



Application of ChatGPT in natural disaster prevention and reduction

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ABSTRACT

Improving disaster prevention, reduction, and emergency response capabilities is crucial in a country prone to frequent natural disasters. Since the release of ChatGPT, it has garnered widespread attention and sparked extensive discussions in various fields due to its powerful language processing and reasoning abilities. This paper explores the application of ChatGPT in natural disaster prevention and reduction, building upon its language capabilities. The paper examines ChatGPT's ability to gather information and its potential for disaster prevention science popularization and education. It describes the rapid response and availability of ChatGPT in natural disaster prevention and highlights its potential to assist emergency response efforts. The paper also outlines ChatGPT's assistance in the pre-disaster, during-disaster, and post-disaster phases. Additionally, it points out the current limitations and challenges in applying ChatGPT and provides prospects for future research directions in natural disaster prevention and reduction.

1. Introduction

ChatGPT is a large language model OpenAI developed based on the GPT-3.5 architecture. It is specifically designed for interactive conversations and can engage in dialogue with users (Radford et al., 2018). It is trained on vast text data from the internet, including books, articles, websites, and other sources. Through this training, the model learns to understand natural language and generates coherent and contextually relevant responses. ChatGPT has demonstrated impressive language comprehension and generation capabilities in many aspects. It can answer various questions, provide rich information and targeted guidance, and even engage in entertaining chitchat and storytelling. Since its official unveiling on November 30th, 2022, ChatGPT has gained millions of user registrations within a few days. The number of active users reached over 100 million within two months, and its popularity is self-evident. It has also attracted significant attention from researchers in the academic community.

The author conducted a keyword search using "ChatGPT" on the China National Knowledge Infrastructure (CNKI) database on July 2nd, 2023, and obtained 1224 results. A search using "ChatGPT" as a topic keyword on the Web of Science Core Collection yielded 551 results. Furthermore, an investigation using "ChatGPT" as a topic keyword on the

Google Scholar search engine revealed over 13,400 results since 2022 alone. The author performed keyword co-occurrence analysis based on the results obtained from the CNKI database, as shown in Fig. 1, which indicates that ChatGPT has been involved in various fields such as automation technology, computer science, news, education, administration, economics, ethics, and medicine. For example, Surameery and Shakor (2023) think that ChatGPT can play a role in solving programming bugs by providing debugging assistance, bug prediction, and bug explanation. Its ability to analyze and understand code snippets, along with its knowledge representation and natural language generation capabilities, make it well-suited for these tasks. Biswas (2023a) mentioned that ChatGPT has the potential to greatly enhance and improve various military operations and capabilities. Shen (2023) argues that ChatGPT can bring more comprehensive, enriched, and personalized educational resources to higher education. It can also provide more diverse, personalized, and intelligent teaching tools and learning methods. Additionally, ChatGPT has the potential to create customized learning plans for each student, helping them learn and grasp knowledge more efficiently. Based on extensive data analysis, ChatGPT can provide teachers with more detailed learning assessment and feedback data, assisting them in developing better teaching methods to improve the quality of instruction. Coincidentally, Biswas (2023b) also believes that

