Disaster Resilience through Geo-AI Agents: A Review of Emerging Trends

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SUMMARY

The rapid development of artificial intelligence in geospatial domains—from traditional GIS analytics to large language models and autonomous AI agents—is transforming the ways in which geospatial information supports decision-making. In disaster management, these technologies are emerging as powerful tools to enhance resilience and support communities that are more vulnerable to risks due to climate change and other hazards.

This study provides an overview of different Geo-AI agents prevalent in disaster management domain. AI agents are autonomous systems capable of perceiving, analysing, and acting on complex data. They show reasoning, planning, and memory and have a level of autonomy to make decisions, learn, and adapt. Because of their multifunctional and adaptive nature they are being deployed nowadays to support decision-making across diverse scenarios.

The study explores the roles of AI agents across the four main phases of disaster management: mitigation, preparedness, response, and recovery as well as multiple disaster type applications scenarios including natural, human-induced, and technological hazards. In mitigation, AI agents help identify risks and map hazards. During preparedness, they support simulations and early-warning systems, enabling better planning before events occur. In response phase, AI agents assist with assessing damage, organizing resources, and guiding evacuations. Finally during recovery, they help track rebuilding efforts and support decisions that strengthen long-term resilience.

Thus, by looking at recent research and real-world examples, this study highlights how AI agents are making disaster management more efficient, timely, and informed. Furthermore, it also identifies emerging trends and potential opportunities for further integration of AI agents in

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supporting disaster resilience. Overall, this work provides an overview of new technologies in the field and shows how Geo-AI agents can transform disaster management, offering a basis for future studies and practical applications.

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