

# Research on Information Diffusion Optimization Mechanism in Typhoon Disaster: A Case from China

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## Abstract

As a result of its increasing popularity in recent years, social media represented by MicroBlog has received widespread attention in the application of event space-time modeling. Study on user sentiment under new media context may investigate the evolution of use sentiment and offer reference to related departments in the formation of pertinent countermeasures in response to public opinions. Taking blogs posted by netizens for Typhoon Lekima as the research subject, the paper performs sentiment analysis on the data based on a lexical method as per the progress of the typhoon, subsequently adopts LDA to discover subjective factors hidden behind different sentiment attitudes, and eventually proposes proper strategies of netizen sentimental attitude guidance for typhoon disaster. As proved by the experimental results, the method can accurately classify blog statistics, and effectively observe characteristics indicative of changes of public opinions, which provides feasible suggestions for network emotion counseling during typhoon disaster.

## Keywords

**Typhoon Disaster; Social Networks; Sentiment Analysis; Internet Public Opinion; Latent Dirichlet Allocation(LDA).**

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## 1. Introduction

Typhoon disaster, as one of the major natural worldwide disasters featuring extensive scope of influence and formidable destructive power, brings about tremendous economic losses to disaster-hit areas and severely endangers the lives of victims affected by it. Accompanied by the aggravation of global warming and the destruction of human factors to the ecological environment, abnormal climate frequently takes place across the globe. Due to the fast growth and high density of population amid the prompt progress of urbanization, natural disasters have triggered more losses. During the decade in 2006-2015, economic losses arising from typhoon disaster approximately approached \$55 billion, far more than those caused by floods, earthquakes, and other natural disasters. According to Chinese Marine Disaster Bulletin in 2019 disclosed by State Oceanic Administration, the survey statistics and analytical results concerning marine disasters in 2019 showed Chinese marine disasters dominated by storm tide, sea wave, sea ice, and coastal erosion gave rise to direct economic losses totaling 11.703 billion RMB and 22 deaths (including the missing). Direct economic losses triggered by storm tide disaster and sea wave disaster amounted to 11.638 billion RMB and 34 million RMB, respectively, and the latter incited 22 deaths (including the missing).

As indicated by the literature review, studies concerning typhoon disaster emergency management mainly concentrate on the following few aspects. Taking typhoon disaster early-warning research, for example, some scholars forecast and detect typhoon disaster according to the surveillance of

meteorological data. For instance, some researchers [1-3], observed how to implement emergency management for typhoon disaster. Some scholars also went into the medical treatment during typhoon disaster [4,5], traffic [6], tourism [7], crowd evacuation [8,9], rescue [10-12]. Moreover, some scholars assessed the losses caused by the typhoon disaster, and examined post-disaster rehabilitation measures. Some scholars [13] performed an analysis of the risk assessment about typhoon-induced property losses in the coastal area. Some scholar [14] quantified the locations and damages of coastal cities after the typhoon disaster. Other scholars [15] proposed a new method appropriate for the assessment of interior building damages resulting from the hurricane.

In recent years, sentiment analysis and text mining in public opinions have gained wide concern from a great many scholars. Some focused on the sentiment analysis under social media context, including sentiment classification for web text [16,17], the abstraction of user opinions [18], interdisciplinary sentiment analysis across different domains [19,20]. Some emphasized the progress and update of sentiment analysis technology, managing to investigate cutting-edge technologies in the field of sentiment analysis [21] and particularly detailing the introduction, assessment, and comparison of common sentiment analysis algorithms from a technical perspective, such as natural language processing technology [22], machine learning [23], deep learning [24]. Besides that, some probed into cases concerning the application of sentiment analysis technology in diverse industries, including medical treatment and health [25], product sales [26,27], financial forecast [28,29], opinion survey [30,31], emergency management [32,33].

The public reaction towards typhoon disaster is of critical importance, for the public may run across mental malfunction in such a case. During different stages in typhoon disaster from the beginning to the end (preliminary stage, medium stage, and later stage), online users' sentiment may be infected and influenced, demonstrating discrepant characteristics and evolutionary patterns. Threats confronted by decision-makers not only come from the emergency management for typhoon disaster by technical means but also the need for pacifying mass sentiment and guiding mass behaviors for social stability. Hence, through detailing the basic characteristics and influence factors of online sentiment in typhoon disaster, and analyzing netizen sentimental attitude guidance strategies in each stage, on-time and appropriate management of netizen sentimental attitude for typhoon disaster helps boost social moral before the disaster. The research also has great practical significance to the emergency management work in public emergency management sectors.

