Research on Online Public Opinion Based on the LDA Model: A Case Study of the Xiaomi SU7 Electric Vehicle Explosion Incident

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Abstract. The Xiaomi SU7 explosion incident sparked heated online debates about new energy vehicle (NEV) safety. This study analyzes Weibo comments from March 30–April 14, 2025, using the Latent Dirichlet Allocation (LDA) model. Four major themes emerged: (1) accident process and hardware defects, (2) risks of intelligent driving, (3) human–machine collaboration, and (4) responsibility and brand reputation. Results show skepticism toward Xiaomi's hardware and intelligent driving systems, as well as disputes over liability. The paper recommends improving hardware safety and intelligent driving reliability, enhancing crisis communication, and strengthening governmental regulatory and accident investigation mechanisms.

Keywords: online public opinion; LDA model; new energy vehicles; crisis communication.

1. Introduction

1.1. Research Background

On January 17, 2025, the China Internet Network Information Center (CNNIC) released its 55th "Statistical Report on China's Internet Development". As of December 2024, China's internet user population had exceeded 1.1 billion, with an internet penetration rate of 78.6%. Mobile internet users numbered 1.105 billion, accounting for 99.7% of the total, while online news users reached 811 million (73.2%) [1].

Weibo, a microblogging platform, serves both as a social networking site enabling users to acquire, transmit, and share information and as a form of social media that facilitates the dissemination of concise, real-time updates through a follower-based mechanism [2]. By September 2024, Weibo's monthly active users numbered 587 million, and daily active users reached 257 million, making it a key platform for online content creation, discovery, and sharing [3]. It has also become a vital channel for mainstream media to release timely news updates, while user comments under official media accounts have emerged as an important source of public opinion data on social hot topics.

Against this backdrop, the Xiaomi SU7 electric vehicle explosion incident garnered substantial attention after being reported online. As a major player in China's technology sector, Xiaomi entered the NEV market with high public expectations. The accident not only damaged Xiaomi's corporate image but also triggered public concern regarding the safety performance of NEVs, the reliability of intelligent driving systems, and issues of responsibility attribution.

1.2. Research Significance

By conducting an in-depth analysis of Weibo discussions surrounding the Xiaomi SU7 explosion incident, this study aims to provide a comprehensive understanding of public attitudes and opinions toward the event. On one hand, tracking the formation and evolution of public opinion can help government agencies issue timely warnings, guide online discourse, and promote a healthy digital environment. On the other hand, understanding public concerns can inform policy-making in the NEV sector. The findings also offer valuable decision-making references for Xiaomi and the broader NEV industry in areas such as technological improvement, product optimization, crisis management, and brand rebuilding, thereby promoting sustainable industry development.

1.3. Research Content and Methods

Weibo was selected as the data source. Using keywords "Xiaomi," "SU7," and "explosion," media posts between March 30–April 14, 2025, were collected, yielding 7,897 valid user comments after cleaning. Jieba was used for word segmentation, and stop words were removed. The LDA model was applied to extract discussion themes, with the optimal number of topics determined through perplexity, coherence scores, and visualization. Four clear topics were identified.

2. Case Overview: Xiaomi SU7 Explosion Incident

The public opinion surrounding the Xiaomi SU7 explosion incident unfolded in four distinct stages: latent period, outbreak period, peak period, and decline period. According to the Shiwei Business Intelligence public opinion monitoring system, from March 30 to April 14, 2025, there were approximately 5.3 million online posts related to the "Xiaomi SU7 explosion incident". On the night of March 29, a Xiaomi SU7 caught fire after an accident on a highway, resulting in the deaths of three occupants. The following day, relevant information began circulating on platforms such as Baidu Tieba and Bilibili, attracting limited public attention.

On April 1, detailed reports by Southern Metropolis Daily and China News Service triggered a rapid surge in public interest. That same day, a Xiaomi spokesperson, Xiaomi Auto, and Lei Jun issued statements at midday and in the evening. Meanwhile, family members of the victims spoke out on multiple platforms (later deleted), fueling heated discussions and pushing public attention to its peak on April 2. Thereafter, the incident entered a decline stage, with a sharp reduction in the volume of related online information.