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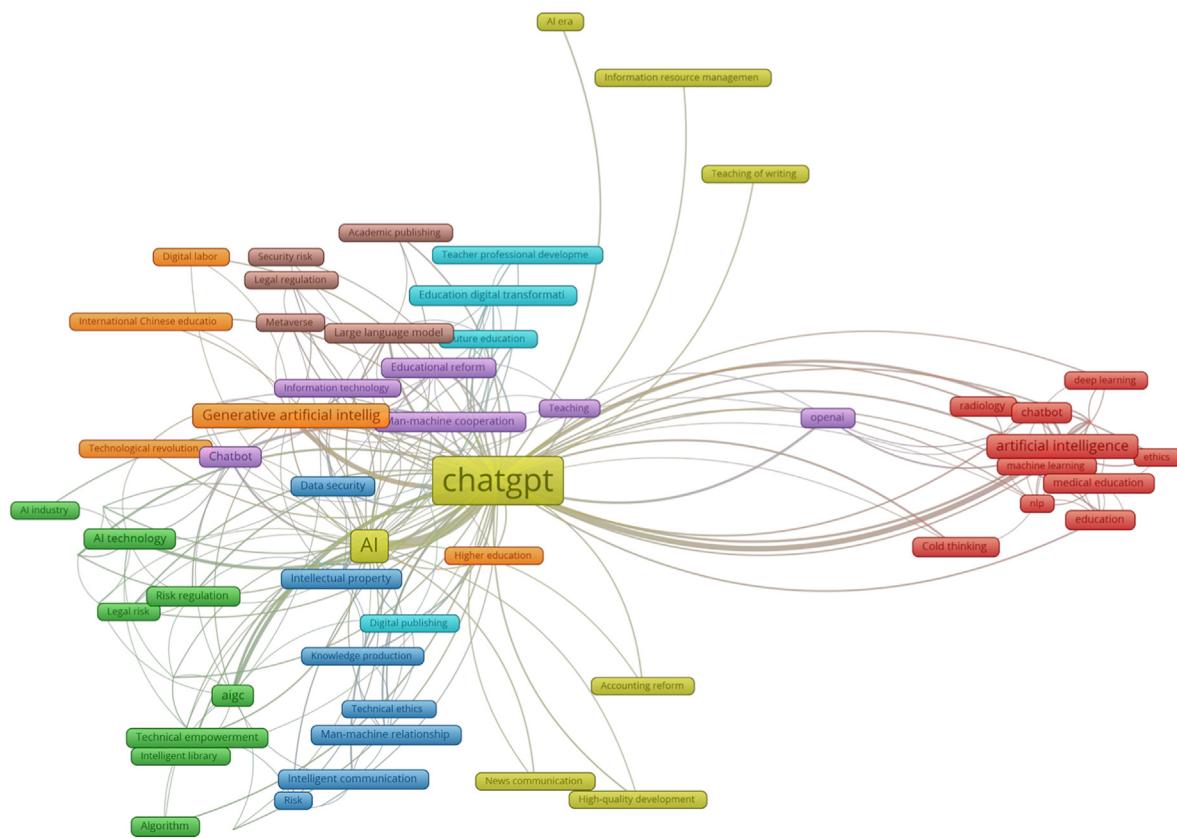


Fig. 1. Keyword co-occurrence map with ChatGPT as the subject word.

ChatGPT has great application potential in education. With its ability to generate writing that closely mimics human language and its capacity for multiple ongoing conversations, ChatGPT is a versatile tool that can aid in open education by providing personalized support, direction, and feedback to autodidactic learners, thus increasing motivation and engagement. Lv and Zheng (2023) discussed the potential role of ChatGPT in auditing, stating that it can digitize textual information from audit reports using natural language processing techniques. It can also understand complex accounting languages and environments. In this way, ChatGPT can reduce audit personnel's workload and improve auditing quality and efficiency. ChatGPT can automatically identify and classify data through machine learning methods, uncovering underlying patterns and trends. It can quickly detect anomalies and risk points in large datasets. Qiao et al. (2023) discussed the application prospects of ChatGPT in the industrial sector. They believe it will likely upend the future form of software in the industrial field, shifting from the form of apps or desktop platforms to interactive forms with humans. The information flow will transition to "human-machine-internet of things devices-ChatGPT". ChatGPT will meet the requirements of different roles for information generation and dissemination in terms of granularity, types, and real-time capabilities in a more intelligent manner. It can quickly explore diverse and innovative design solutions, enhancing efficiency while rapidly iterating and optimizing materials, manufacturing processes, and performance parameters. Cascella et al. (2023) in the healthcare field suggest that ChatGPT has tremendous potential to accelerate science and improve scientific literacy by supporting research in various aspects. On a broader scale, they may aid in exploring literature and generating new research hypotheses. Furthermore, these strategies can be utilized for handling complex data and extracting useful information from medical texts such as electronic health records, clinical notes, and research papers. They can even facilitate the dissemination of science by translating complex research into language that is more easily understood by the public.

Although there have been numerous discussions about ChatGPT in various fields, the author has observed a lack of exploration in natural disaster prevention and mitigation. Global frequent natural disasters have caused significant loss of life and property, making natural disasters a common challenge for countries worldwide (Huang et al., 2023b; Xu and Xu, 2021). In recent years, with global climate change, extreme weather events such as heatwaves, floods, and droughts have become more frequent in China, exacerbating the risks associated with these events. The risks of natural hazards are also increasing. These high-risk areas are concentrated in eastern China's densely populated and economically developed regions. With the rapid development of economic globalization and urbanization, the concentration of social wealth and population density, various disaster risks intertwine and accumulate, posing more complex challenges and a difficult situation for natural disaster management in our country. As social intelligence levels continue to rise, does ChatGPT play a positive role in addressing these challenges? Therefore, the author explores and analyzes ChatGPT's capabilities in information acquisition, rapid response and availability, disaster prevention knowledge dissemination and education, and assistance in emergency response in natural disaster management. The author also discusses the current limitations of using ChatGPT and provides prospects for the future of artificial intelligence in natural disaster prevention and mitigation.

