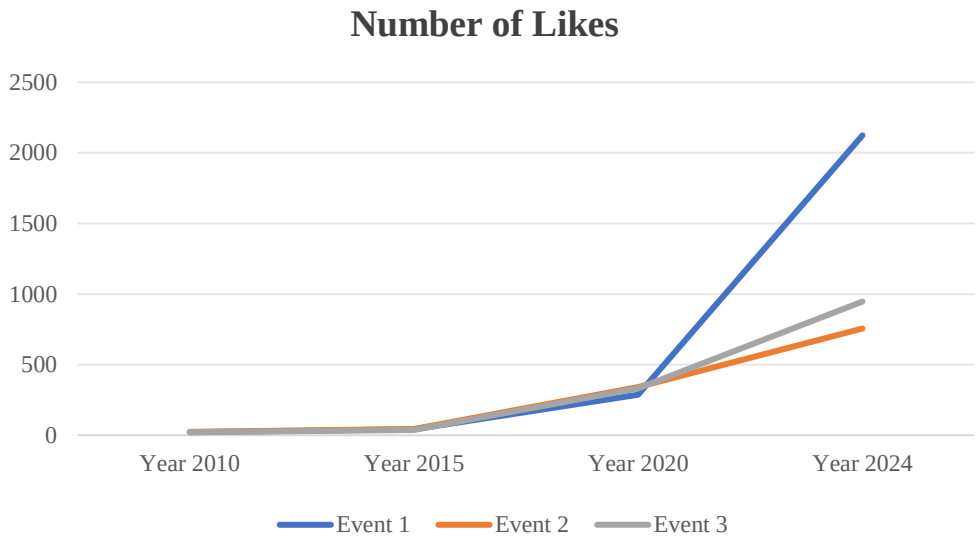

Figure 1: Number of likes of disaster warning posts issued by the Twitter account "Earthquake Fast Report".

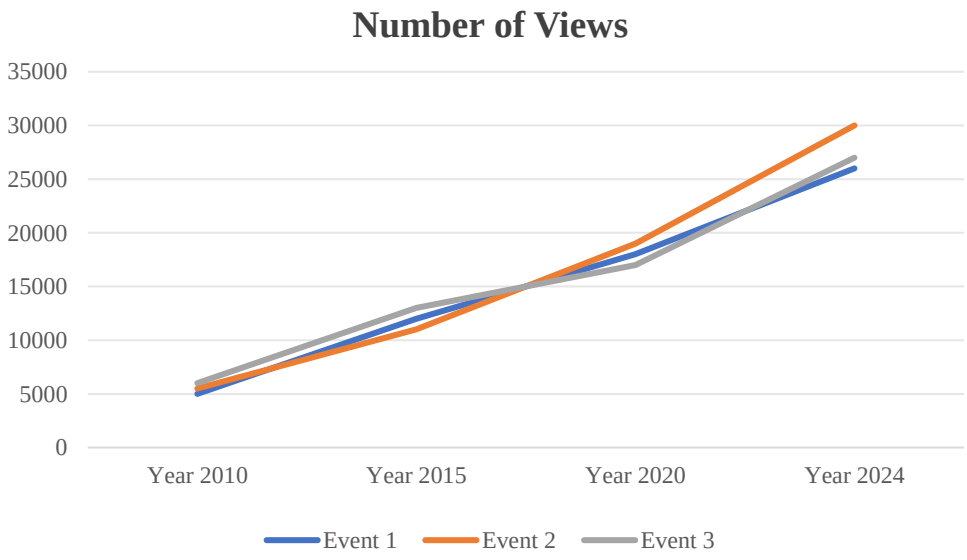

Figure 2: Number of views of disaster warning posts issued by Twitter account "Earthquake Fast Report".

The data shows that according to the four periods in chronological order, the number of likes and views of earthquake disaster events tweets has a large increment, and it has increased year by year. It can be seen that taking earthquake disaster as an example, the heat of crisis events has increased rapidly with the development of social media, especially the attention on Twitter has increased significantly. This provides background support for this study, and on this basis, further research on crisis communication. At the same time, the increasing attention of the public to crisis events ensures and broadens the coverage and universality of this study.