## 2. Material and methods

### 2.1 Data Source

Research data come from blogs posted during the attack of Typhoon Lekima in 2019. As stated by Chinese Marine Disaster Bulletin in 2019 disclosed by State Oceanic Administration, Typhoon Lekima is the most forceful typhoon which gives rise to heavy rains in East China and circum-Bohai-Sea region by far. Super Typhoon Lekima first landed on southern coastal towns in Wenling, Zhejiang at around 01:45 am on August 10, with maximum wind level 16 close to the landfall center. Typhoon Lekima came into the waters of the Yellow Sea across Jiangsu at around 12:00 am on August 11, and made its second landfall on coastal areas of Huangdao District, Qingdao of Shandong until 20:50 pm, with maximum wind level 9 close to the center. Subject to the storm tide of Typhoon Lekima and costal wave, direct economic losses added up to 10.288 billion RMB. East China and the circum-Bohai-Sea region were severely attacked by Super Typhoon Lekima during its two landfalls and entry to the sea. Considering its high landing intensity, long periods of stay, high rainfall intensity, prominent extremity, wide scope of wind influence and long duration, Super Typhoon Lekima incurred urban-rural waterlogging, medium and small river floods, mountain torrents and landslide to varying degrees in places in Zhejiang, Anhui, Jiangsu and Shandong Province.

The source of data is Sina MicroBlog. Related data related to 2019 Typhoon Lekima are gained by the crawling technique. By applying Python in the crawling of news about 2019 Typhoon Lekima on

Sina MicroBlog, the research collects 23,320 blogs, and 22,980 valid blogs are left after preliminary screening.

Gained data include user ID, user name, user registration region, blogs, post time, number of collection, number of forwarding, number of comments, number of likes, link, forwarding user ID. Collected data have been stored in the database after extraction, screening, and cleaning pre-processing flows.

## 2.2 Data Pre-processing

Upon the completion of data crawling, altogether 23,320 blogs have been attained. After data cleaning treatment comprising simplifying traditional Chinese characters, deleting spam advertisement and invalid comments, introducing Jieba word segmentation, and removing stop words, the research derives 22,980 pieces of valid data. The pre-processing flow contains the following steps: (1) Remove punctuation from HTML tags by "BeautifulSoup" Python; (2) Figures and links are replaced by tag NUM and LINK, respectively; (3) Make word segmentation and remove stop words with the Cut function in Python Jieba Library to prepare for subject modeling, sentiment analysis and subsequent studies; (4) Remove advertisements, abnormal information and other blogs non-related to the research.

## 2.3 Word Frequency Analysis and Latent Dirichlet Allocation

Word frequency analysis belongs to a representative text content analytical method which determines the hot spots and variation trend according to the frequency of words. Counter function in Python is subsequently taken to perform word frequency statistics for each word after segmentation, and word frequency is sorted from large quantity to small quantity in sequence.

Latent Dirichlet Allocation (LDA) proposed by Blei [ 34] is used for speculating the subject distribution of documents. While presenting the subject of each document in the form of the probability distribution, LDA extracts the subject distribution law of some documents, and then carries out subject clustering or text classification in accordance with subject distribution [35,36]. For preparing for subject clustering analysis on blog text data, Python extracts the feature word and subject from the text by LDA package. Under the instruction of LDA library in Python, the research sets parameter alpha as 1.25, beta as 0.1, and K as 40 for text subject model analysis.

## 2.4 Sentiment Analysis

Sentiment text analysis, also known as opinion mining, and orientation analysis, refers to the process that analyzes, processes, generalizes and infer subjective texts with emotional reflections [37-40]. The positive sentiment probability of each blog is computed by the Snow NLP package fit for Chinese text analysis in Python. The value ranging between 0 and 1 means the probability of the positive sentiment attitude of the text. Within the value range of (0,1), sentiment value closer to 1 means positive sentiment, while that closer to 0 means negative sentiment.