2. The ability to obtain a wide range of information efficiently

With the development of technology, there have been significant changes in how information is conveyed. From print media and television to online media and from online media to digital platforms such as WeChat and short videos, the efficiency of information dissemination has dramatically improved, and the cost of accessing information has been reduced. Moreover, the mediums and methods of information dissemination continue to evolve. In the traditional process of information

dissemination, humans have been the main agents involved in creating and organizing information, such as publishing papers, books, and recording and broadcasting videos. These knowledge carriers are produced through human actions and acquired by information seekers through publishing, recording, and playback (Wang et al., 2023). At this stage, the effectiveness of information dissemination can be influenced by factors such as the biases of the initial information disseminators, the quality of the content being conveyed, and the mode of transmission. However, such methods of information dissemination are not conducive to people quickly obtaining the information they need, especially in critical situations. In this context, ChatGPT has a significant advantage in terms of its ability to acquire information (Li et al., 2023). In the past, they acquired information by conducting keyword searches online, filtering and selecting data from the results based on individual needs, and summarizing and analyzing the desired information. However, when using ChatGPT to acquire information, one simply needs to ask targeted questions in the interactive interface. The cumbersome processes of information retrieval, filtering, and summarization can be handled by ChatGPT alone. The two methods are illustrated in Fig. 2. It is evident that with the support of ChatGPT, the information acquisition process becomes remarkably simplified and efficient.

During its training process, the ChatGPT model learns from a vast amount of text related to natural disasters, resulting in a substantial accumulation of knowledge in natural disasters. The knowledge behind and impact of every natural disaster is complex and involves many fields. For instance, the catastrophic mudslide event in Zhouqu County on August 7, 2010 (Liu et al., 2011; Shan, 2015; Zhang et al., 2013) could include geology, earth science, geography, meteorology, environmental science, civil engineering, and social science. Researchers need to consider numerous factors when analyzing similar events, making the contextual information surrounding these events highly crucial. However, obtaining information through means such as accessing research papers, online news, short videos, and newspapers may not be efficient in information retrieval. ChatGPT can play a significant role in the initial information-gathering stage in such cases. Furthermore, as algorithms and semantic data continuously improve, the information provided by ChatGPT will become even more accurate.

Natural disaster events are closely relevant to everyone. When facing such circumstances, it is crucial for researchers to deeply understand and analyze them and for ordinary people to know about them. Only when everyone has a high level of disaster prevention awareness can the losses caused by natural disasters be significantly reduced. There are many ways to learn about natural disaster prevention and mitigation. The primary sources of information about natural disaster prevention and reduction for the public are television, mobile phones, and other media. However, these sources of information often provide a passive mode of access, and the content of the information may not always align well with the recipients' needs. In other words, many pieces of information are irrelevant and can easily lead to information overload in the brain,

reducing sensitivity to the truly relevant information. ChatGPT, focusing on one-on-one question-and-answer interactions, can transform the way people receive information from passive to active. This approach can deepen people's memory of the information and enhance their ability to translate theory into practice.

3. Quick response and availability

3.1. Quick response

Due to being a standalone model, ChatGPT can provide instant responses to user queries even without an internet connection, eliminating the need for waiting. This real-time capability and continuous availability give ChatGPT an advantage in providing quick information support. In emergencies, users can swiftly access relevant disaster knowledge and guidance. Since natural disasters often involve network and communication disruptions, utilizing ChatGPT to plan corresponding disaster relief efforts can be highly efficient. However, it is essential to note that ChatGPT cannot access real-time disaster data and the latest intelligence information in case of network and communication failures. Therefore, when using ChatGPT's answers and suggestions, it is necessary to conduct careful analysis and judgment in combination with real-time circumstances.