2.1. Latent Period (March 29–30)

At 22:44 on March 29, 2025, a Xiaomi SU7 Standard Edition electric vehicle caught fire after a severe traffic accident on the De-Shang Expressway in Anhui Province, resulting in the deaths of all three occupants. On March 30, photos of the accident scene began circulating on Baidu Tieba and Bilibili, attracting initial attention.

2.2. Outbreak Period (March 31–April 1, morning)

On March 31, the victim's family publicly alleged safety hazards in the SU7 and called on Xiaomi CEO Lei Jun to respond. On April 1, *Southern Metropolis Daily* published an in-depth report, later reprinted by other major media outlets, causing the incident's online visibility to surge.

2.3. Peak Period (April 1, afternoon–April 2)

Between April 1 and 2, Xiaomi's corporate spokesperson, the Xiaomi Auto account, and Lei Jun issued statements. The victim's family raised questions about potential self-ignition, locked doors, and Xiaomi's lack of direct contact, pushing the topic to the top of multiple trending lists. Public discussions increasingly focused on responsibility attribution, intelligent driving safety, and corporate accountability.

2.4. Decline Period (April 3 onward)

Following Xiaomi's rebuttals and clarifications on April 7 and April 11, online attention gradually waned, and the incident's influence subsided [4].

3. Online Public Opinion of Xiaomi SU7 Explosion Incident

3.1. Data Collection and Preprocessing

For data collection, this study used the keywords "Xiaomi," "SU7," and "explosion," with the condition of media publication, and limited the search period to March 30–April 14, 2025. After

manual screening, 108 relevant posts were retained. Using web crawling techniques, comments from these 108 posts were extracted, resulting in 10,388 raw comments. The collected information included post URL, author, publication time, post content, commenter, comment content, comment time, and number of likes. After removing duplicate, blank, irrelevant, and meaningless comments, a total of 7,897 valid comments remained.

Since the subsequent analysis is primarily based on words, text segmentation was required. This study adopted jieba, one of the most widely used tools in Chinese word segmentation. However, in practice, the segmentation results from jieba may not fully meet the research needs, as certain meaningless words remain after segmentation. These words are irrelevant to the analysis and would increase computational load; therefore, they were removed.

3.2. Descriptive Analysis: Word Frequency and Word Cloud

After text preprocessing, a preliminary exploration of public concerns regarding the incident was conducted by performing word frequency analysis and generating a word cloud. Python was employed for word frequency statistics and word cloud visualization.

The word cloud displays the 50 most frequently occurring words in the collected comments. Terms such as "Xiaomi," "driving," "intelligent driving," "accident," and "problem" appeared with high frequency. This indicates that public discussions surrounding the Xiaomi SU7 explosion incident primarily focused on concerns about the safety of Xiaomi automobiles, skepticism toward intelligent assisted driving technology, and speculation regarding the cause of the accident. For example, a large number of users on Weibo shared their views on the safety of new energy vehicles, with some expressing that they would be more cautious when selecting such vehicles in the future, and that their trust in Xiaomi automobiles had declined.

3.3. LDA Topic Model Analysis

3.3.1 Model Construction

To gain a more detailed understanding of netizens' specific opinions on the incident, the processed comment texts were subjected to Latent Dirichlet Allocation (LDA) topic modeling. The modeling process began by determining the optimal number of topics through a combination of perplexity and coherence metrics, supplemented with pyLDAvis visualizations. Specifically, the perplexity index was first used to establish a general range for the number of topics. Within this range, the coherence score was then applied to select the most suitable topic number. Finally, the results were cross-validated with visualizations to confirm the optimal topic configuration for model construction.