# 3. Results

## 3.1 Time Sequence Trend Analysis on Number of Blogs

This section counts the number of blogs posted on August 2, 2019, and August 30, 2019 by date. As shown in Fig.1, prior to August 8, 2019 in the early stage of typhoon disaster, netizens paid more attention to Typhoon Lekima as it approached progressively. The period on August 9 - August 12, during which the landfall of typhoon disaster (on August 10 and August 11, respectively), brought netizen focus and discussion to the climax. Later on, as typhoon wind level mitigated, mass fervor also ceased. Whereas, the topic triggered another heated discussion about disaster prevention and relief countermeasures after Shandong Provincial Government funded 400 million RMB to support disaster relief and post-disaster reconstruction.

## 3.2 Analysis on Popular Blogs

Table 1 presents the top 5 blogs with maximum forwarding statistics. As shown in the table, blogs with high forwarding statistics were primarily posted during August 10-August 11, the worst-hit

period after the landing of the typhoon. The public in panic was quite concerned about the disaster information. Since the first blog and the fifth blog were posted by celebrity Li Wenhan, celebrity effects further expanded the influence of the event. The other three blogs posted by mass media singing high praise for the contributions paid by anti-disaster electric workers, hydrologists, and traffic police were forwarded by a number of netizens.

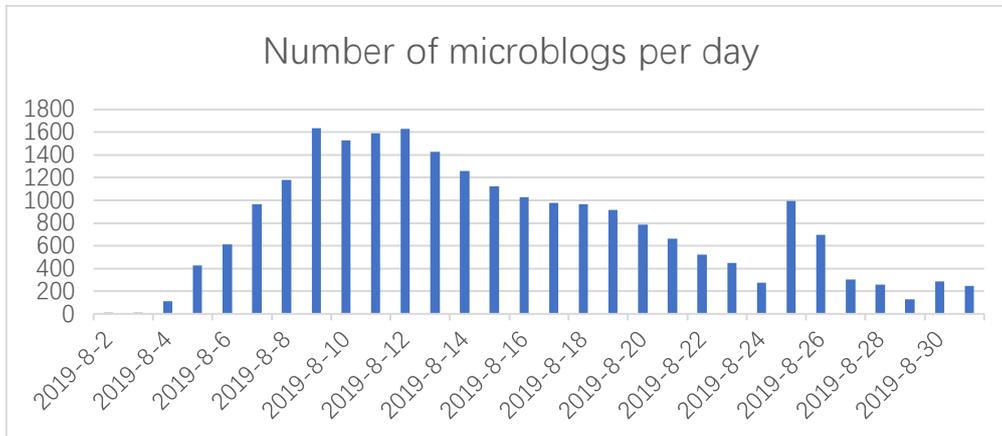


Fig. 1 Statistics of the Number of Blogs about Typhoon Lekima

Table 1. Number of TOP 5 Forwarded Blogs (English versions)

Blog subject	Number of forwarding	User	Time of post
Dear Mr. Lekima, please spare my life! LUNINE_blog video of Li Wenhan	124,088	UNINE_Li Wenhan	August 10, 15:31
[This blog is to pay a tribute to all disaster-relief contributors in typhoon] You always have a group of people by your side in wind and rain. Even Typhoon Lekima is no match of them. In order to lessen the destructive force of the typhoon to people’s life, they braved to eliminate dangers and stick to posts against the storm. They are firefighters, traffic police, sanitation workers, electric workers - the most steadfast figures! Forward the blog for homage!	74,592	People’s Daily	August 10, 15:59
[So many circuit breakers tripped! I’ve tried my best, but the situation is out of control...] #Attack of Typhoon Lekima# Tian Hanlin, the electric worker, has been busy with urgent repairs all night long. He cried out at a time when being asked to take a rest, “So many circuit breakers tripped! I’ve tried my best, but the situation is out of control...” Thanks for your hard work! # To pay tribute to heroes in typhoon-disaster relief# @ Voice of Zhejiang	35,407	CCTV News	August 11, 09:39
# Focus on Typhoon Lekima# [The move of the 81-year-old woman impressed many] Yao Kuangyin, the late husband of the 81-year-old woman Zhou Guifeng, used to be a famous hydrology agent in Shiling Rainfall Station in Lin’an District, Hangzhou of Zhejiang. As Shiling was one of the eight largest rainstorm centers in Zhejiang, hydrology reporting and forecasting work was quite arduous. Zhou Guifeng helped her husband report flood prevention and hydrology news an hourly basis all night long whenever the typhoon disaster occurred.	31,689	Xinhuanet	August 11, 19:56
[#Typhoon Lekima caused 22 deaths and 10 missing cases#] Affected by Typhoon Lekima this morning, Shanzao Village, Yantan Town, Yongjia Country of Zhejiang was attacked by a serious natural disaster caused by a landslide, flash flood, and precipitous rise of water level. By 8:00 pm, the typhoon had murdered 22 and another 10 missed. Other victims afflicted had been properly placed, the injured had been treated, and communication was restored. The supply system for water, electricity, and traffic was still under construction. Peace to you !	16,110	UNINE_Li Wenhan	August 10, 22:17