3.2. Availability

While ChatGPT cannot directly monitor natural disasters, it can provide information on natural disaster early warning systems and monitoring technologies. For example, ChatGPT can explain the working principles of earthquake early warning systems, how sensors are used to monitor volcanic activity, and how satellite imagery is used to detect signs of natural disasters. It can also provide summaries and analyses of existing research findings. It can accurately explain mature theories and some methods of disaster warning. It is beneficial for non-professionals to understand the research in this field. The author conducted simple question-and-answer tests using ChatGPT in four categories: concept explanation, method and technology, decision-making solutions, and phenomenon analysis. First, ChatGPT was used to explain concepts and terms related to natural disasters, and its responses were compared to the definitions of the relevant concepts. It was found that ChatGPT provided highly accurate answers, which can be attributed to its extensive training in related texts. Next, the author tested the accuracy of ChatGPT in answering questions about methods and technologies. It was found that ChatGPT provided detailed answers on various monitoring methods, analysis techniques, spatial information technologies, and pattern recognition and prediction techniques used in the field of natural disasters. Then, ChatGPT was tested on decision-making solution questions, and it was found that its responses in this category (including what to do and how to make decisions) were relatively generalized and lacked

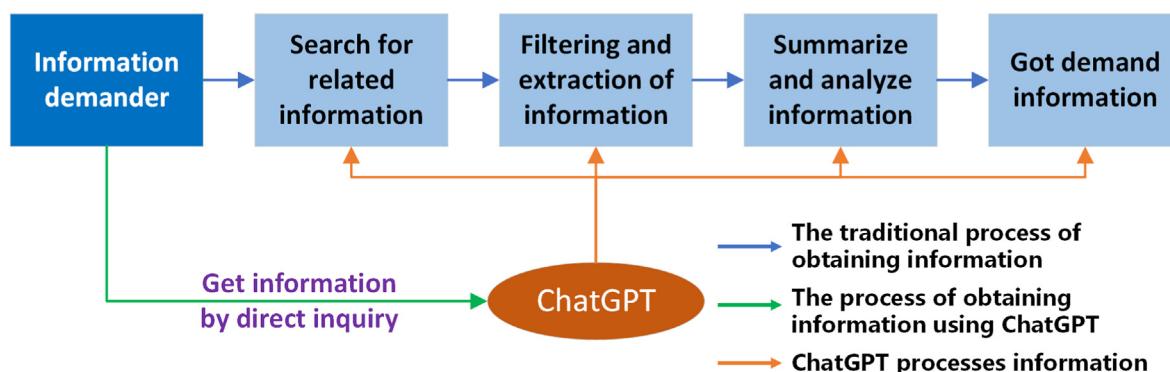


Fig. 2. Comparison between the traditional information acquisition process and ChatGPT information acquisition process.

specific answers. Finally, ChatGPT was tested on phenomenon analysis questions (such as the factors related to a landslide occurrence in a particular location and year, risk assessment, and vulnerability analysis), and it was observed that ChatGPT's responses in this category were rigid and had significant deviations from the actual situation. It indicates that ChatGPT lacks accuracy in answering more specialized questions. It is because ChatGPT is a text prediction model and may struggle to provide accurate answers to questions requiring professional analysis.

ChatGPT can provide advice and guidance in disaster response and emergency situations, including emergency measures, rescue strategies, and emergency response plans. It can answer questions about disaster warning systems, evacuation plans, and rescue resources. Regarding warning and prevention measures, ChatGPT can provide information on natural disaster warning systems and preventive measures, including monitoring techniques, interpretation of warning signals, and protective facilities. Regarding post-disaster recovery and reconstruction, ChatGPT can provide support for post-disaster recovery and reconstruction efforts, including advice on post-disaster assessment (Huang et al., 2022a; Shao et al., 2022, 2023; Shao and Xu, 2022), disaster area reconstruction planning, and post-disaster resource management. These aspects demonstrate that ChatGPT possesses rich knowledge and language understanding capabilities in natural disaster prevention and reduction, with the added benefit of fast response speed, indicating its high usability.