In this context, the social platform Twitter, as a carrier, plays an increasingly important role in crisis events, which has a huge impact on the dissemination and formation of public opinion. However,

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the research on the specific role and influence mechanism of Twitter in crisis communication is still relatively limited, which needs to be further discussed and analyzed. This study will further study and discuss the role and influence of Twitter in crisis communication, providing theoretical support and practical guidance for a detailed understanding of the crisis communication process and the formulation of corresponding strategies.

3.2. Hurricane Katrina in New Orleans, USA

New Orleans Hurricane Katrina was a major natural disaster in the southern United States in August 2005. Hurricane Katrina, the twelfth tropical storm of the North Atlantic hurricane season that year, formed on August 23,2005, and made landfall on August 29. According to Table 1, Hurricane Katrina caused serious damage and disaster in and around New Orleans. Before that, social media such as Twitter have not yet appeared (Twitter was founded in 2006).

Table 1: The number of people affected during Hurricane Katrina.

Type of suffering	**Quantity**
Casualties	Over 1800
Missing population	Over 1000
Personnel injured	Enormous
Shelter placement personnel	Enormous

During this period, there are some negative situations in crisis communication: information lag, due to the lack of instant social media platforms, the transmission of information between the public and disaster relief workers is limited, resulting in delayed information dissemination, and the efficiency of emergency rescue operations is affected; The spread of rumors, without the support of social media platforms, rumors and false information easily spread in traditional media and word of mouth, causing more confusion and panic and increasing the complexity of rescue work; Difficulties in resource coordination, traditional media and official channels are unable to effectively coordinate and integrate various resources to deal with the crisis, resulting in the misallocation and waste of emergency rescue resources.

This case shows that when social media is not mature enough, its lack of instant communication, information accuracy and coordination resources in crisis communication may have a negative impact on crisis management. It also highlights the importance of social media playing a positive role in crisis communication today, especially in providing real-time information, supporting emergency relief operations and dispelling rumours.

3.3. COVID-19

COVID-19, the coronavirus outbreak that began at the end of 2019, is a major challenge facing the world today. The outbreak began in Wuhan, China, and quickly spread around the world, resulting in millions of infections and hundreds of thousands of deaths.

The pandemic has had a huge impact on economies, societies and health systems around the world, killing hundreds of thousands of people and infecting millions more. Governments around the world

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have taken a series of strict prevention and control measures, including locking down cities, social distancing and wearing masks, to control the spread of the epidemic. In addition, social media such as Twitter has played an important role during the COVID-19 pandemic.

3.3.1. Data Collection and Analysis

This study collected 18,145 Twitter tweets containing keywords such as "novel coronavirus", "COVID-19", "virus detection", "vaccination", "free vaccine for all" and the following user comment data for keyword analysis and sentiment analysis.

The study removed emoticons, pictures, and ambiguous characters from all tweets and comments. In ambiguous text messages, the interaction between written text and emojis is complex, and they may exhibit different behaviors in response to positive and negative messages [3].