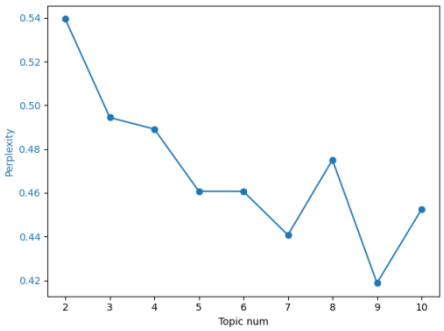

Fig 1 Perplexity Variation Chart

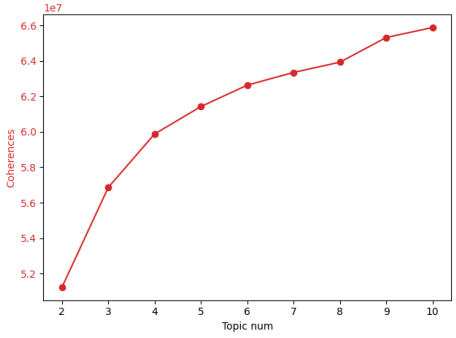

Fig 2 Coherence Variation Chart

As shown in Figures 1 and 2, perplexity decreases while coherence increases with the growth in the number of topics. According to the definitions of these metrics, lower perplexity and higher coherence indicate better topic classification performance. However, when the number of topics becomes excessively large, the model risks overfitting. Based on these trends, the preliminary range for the topic number was set between 1 and 7.

Subsequently, multiple models with different topic numbers within this range were constructed and visualized using pyLDAvis. The visualization presents topic distributions in a coordinate space,

allowing for intuitive comparison of clustering effects. The results indicate that when the number of topics is set to four, the topics are clearly separated without overlap, achieving the best clustering effect. The topic visualization for this configuration is presented in Figure 3.

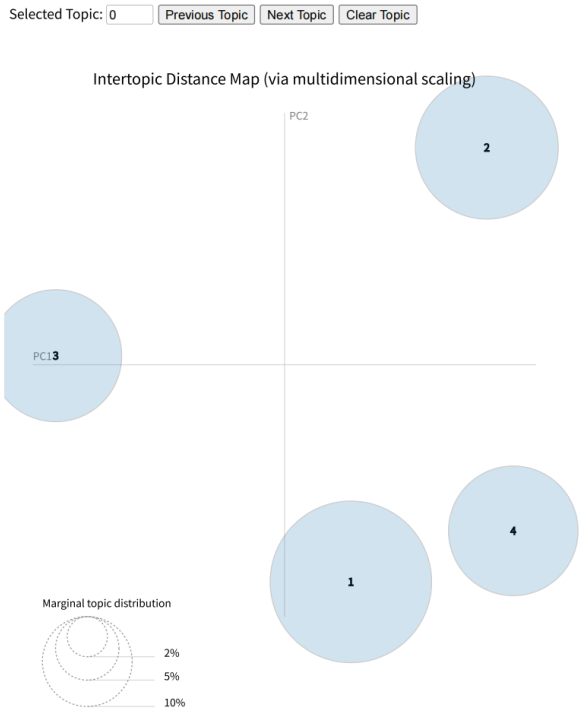

Fig 3 LDA Topic Clustering Visualization

As shown in Figure 3, each bubble represents a distinct topic. The size of the bubble indicates the frequency of that topic within the overall corpus, while the distance between bubbles reflects the similarity between topics. Overlapping bubbles suggest thematic overlap, indicating that the topics are not clearly distinguished. In Figure 3, the four bubbles are non-overlapping and maintain a certain distance from each other, suggesting that the constructed topic model is generally reasonable.

3.3.2 Model Output

Based on the top ten keywords and their corresponding weights for each extracted topic, the four topics were labeled. The results are illustrated in Table 1.