4. Disaster prevention knowledge and education

4.1. Providing resources for knowledge dissemination and education

There are still several challenges and issues in disseminating knowledge about natural disaster prevention and reduction in China. These include limited coverage and an incomplete system of sharing knowledge, inadequate public awareness and lack of educational emphasis, lack of innovation and outdated content in knowledge dissemination methods, insufficient practical emergency drills, and a lack of self-help and mutual assistance capabilities among the public. These challenges and issues are not aligned with the transformation of the emergency management system under the new institutional framework, making it difficult to respond to sudden disasters or emergencies effectively (Lu et al., 2019). In response to this situation, various departments are making efforts to improve the popular science system in the field of natural disaster prevention and reduction. For example, professionals provide collective lectures and education to students or specific groups, operate official accounts related to natural disasters, and promote popular science activities on campuses. As different groups of people may need other contents of popularization of science, their ability to learn and accept may also be different. When famous science personnel give collective lectures, the amount of knowledge received and retained by individuals may be limited.

In contrast, ChatGPT has significant advantages in delivering widespread science knowledge through interactive means. It can analyze students' learning history and abilities and customize personalized learning plans based on their needs and interests (Jiang et al., 2023). ChatGPT also provides a unique opportunity for personalized and compelling learning experiences because everyone has unusual learning habits, abilities, and needs. Students can utilize ChatGPT for specific skill training, such as setting up disaster scenarios and formulating evacuation plans. Through personalized and multi-turn dialogues, ChatGPT has the potential to overcome the temporal and physical limitations of human teachers, making knowledge transfer more efficient and convenient, while deepening students' learning experiences. When faced with emergency situations, people will no longer feel helpless, thereby reducing the losses caused by natural disasters.

4.2. Interactive learning and simulation exercises

ChatGPT can simulate various disaster scenarios and engage in virtual conversations with users, such as earthquakes (Cheng et al., 2023; Zheng et al., 2023), landslides (Huang et al., 2022b, 2023a; Ma et al., 2023), debris flows, floods, fires (Sun et al., 2023), etc. Users can ask ChatGPT questions about the current scenario, such as how to evacuate, find shelter, or use a fire extinguisher. Based on the information and questions provided by the user, ChatGPT can offer relevant advice and guidance. ChatGPT can also provide detailed instructions and practice processes based on the user's needs. Users can consult ChatGPT on self-help techniques, first aid measures, finding shelters, and safe evacuations. ChatGPT can provide specific steps and guidance, allowing users to simulate drills and enhance their proficiency in emergency operations.

Additionally, ChatGPT can engage in decision-making simulations, generating different emergencies and consequences based on the user's choices and actions. Users can understand the impact of their choices through conversations with ChatGPT and adjust and make decisions based on its suggestions. Through interactive learning and simulation exercises, ChatGPT can provide personalized emergency guidance and practical learning opportunities. Users can simulate real emergencies in conversations with ChatGPT, understand specific steps and methods for disaster response, and enhance their responsiveness and decision-making abilities through simulated drills. This interactive learning approach allows users to comprehend better and apply disaster prevention knowledge through practical and scenario-based dialogues.

5. Assisting in emergency response

5.1. Pre-disaster response

Due to China's frequent occurrence of natural disasters, there are significant challenges in emergency rescue operations. Some natural disasters occur suddenly, and the resulting casualties, property damage, and ecological harm are complex, posing enormous challenges to emergency response efforts (Chen and Wang, 2023). Therefore, it is necessary to have more rational and practical plans to deal with such emergencies in high-risk areas. ChatGPT can provide a wealth of information about natural hazards. Users can interact with ChatGPT to obtain the necessary knowledge, understanding these disasters' causes, characteristics, impacts, and response measures.

In high-risk areas, expert teams often must conduct in-depth analysis and deliberation to propose risk assessment plans, which will require a longer time and a higher labor cost (Zhang, 2023). The ChatGPT model can generate detailed emergency plans for users or households by combining various data and knowledge related to risk areas. For example, in a conversation, if a specific scenario is set (e.g., a house located at the foot of a mountain with frequent rainfall), ChatGPT can generate an emergency plan for that scenario. It will provide specific measures such as monitoring weather forecasts, understanding alarm systems, tracking water level changes, establishing a family alert system, identifying emergency contacts, creating a safe evacuation plan, preparing emergency supplies and equipment, developing a pet plan, scheduling regular reviews and drills, and fostering community cooperation. It will also provide detailed implementation methods or specific operational steps for each project. Although it cannot personally monitor various data indicators, it can offer particular and feasible strategies. In terms of providing resources and guidance, ChatGPT can provide information about disaster response resources and advice. It can provide answers related to emergency services, rescue organizations, donation institutions, and more, helping users understand the support and resources they can seek during a disaster. It is crucial because there is often a valuable period before a disaster occurs, and making the right choices quickly during this time can minimize the damage caused by the disaster.