Table 2 shows the top 5 commented blogs. Obviously, blogs with most comments were mostly posted during August 10-August 11. The former 3 blogs were as shown in Table 1, and the remaining two were posted by mass media reporting the casualties in disaster-hit areas and reminding people to evacuate to safe places. These blogs had gained comments from lots of netizens.

Table 2. Number of TOP 5 Commented Blogs (English versions)

Blog subject	Number of comment	User	Time of post
Dear Mr. Lekima, please spare my life! LUNINE_blog video of Li Wenhan	42,190	UNINE_Li Wenhan	August 10, 15:31
[So many circuit breakers tripped! I've tried my best, but the situation is out of control...] #Attack of Typhoon Lekima# Tian Hanlin, the electric worker, has been busy with urgent repairs all night long. He cried out at a time when being asked to take a rest, "So many circuit breakers tripped! I've tried my best, but the situation is out of control..." Thanks for your hard work! # To pay tribute to heroes in typhoon-disaster relief# @ Voice of Zhejiang	29,059	CCTV News	August 11, 09:39
# Focus on Typhoon Lekima# [The move of the 81-year-old woman impressed many] Yao Kuangyin, the late husband of the 81-year-old woman Zhou Guifeng, used to be a famous hydrology agent in Shiling Rainfall Station in Lin'an District, Hangzhou of Zhejiang. As Shiling was one of the eight largest rainstorm centers in Zhejiang, hydrology reporting and forecasting work was quite arduous. Zhou Guifeng helped her husband report flood prevention and hydrology news an hourly basis all night long whenever the typhoon disaster occurred.	23,859	Xinhuanet	August 11, 19:56
[#People's Daily Live# 253,000 dwellers in Shanghai had been evacuated in response to Typhoon Lekima] No.9 Typhoon Lekima landed on Chengan Town, Wenling of Zhejiang at 1:45 am on August 10, with wind power 16. It was the typhoon with maximum intensity this year. For battling against the typhoon in Shanghai, 90,000 emergency guardians organized the orderly evacuation of over 253,000 dwellers. From People's Daily Live on MicroBlog.	19,255	People's Daily	August 10, 14:31
[#Typhoon Lekima caused 22 deaths and 10 missing cases#] Affected by Typhoon Lekima this morning, Shanzao Village, Yantan Town, Yongjia Country of Zhejiang was attacked by a serious natural disaster caused by a landslide, flash flood, and precipitous rise of water level. By 8:00 pm, the typhoon had murdered 22 and another 10 missed. Other victims afflicted had been properly placed, the injured had been treated, and communication was restored. The supply system for water, electricity, and traffic was still under construction. Peace to you!	17,823	CCTV News	August 10, 22:17

Table 3 lists the top 5 blogs with the maximum number of likes. It turns out that blogs with maximum likes were mostly posted on August 9-August 11, in which the former two were as listed in Table 1 and Table 2, and the remaining 3 were posted by the media to forecast typhoon landfall time and site. During the live broadcast, the host personally shared the experience using words like "can't hold up" or "may face is barely deformed". These blogs had received a consentaneous reputation among netizens.

### 3.3 Statistics of User Posts

Statistics of the number of user blogs are shown in Fig.2 as below. The number of blogs distributed by single users ranges in 1-10. In particular, 13,320 users merely issue 1 blog, which means that the majority of users still desire most to read and acquire information, and only a small number of users would like to share the news. The top blog user "Zhejiang Voice" has altogether posted 100 blogs, in which blog subjects and contents primarily involve on-site coverage for typhoon landfall, and how the public introduces news about disaster relief and combat against a typhoon.

