

Harnessing Artificial Intelligence for Emergency Preparedness and Response: Opportunities and Risks

Note: AI helped produce this poster.

Introduction

The emergence of more accessible artificial intelligence technology provides emergency preparedness and response professionals with opportunities to work more quickly and efficiently as disasters seemingly become more frequent and severe (Haseley et. al, 2023). While AI as a tool has great implications for our work, it is important to balance its usefulness against potential risks.

Applications of AI in the Emergency Management Cycle

There are opportunities to use AI across the five phases of the emergency management cycle. Some examples are tied to the phases in Figure 1 (GeeksforGeeks, 2024).

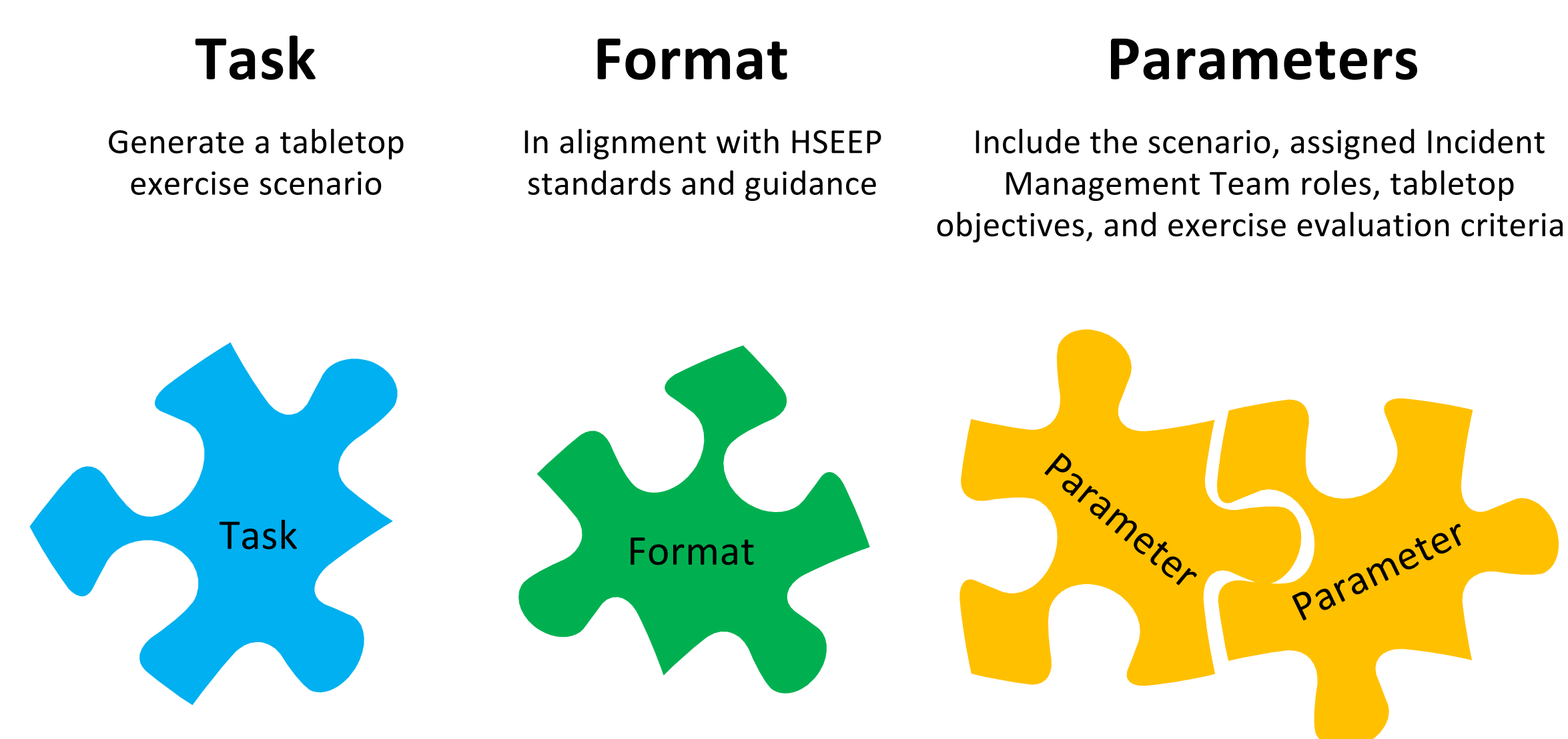
Figure 1. Applications of AI across the emergency management cycle