5.2. During-disaster response

During disasters, communication is a crucial aspect. However, investigators found that government officials often use platforms like WeChat to transmit forecast and warning information during disaster response (Xu, 2022). This approach presents a significant problem, and important information can easily get lost or overlooked, reducing the efficiency of information dissemination. Especially during holidays, there is an influx of well-wishing messages on WeChat. Some messages may not even be read or responded to in time. This issue is even more pronounced at the grassroots level. Each person may be part of several work groups, ranging from a few to dozens. In special situations, information from multiple work groups may be concentrated, making it easy for critical and urgently needed information to be overwhelmed by a massive "information flow," thereby reducing the efficiency of information dissemination and potentially delaying timely actions.

Additionally, during significant disasters, communication infrastructure can suffer severe damage. Emergency hotlines like "120" and "119" may become unavailable, creating an "information island" in disaster-affected areas, which hampers people's ability to seek help. In such circumstances, ChatGPT, as an independent model, can still play a crucial role. It can instantly answer user queries without an internet connection if deployed locally. It can be a ray of hope for those unable to communicate with the outside world during a disaster. In such urgent situations, individuals may experience panic-induced mental blocks that hinder effective decision-making. ChatGPT does not face such limitations and can consistently provide relatively accurate advice regardless of the circumstances.

5.3. Post-disaster response

After a disaster occurs, the priority is to initiate rescue operations. In the actual implementation of emergency rescue work, the operational capability of relevant personnel is crucial for the smooth progress of rescue efforts. However, the overall functional capacity of emergency rescue teams still needs to be strengthened. There is a lack of practical experience and a lag in developing and upgrading advanced rescue equipment. Emergency rescue teams conduct a few targeted simulation training activities, and the drill evaluation system is not yet sound, resulting in unsatisfactory exercise outcomes.

Additionally, there is a lack of efficient collaboration and communication regarding theory, technology, and relevant laws and regulations (Chen and Wang, 2023). ChatGPT can play a significant role in emergency rescue operations as an interactive intelligent dialogue system. For example, it can still provide clear guidance to rescue personnel and volunteers in emergencies. Those involved in rescue efforts can ask ChatGPT questions to obtain rescue strategies for the disaster scene. Through multiple prolonged interactions with ChatGPT, it can provide increasingly accurate decision-making and action plans.

After a disaster, ChatGPT can also provide psychological support and advice by answering questions related to coping with psychological stress and handling emergencies. People will likely experience post-traumatic stress disorder (PTSD) after facing a significant crisis (Deng et al., 2019), including the affected population and rescue personnel. Previous research has found that individuals affected by PTSD should develop timely and effective psychological intervention and rehabilitation programs, especially for those who have been injured or engaged in highly demanding and psychologically intense tasks during rescue operations, as they have a higher risk of developing PTSD after rescue efforts (Liu et al., 2015). ChatGPT can communicate with affected individuals in real time and provide emotional support, encouragement, and comforting language to convey hope and reassurance. For the government, utilizing ChatGPT to develop intelligent chatbots or online question-and-answer systems can provide the public with guidance on post-disaster recovery, resource information, support measures, and more. This helps strengthen public unity and participation and enhances the visibility of

post-disaster recovery efforts. ChatGPT can also integrate and provide information on various post-disaster resources, policies, procedures, and guidance documents. The government can develop ChatGPT as a convenient information platform to offer one-stop post-disaster support and guidance to the public, helping affected individuals understand the various support measures provided by the government.

6. Problems faced in practical application

Although ChatGPT has excellent potential in natural disaster prevention and mitigation, it still faces challenges regarding real-time responsiveness, providing professional answers, accuracy, and how to update its database dynamically. The following points need to be considered in natural disaster prevention and mitigation.

6.1. Data quality and reliability

ChatGPT's responses are based on the extensive data it has been trained on. If the training data contains errors, biases, or inaccurate information, it can impact the generated responses from ChatGPT. Therefore, ensuring the quality and reliability of input data is crucial for obtaining accurate answers. It is essential when providing emergency plans, as reliable data and information are necessary to generate effective strategies. However, it's important to note that the model is trained on a specific database until a particular time, such as the ChatGPT model trained on data before September 2021. As a result, it lacks the ability to access the latest information and may not be able to provide up-to-date responses. Therefore, caution should be exercised when relying on ChatGPT's answers. Verifying the information from multiple sources may be necessary to avoid potential negative consequences.