Table 3. Number of TOP 5 Liked Blogs (English versions)

Blog subject	Number of like	User	Time of post
<p>[#People’s Daily Live# 253,000 dwellers in Shanghai had been evacuated in response to Typhoon Lekima]</p> <p>No.9 Typhoon Lekima landed on Chengan Town, Wenling of Zhejiang at 1:45 am on August 10, with wind power 16. It was the typhoon with maximum intensity this year. For battling against the typhoon in Shanghai, 90,000 emergency guardians organized the orderly evacuation of over 253, 000 dwellers. From People’s Daily Live on MicroBlog.</p>	1090,202	People’s Daily	August 10, 14:31
<p>[So many circuit breakers tripped! I’ve tried my best, but the situation is out of control...]</p> <p>#Attack of Typhoon Lekima#</p> <p>Tian Hanlin, the electric worker, has been busy with urgent repairs all night long. He cried out at a time when being asked to take a rest, “So many circuit breakers tripped! I’ve tried my best, but the situation is out of control...” Thanks for your hard work! # To pay tribute to heroes in typhoon-disaster relief# @ Voice of Zhejiang</p>	496,031	CCTV News	August 11, 09:39
<p>#I could not even hold up Jio# [Here came the Super Typhoon Lekima # The journalist could not even hold up against the high wind#]</p> <p>There appeared high winds and waves before the arrival of the Super Typhoon Lekima. Journalist from @ Zhejiang TV during the live broadcast stood ashore, with his raincoat jolting by the wind. Thanks for his hard work! From Zhejiang TV Live on MicroBlog.</p>	371,409	People’s Daily	August 9, 13:20
<p>[Live Broadcast: #Typhoon Lekima is foreseen to land on Shangdong tonight#]</p> <p>It is predicted that Typhoon Lekima will make landfall on coastal area of Shandong tonight on August 11. The province is covered by an intense rainstorm. Accumulated rainfall in Changle, Weifang amounts to 590.5 mm at most. In response to the crisis of Typhoon Lekima, Shandong Observatory sends a red alert and transfers more than 70,000 dwellers. From People’s Daily Live on MicroBlog.</p>	289,751	People’s Daily	August 11, 17:52
<p>[Landfall of Typhoon Lekima# the host’ face was distorted by the typhoon#]</p> <p>“It is 15:00 on August 9. The spiral rainband of No.9 Typhoon has swept across Yangshan Port. The rain here is so heavy. You may feel it right now.” Upon the approach of Super Typhoon Lekima, Shanghai meteorologist host Sha Boning goes to Yangshan Port for follow-up coverage. “Life is so hard on me. My hair is messy and my face is distorted...” L Beijing News Video</p>	288,027	Beijing News Video	August 10, 08:23