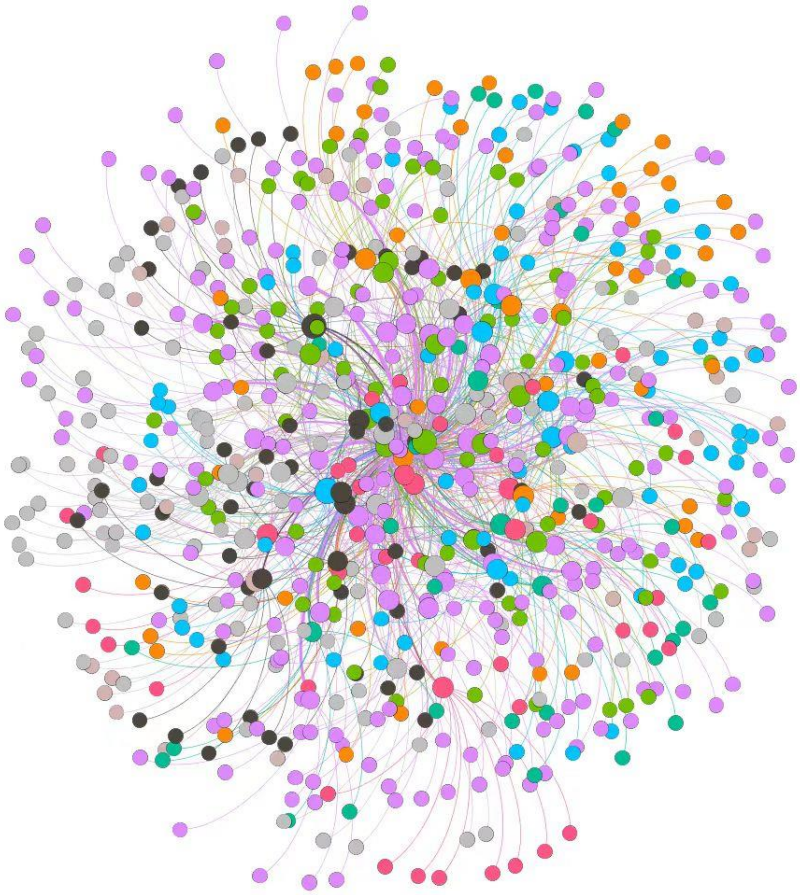

Figure 3: Gephi-based tweet comment network diagram.

In complex network, the analysis of network structure includes the calculation and analysis of node degree distribution, clustering coefficient, average shortest path length and other indicators, which can help to reveal the overall structure and characteristics of the network.

In the above network structure analysis chart, it can be seen that among the 18,145 pieces of COVID-19 related data collected by Twitter, there are quite a lot of closely connected edges among many nodes represented by several important nodes, that is, popular tweets or comments that may exist (Figure 3).

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This study finds that there are many ways and wide range of network information such as Twitter comments, which further shows the important influence of Twitter in the process of information transmission and can greatly promote the diffusion of information.

3.3.2. Sentiment Analysis

Prior to the analysis of the collected data, this study speculated on the results, expecting that emotional transmission would show a positive attitude. However, some previous studies have found negativity and bias in social communication [4]. There are also different studies that suggest that information with positive emotions is more likely to be shared [5].

However, these previous studies did not indicate the proportion of positive and negative emotions in the overall communication process, and the pattern of emotional communication in social media (Twitter) during the crisis event. Different from ordinary members of society, the emotion of social media users is the focus of this study. Although the previous research results have some reference value, this study will focus on the emotional analysis of Twitter users on this basis and explore the impact of social media on the communication of crisis events.

Based on TextBlob, this study performed sentiment analysis on 18,145 Twitter comments. In this process, first, after being sorted by an emotion classifier, TextBlob calculates an emotion score for each piece of text, usually in the range of -1 to 1, indicating the intensity and polarity of the emotion. Where -1 is extremely negative, 0 is neutral, and 1 is extremely positive.

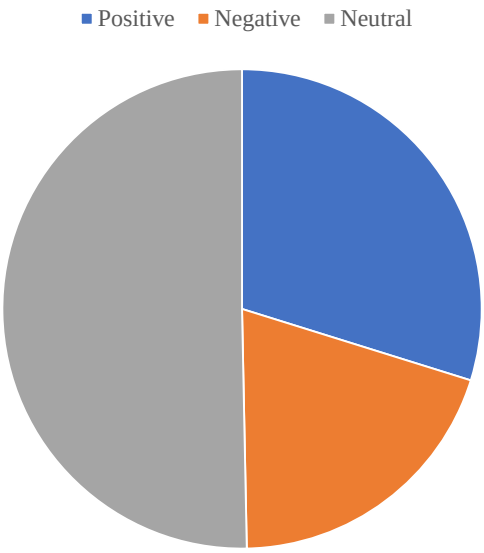

Figure 4: Sentiment analysis based on TextBlob.

According to statistics, 5,410 of the 18,145 tweets had an emotion score greater than 0 and less than or equal to 1, which was considered as positive emotions; 3,605 emotion scores less than 0 and greater than or equal to -1, considered negative negative emotions; The 9130-emotion score is 0, which is considered neutral emotion.