Table 1 LDA Topic Model Results

Topic No.	Topic Label	Top Keywords (weight × keyword)	Comments
1	Accident Process & Hardware Defects	0.022Xiaomi + 0.022Accident + 0.020Car Door + 0.012Problem + 0.012Intelligent Driving + 0.011Automaker + 0.010Cannot Open + 0.009Occurrence + 0.009Highway + 0.009Collision	2148
2	Safety Risks of Intelligent Driving	0.026Driving + 0.025Xiaomi + 0.018Intelligent + 0.015Intelligent Driving + 0.012Life + 0.012Car + 0.011Assistance + 0.009Expert + 0.009Accident + 0.009Safety	1602
3	Human–Machine Collaboration in Assisted Driving	0.046Driving + 0.022Intelligent Driving + 0.022Xiaomi + 0.021Assistance + 0.018Driving a Car + 0.012Intelligent + 0.012Steering Wheel + 0.011Driver + 0.011Highway + 0.011Problem	2356
4	Responsibility Attribution & Brand Reputation	0.031Xiaomi + 0.014Intelligent Driving + 0.013Know + 0.012Responsibility + 0.011Problem + 0.011Owner + 0.009Accident + 0.009Automaker + 0.008Compensation + 0.008Driver	1791

In Topic 1, words such as "Xiaomi," "car door," "cannot open," "accident," "collision," and "highway" show the public's high attention to the process and cause of this accident, as well as doubts about the escape mechanism of the car door at the time of the incident. Many believe that the inability to open the door in high-risk situations caused the victims to be trapped, losing the chance to escape and ultimately their lives. This reflects the public's view that the hardware design or quality control of Xiaomi SU vehicles has certain defects, seriously damaging the brand's sense of safety and trust in the minds of consumers.

In Topic 2, words such as "intelligent," "intelligent driving," "driving," "life," "safety," and "expert" indicate that the public is highly concerned about the potential risks of the intelligent driving system equipped in the Xiaomi SU7, worrying that the "intelligent driving" function cannot truly ensure life safety, and expecting authoritative experts to provide professional evaluation and explanation on the risk control and fault-tolerance mechanisms of intelligent driving technology.

In Topic 3, words such as "intelligent driving," "assistance," "steering wheel," "driver," and "driving" reflect the public's discussion on human–machine collaboration in assisted driving, focusing on the control handover and transition between intelligent and manual driving during the driving process. There is concern that drivers cannot quickly take over in emergencies, which has triggered public debate on the boundaries of human–machine collaboration and the distribution of responsibilities.

In Topic 4, words such as "responsibility," "compensation," "owner," "automaker," and "driver" show the public's high concern about the responsible party and handling mechanism of the accident. The victims' families insist that Xiaomi should take responsibility and provide compensation, and they question the quality of Xiaomi SU vehicles. This has seriously affected the brand's reputation and triggered widespread discussion among the public about corporate social responsibility and the protection of user rights.

Overall, although Xiaomi has successively issued official responses to the incident, the public still holds serious doubts about the hardware design and the safety of the intelligent driving system of the Xiaomi SU7. Its responses have been technically unfocused, failing to address the core concerns of the families and unable to quell public questioning. On the one hand, hardware failures such as "doors cannot be opened" and "post-collision combustion" have exposed vehicle quality risks; on the other hand, the intelligent driving function of the Xiaomi SU7 lacks reliable assurance in control switching at critical moments, making human–machine collaboration face safety risks. In addition, many netizens have focused on "responsibility and compensation," with some believing the driver should be the primary responsible party, while others believe the automaker should bear compensation responsibility.

4. Conclusion and Recommendations

Based on the above LDA topic model analysis results, it can be concluded that in the Xiaomi SU7 car explosion incident, hidden dangers in Xiaomi's hardware safety and the reliability of its intelligent driving system were fully exposed, and Xiaomi's official responses were unfocused and evasive, which weakened public trust in the brand. Therefore, this paper proposes the following suggestions for future product optimization and crisis communication for similar enterprises: Strengthen hardware design and escape mechanisms, improve intelligent driving algorithms and handover processes, and issue timely, empathetic statements citing independent evaluations.

For government authorities, it is essential to enhance NEV safety standards and establish stricter regulatory frameworks to ensure product reliability. Clear rules regarding the access conditions and emergency protocols of intelligent driving vehicles should be formulated to prevent risks during road operations. At the same time, an independent accident investigation mechanism needs to be created, with transparent and timely reporting of findings to strengthen public trust. Moreover, mandatory data disclosure requirements should be enforced, obligating enterprises to provide complete and

accurate driving records after accidents. These measures will improve regulatory transparency, safeguard users' right to know, and promote accountability across the NEV industry.

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