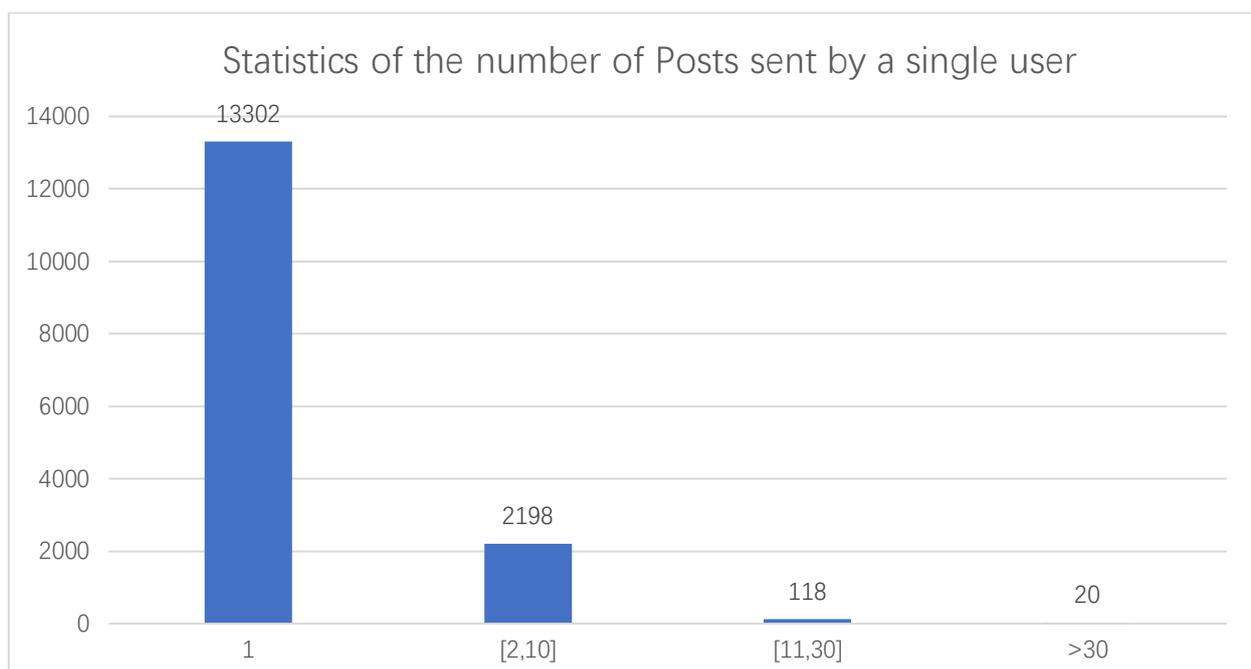


Fig. 2 Statistics of the Blogs of Individual Users

### 3.4 Subject Model Analysis

Blog contents may be divided under the following five subjects throughout parameter setting and text analysis for every single blog.

Table 4. Five Subjects of Text Analysis under Subject Model (English versions)

Serial number	Subject	High-frequency word
Topic 1	Introduction to Typhoon Lekima Landfall and Knowledge about Typhoon	typhoon, Lekima, video, landfall, development, weather, Zhejiang, full text, blog, coastal area, km, violent typhoon, center
Topic 2	Early-warning and Precaution for Typhoon Lekima	landfall, center, Zhejiang, development, violent typhoon, blog, early-warning, full text, weather, comment, issue, influence, prediction, wind, and rain
Topic 3	Impact of Typhoon Lekima on Weather	landfall, violent typhoon, blog, direction, influence, mitigation, live broadcast, development, Rosa, video, coastal area, weather, sea level, afternoon, forward, km, high temperature
Topic 4	Poverty Relief for Typhoon Lekima	video, influence, direction, intensity, full text, coastal area, rescue, km, center, landfall, weather, Zhejiang Province, issue, rainfall, National Meteorological Center
Topic 5	Emergency Management for Typhoon Lekima	violent typhoon, center, Zhejiang, forecast, emergency, landfall, influence, forward, hour, meteorology, video, department, sea level, issue, personnel, km, northwest

Table 4 manifests the five subjects reveal netizens’ focus on the knowledge about typhoon prior to the arrival of Typhoon Lekima, and draw reference to the precaution of typhoon disaster. Concerned about the time of landfall of Typhoon Lekima, some netizens have made full preparations for disaster early-warning and precaution. While some take notice of the potential influence of typhoon on extreme weather. Typhoon is projected to bring about heavy rain to relieve the high temperature, especially in hot summer. Additionally, the general public places emphasis on the rescue countermeasures for Typhoon Lekima, including rescue work in coastal area, evacuation, and protection for offshore fishermen. Interested in emergency management in Typhoon Lekima, some learn how the public management sector performs emergency management, including information issues in public management sectors, overall planning for rescue workers, and so forth. Now that these subjects involve every aspect of Typhoon Lekima during landfall, it embodies the highlight of the general public on landfall-related news and discussion about typhoon disaster rescue and emergency management.

