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EDITED AND REVIEWED BY
Yi Xue,
Xi'an University of Technology, China

*CORRESPONDENCE
Yunhui Zhang,
zhangyunhui@swjtu.edu.cn

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Editorial: Advances and applications of artificial intelligence and numerical simulation in risk emergency management and treatment

Yunhui Zhang[1]*, Quanle Zou[2], Yihuai Zhang[3], Leilei Liu[4] and Chengyi Pu[5]

[1]Faculty of Geosciences and Environmental Engineering, Southwest Jiaotong University, Chengdu, China, [2]State Key Laboratory of Coal Mine Disaster Dynamics and Control, College of Resources and Environmental Science, Chongqing University, Chongqing, China, [3]James Watt School of Engineering, University of Glasgow, Glasgow, United Kingdom, [4]School of Geoscience and Info-Physics, Central South University, Changsha, China, [5]School of Insurance, Central University of Finance and Economics, Beijing, China

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Editorial on the Research Topic
Advances and applications of artificial intelligence and numerical simulation in risk emergency management and treatment

There are various types of risks in the world, with geological, environmental, and ecological risks, such as karst desertification, water inrush, rock burst, debris flow, and landslides, existing in natural and engineering situations (Liu et al., 2019; Luo et al., 2020; Xue et al., 2020; Zhang et al., 2021; Huang et al., 2022). These risks pose significant safety threats to human survival. Therefore, risk emergency management and treatment have become important topics of the national governance system and governance capacity. They take on the crucial responsibility of preventing and resolving significant security risks, timely responding to all kinds of disasters and accidents, the significant mission of protecting people's lives and property, and maintaining social stability. To better study risk emergency management and treatment, interdisciplinary risk science was formed, which includes environmental science, earth science, engineering science, safety science, and information science.

Our Research Topic focused on novel research in risk emergency management and treatment. A total of 21 research papers on this Research Topic present the *Advances and applications of artificial intelligence and numerical simulation in risk emergency management and treatment*.

Artificial intelligence and numerical simulation are feasible in the prevention of geohazards, such as landslides, karst desertification, etc. Ma et al., Wei et al., and Wang

et al. investigated the regional characteristics of landslides and evaluated the susceptibility by machine learning methods. Cai et al., Yang et al., and Yan and Xiao analyzed the mechanical mechanisms and treatment measures of local rock slopes by numerical simulation.

A geophysical exploration is an efficient approach to detecting blind geological problems. Chen et al. used a 3D vertical seismic profile (VSP) survey to indicate an offshore subsurface characterization. Jia et al. applied the high-density resistivity method to detect a mined-out area of a quarry in Xiangtan City. Li et al. found a new way to efficiently calculate seismic wave travel time. Zheng et al. introduced a very new technology to explain unmanned aerial vehicle remote-sensing images based on a fully convolutional neural network.

Advances and applications of artificial intelligence and numerical simulation were applied to tunnel engineering. Chen et al., Li et al., Lu et al., and Zeng et al. used numerical simulations to investigate engineering problems and their mechanisms. Gao et al., Li et al., Zhang et al., and Zhang et al. used artificial intelligence and numerical simulation to seek advanced and efficient methods to address engineering.

This Research Topic also brings some novel research related to the ecological environment. Qin et al. revealed the karst water circulation of eastern Sichuan in southwestern China based on the GIS and environmental isotope methods. Xu et al. conducted a comprehensive evaluation of the Ruoergai Prairie ecosystem upstream of the Yellow River.

So far, brilliant achievements have been obtained in the field of artificial intelligence and numerical simulation in risk emergency management and treatment. However, more related research is expected to be carried out, helping to construct a safer world.

Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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