6.2. Professionalism and accuracy

ChatGPT is a general language model that has not undergone specialized training or acquired domain-specific knowledge. Therefore, when it comes to complex issues related to natural disaster prevention and mitigation, ChatGPT may be unable to provide sufficiently accurate and professional answers. While the model can offer helpful information and reasonable suggestions, its responses are based on probabilistic predictions and do not guarantee 100% accuracy or applicability to all situations. For questions involving specialized knowledge, complex models, or disaster risk assessment, it is still necessary to rely on the expertise of domain experts and professional tools.

6.3. Lack of real-time awareness

ChatGPT is based on a static pre-trained model and cannot directly process real-time data. Therefore, ChatGPT has no real-time perception and cannot directly monitor natural disasters or provide immediate disaster data. It can only provide answers based on the information in the training data it was trained on. Therefore, users should rely on professional natural disaster monitoring agencies and local authoritative sources to obtain real-time disaster information. ChatGPT cannot directly comprehend the details and complexities of specific contexts or provide advice based on real-world experience. Currently, it can only offer more generalized suggestions. Therefore, in situations where timely updates of disaster information, warnings, or post-disaster assessments are required, ChatGPT may be unable to provide timely support. Reliance on professional data sources and real-time monitoring systems is necessary in such cases.

6.4. Difficult to explain and verify

The answers generated by ChatGPT are based on its training data and the internal mechanisms of the model. While the model can generate fluent and coherent responses, the specific reasoning and decision-

making processes are not visible to humans, making it difficult to explain how the model arrives at particular answers. Since the training data for the model primarily comes from text found on the internet, it may contain inaccurate, misleading, or biased information. Therefore, it is challenging to explain and verify the generated answers. It can make it difficult for users to determine the reliability and trustworthiness of the solutions. When using the information provided by ChatGPT, users should exercise discernment and try to compare and verify it with other reliable sources.

6.5. Limitations in communication and understanding

Due to being a text-based model, ChatGPT may have limitations in understanding non-structured or verbal expressions of information. It means that ChatGPT may not accurately comprehend subtle language nuances, emotional expressions, or non-textual forms of communication. Different wording can lead to other answers, which can be challenging to avoid, even for real humans. Therefore, when interacting with ChatGPT, it is essential to consider how to improve the reliability of the answers provided by ChatGPT.

7. Conclusions and prospects

In summary, new technologies like ChatGPT have great potential for application in natural disaster prevention and reduction. However, further research and innovation are needed to address data quality, real-time capabilities, expression of specialized knowledge, and interpretability to unleash their abilities thoroughly. The author proposes four possible directions for future research in the application of ChatGPT in natural disasters.

- 1) Accumulating more data, cases, and expert knowledge in disasters to better utilize them in the model. For example, ChatGPT can be re-trained by discipline and subject, and data input and proofreading can be carried out specifically. With multiple checks and modifications, ChatGPT will give more accurate and personalized answers when answering relevant questions.
- 2) Personalizing the fusion of the language model by training it with more profound knowledge in disaster prevention and reduction. Adding an explanation mechanism after generating results could further enhance the credibility of ChatGPT's responses.
- 3) Developing a more user-friendly interface for ChatGPT. It could involve incorporating user feedback, continuously optimizing the model based on real-time event information, and correcting inaccurate information. The interface also may include predefined issue buttons, multilingual support, additional resources and links, information trustworthiness hints, privacy protection, and security.
- 4) Exploring the portability of ChatGPT in daily use, deeply learning about users and their surrounding environments. It would create a personalized question-answering tool that considers individual information. Such a technology could provide more tailored recommendations for disaster prevention and reduction in a specific region, avoiding the issue of research results from experts that may not be suitable for the local environment.
- 5) The current ChatGPT is primarily based on text generation models. In the future, there is potential to explore multimodal fusion, combining various modalities such as text, images, and audio, to enable ChatGPT to comprehensively understand and generate information. This becomes particularly important in the field of natural disasters, where image generation can provide a deeper and more comprehensive understanding of the disasters, enhancing people's awareness and knowledge. By pursuing these research directions, ChatGPT can be further enhanced, and its effectiveness in natural disaster prevention and reduction can be maximized.

Declaration of competing interest

The authors declared that they have no conflicts of interest to this work.

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