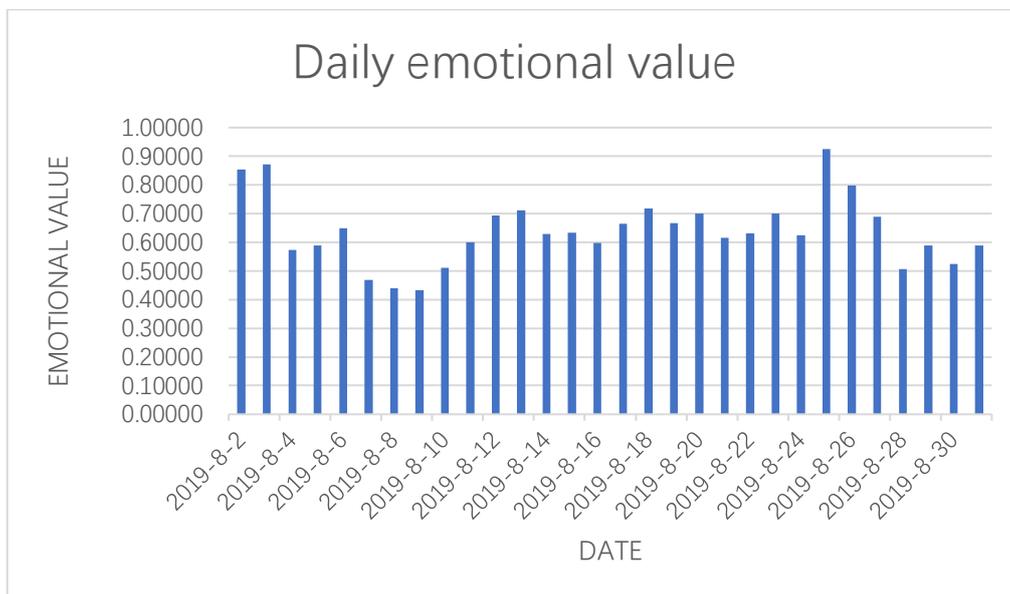


Fig. 3 General Sentiment Mean Trend Chart

### 3.5 Sentiment Analysis

This section is going to carry out a sentiment analysis on blog text by date. The mean () function is employed to process the numerical outcomes of sentiment analysis. Sentiment value in the range of [0,0.5] reveals negative sentiment, while sentiment value in the range of [0.5,1] discloses positive sentiment. Fig.3 illustrates that most values are set in the range of [0.4,0.6], suggesting the stability of netizen sentiment value during the attack of Typhoon Lekima. Moreover, the figure also demonstrates that netizens hold a positive attitude towards the information upon the formation of the typhoon. Afterward, as the typhoon approaches, netizens betray more fears and worries and their sentiment turns passive gradually. The value reached the bottom on August 8 and August 9. That was because netizens had unpredictable pessimistic sentiment towards oncoming typhoon-incurred losses. Netizens prepared themselves for the combat with disaster after landfall on August 10, and their blogs were most inspiring and proactive. The sentiment value remained as 0.6 in the following days. Shandong Province announced to raise 400 million RMB to support Typhoon Lekima disaster relief and post-disaster reconstruction on August 25 and August 26. The news was well appreciated by netizens.

This section independently conducts positive and negative sentiment analysis on blog text by date. Fig.4 displays the fluctuation of both positive and negative sentiment during the attack of Typhoon Lekima. Especially, the negative sentiment fluctuates drastically before the landfall and after the transition of the typhoon. The minor fluctuation of netizens' sentiment should be attributable to their concerted efforts in the fight against typhoons, and their optimism and courage in face of the disaster. Instead, owing to the long time span before and after the disaster, netizens' sentiment attitude is manipulated by subjective factors, external public opinions, and the surrounding social environment. That leads to the fluctuation of netizen sentiment. Therefore, public emergency management sectors and media shall proactively guide public opinions so as to timely dispel netizens' passive sentiment attitude, and create a more vigorous public opinion context.