The data were slightly different from what was expected in this study (Figure 4). The proportion of neutral attitudes was surprisingly high, which was not expected in this study. The actual data showed that 29.8% of users showed a "positive" attitude, including actively promoting positive energy, supporting medical staff, complying with prevention and control measures, caring for vulnerable groups, rationally treating information, participating in social welfare and encouraging mutual assistance and cooperation. If we only focus on the "non-neutral attitude" part, the proportion

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of positive emotions reaches 60.0%, significantly higher than negative emotions. This positive attitude helps build social consensus, transmit positive energy, promote solidarity and cooperation, and jointly fight the epidemic.

4. Discussion

Based on the above analysis results, this study found that positive attitude can occupy a dominant position in emotional transmission when crisis events occur. This is certainly not by chance. In fact, "crisis events" are themselves negative and do not become a source of positive emotions.

There have been previous studies of COVID-19 news sharing behavior, but their efforts have focused on the spread of negative emotions and misinformation [6,7,8,9,10]. In contrast, only a few studies have explored how positive emotions such as hope, or optimism are shared during COVID-19 [11].

However, according to this study, in the process of emotional communication based on social media, especially Twitter, the positive attitude of users still trumps the negative attitude. This suggests that tweets about positive emotions such as optimism, happiness, and hope during a crisis event are more likely to be shared and generate more discussion and support from users than negative emotions. In other words, Twitter, as a famous social media, has led the spread of positive emotions in crisis communication, and has become a communication medium to guide people to face life positively and reduce crisis communication.

At the same time, the study acknowledges the influence of objective factors such as access to education, socio-economic and international context. For example, as societies become more prosperous, people's attitudes toward life become more positive. But this doesn't affect the results of this study, because social media is becoming an integral part of our lives. It can be said that social media is integrating into life, society and even the country, becoming one of the links between the international ties.

On March 12, 2024, Twitter user Daisy published a topic related to "mid-life crisis at age 35", which triggered exchanges and sharing among "users from all over the world". In a tweet, the author expressed his disapproval of the midlife crisis, believing that life begins at 35. As of March 21, 2024, the hashtag has reached 141,000 views. More importantly, Twitter users in many different countries have expressed their opinions here.

Figure 5: Tweets comment word cloud map.

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According to the statistics of this research, more than 65% of the users who commented on this topic expressed a positive attitude similar to "feeling positive energy under the encouragement of Daisy", and some users said, "really feel the meaning of life" (Figure 5). Arguably, social media, such as Twitter, succeeded in spreading positive emotion at a time when the idea of the 35-year-old midlife crisis was prevalent. In the context of the widespread dissemination of crisis events, Twitter plays a role as a communication medium, sharing the latest data, personal experience and emotional support, and ultimately guiding people to face life positively and reducing the spread of crisis.

5. Conclusion

Through targeted case analysis, data analysis and sentiment analysis, this study finds that with the prosperity of social media, Twitter exerts influence in the following aspects. First of all, Twitter promotes instant information dissemination and can quickly transmit the latest crisis information, help people understand the crisis background, the latest situation and protective measures, and improve the public's awareness and vigilance on the crisis. Second, Twitter provides a channel for users to interact and communicate. People can share their views, experiences and emotions, express support and care, and enhance social cohesion and the sense of cooperation in fighting the crisis together. In addition, in the crisis communication, people often feel anxious, panic and loneliness, through Twitter to share emotions, seek support and encourage each other, can relieve psychological pressure, establish emotional connection, enhance psychological resistance. In general, in the age of social media, Twitter has played a positive role in helping to mitigate the spread of crises.

Finally, this study has not covered the possible negative effects of social media, such as rumor spreading and information distortion. This misinformation can mislead the public, cause panic, and even result in an ineffective response to the crisis. In addition, in the process of communication, the original information may be falsified, interpreted by error, or exaggerated, resulting in distortion of information. These negative effects could disrupt public understanding and judgment about crisis events and let them underestimate or overestimate the severity of the crisis. In the future, the above related cases and data can be further refined to facilitate in-depth research on this issue.

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