Method

Using artificial intelligence can be as simple as inputting desired direction and reviewing and editing outputs for use in work application. For example, when using large language model tools, provide prompts to produce desired output using building blocks such as designated tasks, formatting, and additional parameters (Artificial Intelligence: Tools and prompts).

Figure 2. Components of an effective AI prompt



Outcomes

As integration of artificial intelligence tools into emergency preparedness and response activities increases, it is important to consider and understand the opportunities and risk associated with leveraging this technology (S9 Consulting, 2024). Opportunities and risks associated with implementation are laid out below.

Figure 3. Opportunities and risks associated with use of AI

Opportunities

- Efficiency**
AI can produce information and products in seconds, allowing for more efficient work.
- Predictive Analytics**
Algorithms analyze historical data to predict likelihood and severity of disasters, facilitating proactive planning and resource allocation.
- Virtual Assistance**
Chat bots or virtual assistants provide instant access to emergency information, guide individuals through evacuation procedures, and offer psychological support during and after disasters.
- Simulation and Training**
Platforms can simulate various emergency scenarios, allowing responders to train in different situations, test strategies, and improve their preparedness without risking lives or resources.
- Decision Support**
AI can process real-time data, assess multiple scenarios, and provide actionable insights to responders, enabling informed decision-making.

Risks

- Bias, Fairness and Equity**
AI algorithms may include inherit biases from the data they are trained on, leading to unfair or discriminatory outcomes in resource allocation, decision-making, and prioritization during emergencies.
- Lack of Transparency**
Complex AI models often lack transparency, making it difficult to understand how they arrive at their conclusions. This opacity can undermine trust in the decision-making process and hinder accountability.
- Data Privacy and Security**
AI systems rely on vast amounts of sensitive data, raising concerns about privacy breaches and unauthorized access. Malicious actors could exploit vulnerabilities in AI systems to manipulate data or disrupt emergency response operations.
- Legal Implications**
There are insufficient policies in place to adequately regulate AI tools and the by-products created which could have yet unknown legal implications as AI becomes more commonplace.
- Ethical Dilemmas**
AI drives decision making in emergencies raising ethical dilemmas, such as the trade-off between maximizing overall utility and efficiency and protecting individual rights, autonomy, dignity, and equity.
- Technology Failure**
Systems are not infallible and can experience technical failures and malfunctions, especially in high-stress situations. Dependence on AI without backup plans or human oversight could compromise response efforts.

Conclusion and Next Steps

By understanding and balancing the opportunities and risks associated with AI and integrating with human expertise, we can create a future where technology empowers us to respond faster, smarter, and more equitably in the face of disasters. It's crucial to strike the right balance, using AI as a tool, not a replacement for human judgement and compassion.

Practical next steps for use of AI in Emergency Management

- Explore different AI tools for practical use in your work.
- Stay informed about uses and potential risks of use.
- Find out what your employer's policy is regarding use of AI.

Types of AI Available for Use

Different artificial intelligence tools offer various opportunities for application in emergency preparedness and response activities. There are artificial intelligence tools designed to assist with text, image, video, research, design, presentations, data collection and analytics, and productivity.



Haseley, A., Kamoie, B., Mariani, J., Karnik, C., Sinha, I., & Muckle Egizi, A. (2023, December 1). Leveraging AI for effective emergency management and crisis response. Deloitte Insights. <https://www2.deloitte.com/us/en/insights/industry/public-sector/automation-and-generative-ai-in-government/leveraging-ai-in-emergency-management-and-crisis-response.html>
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