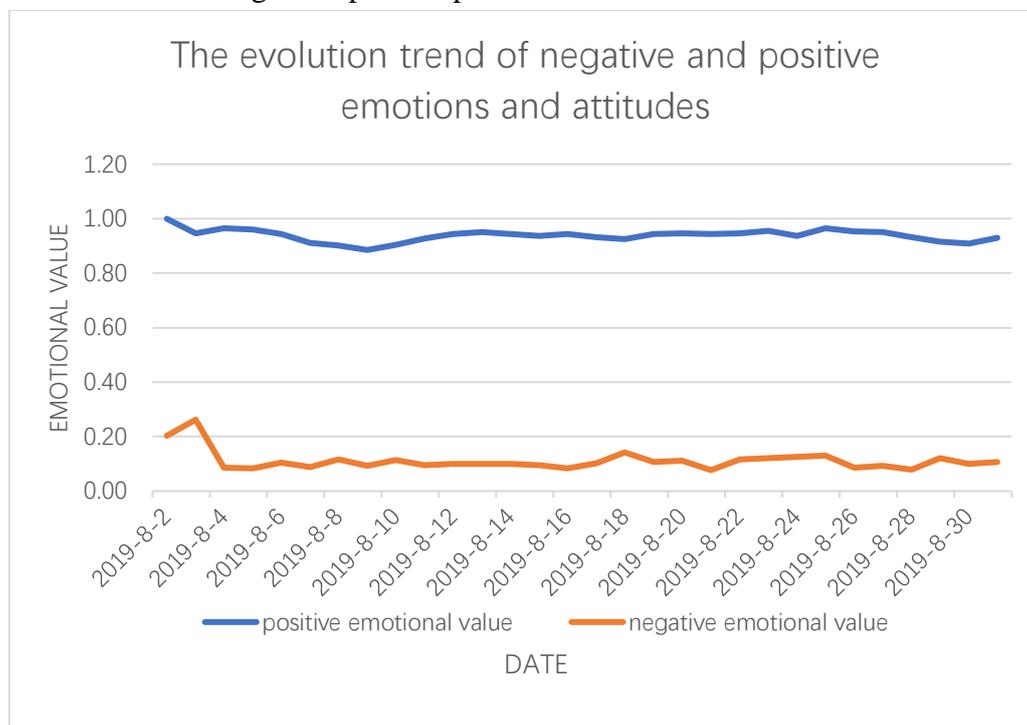


Fig. 4 Negative and Positive Sentiment Attitude Trend Chart

## 4. Discussion

Taking Typhoon Lekima as the research subject, the research makes mathematical statistics and time series analysis on blog data and analyzes the influence factors of Typhoon Lekima online information

transmission from the perspective of blog heat, user analysis, subject model and sentiment analysis. As proved by research results, (1) Diversity, convenience and promptness of online network communication means enable the public to acquire and share information, and also express their viewpoints and sentiment towards events online; (2) Public discussion about Typhoon Lekima gets many aspects involved, including popularity, early-warning and precaution of related knowledge, and emergency management practice in public management sectors; (3) Public sentiment is positive during the attack of Typhoon Lekima. That accounts for that the public dislike and even hate the damages and losses caused by Typhoon Lekima, but they remain proactive to cope with the disaster. As implied by the research results, the research provides the following suggestions for government public management sectors' surveillance and guidance of online sentiment communication in typhoon disaster: (1) First of all, online information communication is an integral part in public opinion communication about natural disasters like typhoon disaster. As the barometer mirroring public opinions, it can reflect the true opinions and attitudes of all walks of life and hold high attention from related media and government departments. (2) Secondly, efforts should be made to vigorously promote information concerning natural disasters such as typhoon disaster so that the public can be aware of the facts and details related to the occurrence, development, and evolution of natural disasters. Subject modeling and sentiment analysis results show that pre-disaster early-warning information may arouse netizens' blind panic. Netizens or self-media spontaneously forward the blogs posted by official accounts about pre-disaster early-warning information on a large scale. During this process, some news media or online self-media exaggerate and even fabricate the dangers brought about by typhoon disasters. Devoid of knowledge and rational cognition about typhoon disaster, overwhelming netizens are easily misled by untruthful news. That's the root of the proliferation of unnecessary rumors, which adds to pre-disaster social chaos. (3) Influencing opinion leaders shall take the lead to guide users' sentiment attitude and help control public opinions as prime subjects of communication. Government emergency management sectors need to reinforce the authority of official news and issue and update disaster early-warning information via authoritative official media on time. The post of authoritative news can pacify netizens' panic about the disaster, resolve their passive emotions, and better carry out the disaster prevention work. (4) As to the means of sentiment guidance, the extremity of negative sentiment fosters mass incidents and threatens social stability. So both the media and the government shall post positive information and properly manipulate public sentiment. Public emergency management sectors are supposed to timely post all major emergency decisions and rescue progress information on MicroBlog and other socialized media platforms, clarify or correct untruthful speeches, publicize successful emergency cases, and create proactive disaster relief atmosphere. Meanwhile, by gathering public feedback and suggestions throughout the communication with netizens via the blog, public emergency management sectors may get control of critical issues in the interest of the mass during disaster relief work. Furthermore, in order to console and encourage public sentiment, it is advised that public emergency management sectors shall dredge negative sentiment and effectively expedite the favorable development of public opinions.

## 5. Conclusion

With the goal of exploring effective guidance strategies for netizen sentiment attitude in typhoon disaster, the research takes Typhoon Lekima as the specific research object to elaborate on the trend of sentiment attitude exhibited in netizens' blogs, and simultaneously, dig into the subject information hidden behind discrepant sentiment attitudes. As indicated by the analytical results, netizens' sentiment attitude towards the disaster is generally proactive and optimistic, but drastically fluctuates before and after the disaster; netizens keep a watchful eye on the knowledge popularization, early-warning, and precaution about Typhoon Lekima, as well as public emergency management and response countermeasures. On the account of the aforementioned analytical results, the research presents netizen sentiment attitude guidance strategies from the perspective of communication content, communication subject, and means of sentiment guidance.

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