

Emotional Machines: The Role of AI in Processing Collective Trauma for a Healing Society

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Article Info	ABSTRACT
Article history: Received 10 28, 2024 Revised 12 01, 2024 Accepted 12 03, 2024 Keywords: Artificial Intelligence Collective Trauma Healing Society Ethical Technology Social Resilience	This paper explores the potential of artificial intelligence (AI) to support societies in processing collective trauma, and addressing the psychological and societal impacts of shared hardships like wars, pandemics, and natural disasters. By examining certain AI’s capacity to document, preserve, and facilitate healing from collective trauma, this paper discusses how AI-driven tools can enhance resilience and social cohesion in line with the Sustainable Development Goals (SDG’s), specifically focusing on SDG 3 (Good Health and Well-being), SDG 10 (Reduced Inequalities), and SDG 16 (Peace, Justice, and Strong Institutions). The paper proposes that AI’s applications in trauma documentation, virtual therapy, and community-based healing initiatives can act as innovative resources for individual and societal recovery. However, the ethical considerations of deploying AI in such sensitive areas are pivotal such as issues of privacy, cultural sensitivity, and the need for genuine empathy are critical. Primarily, a responsible, ethically-guided AI framework in Society 5.0 could transform trauma processing, enabling global communities to heal and progress together toward a more compassionate and resilient future.
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INTRODUCTION

Collective trauma, the shared suffering brought on by predicaments like wars, pandemics, or natural disasters, leaves profound marks on both individuals and communities, affecting generations who may never experience the initial hardship firsthand (Somasundaram, 2014). These experiences craft out emotional and social aspects that are often challenging to heal, with wounds manifesting as cycles of inequality, distrust, and fractured communities. Traditionally, the healing process for collective trauma has been deep rooted in human connection and storytelling (Kiser, 2010), however, as we move into the age of Society 5.0, technology is integrated into human life with empathy and purpose, artificial intelligence (AI) offers new ways to support collective healing.

The integration of AI into mental health care has the potential to overcome various barriers that have historically hindered access to support systems. For instance, language barriers, geographical limitations, and socio-economic factors often prevent marginalised communities from seeking traditional therapy. AI systems, with their ability to adapt and provide multilingual support, can bridge these gaps, offering assistance

where conventional methods might fall short (Thieme, 2020). Moreover, AI can operate continuously, providing 24/7 support, which is critical during times of crisis when immediate intervention might be necessary.

The need for effective methods of addressing collective trauma has never been more pressing. With the rise of global crises such as the COVID-19 pandemic, climate change-induced disasters, and ongoing conflicts, societies worldwide are grappling with the aftermath of shared hardships (Tayyib, 2021). These events not only disrupt daily lives but also create long-term psychological scars that can hinder community cohesion and individual well-being. Addressing collective trauma effectively requires innovative solutions that can reach affected populations swiftly and adapt to diverse cultural contexts (Nicola, 2024). This is where AI can play a transformative role, offering scalable, customizable, and empathetic solutions to trauma care that traditional systems may struggle to provide on their own.

The intersection of AI and collective trauma processing represents a crucial development in mental health care and social healing. Recent studies have shown that AI systems can identify

patterns in trauma narratives that might be overlooked by human observers, potentially leading to more comprehensive understanding of how trauma affects communities across generations (Graham et al., 2019). This technological capability, combined with the growing need for scalable mental health solutions, positions AI as a vital tool in addressing collective trauma. However, the implementation of such systems must be carefully considered to ensure they enhance rather than replace human connection in the healing process.

AI has the capacity to document trauma, preserve stories, provide mental health support, and create spaces for remembrance, evolving into a tool that addresses both individual and collective needs (Graham, 2019). In this framework, AI aligns with critical Sustainable Development Goals (SDG's), such as SDG 3 (Good Health and Well-being), SDG 10 (Reduced Inequalities), and SDG 16 (Peace, Justice, and Strong Institutions). This paper explores how AI, when ethically applied, can stimulate resilience and empathy, enabling societies to process collective traumas in ways that respect both history and human character, creating a foundation for a more compassionate and unified global future.

METHODS

Theoretical Research and Literature Review on AI in Trauma and Mental Health

This research phase involved a comprehensive review of existing literature on AI applications within mental health, trauma processing, and digital empathy. Sources were drawn from peer-reviewed journals in psychology, AI ethics, and digital humanities, and included research papers, meta-analyses, and policy reports that explore AI's ability to respond to human emotional states and support trauma recovery. Key areas of focus included AI's role in preserving cultural memory, supporting therapeutic applications, and fostering social empathy (Balcombe, 2023). The literature review aimed to understand AI's current capabilities and limitations within mental health and trauma-related contexts, while also identifying any gaps in research where future AI advancements could be beneficial (Thieme, 2020).

A significant portion of the literature also highlighted the growing trend of using AI for sentiment analysis in social media, which can be adapted to monitor community stress levels and detect early signs of collective distress (Nijwahan, 2021). By analysing posts and interactions on platforms like Twitter (X) or Facebook, AI systems can gauge the emotional climate of a community, identifying potential triggers for anxiety, depression, or collective trauma (Lanerolle, 2022). This can enable mental health organisations and governments to intervene proactively, providing support before issues escalate. Additionally, AI's ability to handle

large datasets makes it possible to analyse historical trauma narratives, offering insights into recurring themes and helping design better-targeted therapeutic interventions.

Data Sources and Selection Criteria

To ensure a comprehensive analysis, academic databases such as Semantic Scholar, DOI, Springer, Pubmed, etc were used. Selection criteria focused on studies published in the last several years, prioritising those that examined AI's impact on emotional processing, trauma documentation, and ethics in digital empathy.

Goals based on this Research

The objective was to gain insights into both the practical applications and theoretical underpinnings of AI in trauma and mental health. This review provided the foundational knowledge for assessing how AI can be aligned with SDG 3 (Good Health and Well-being), SDG 10 (Reduced Inequalities), and SDG 16 (Peace, Justice, and Strong Institutions).

Ethical Framework Analysis and SDG Alignment

Given the sensitive nature of trauma-related AI applications, this methodology places a strong emphasis on evaluating ethical considerations and aligning AI initiatives with specified SDG's.

Ethical considerations are particularly important when AI applications deal with vulnerable populations (Makridis, 2021). Individuals suffering from trauma may not be in the best state to provide informed consent, and there is always the risk of exploiting sensitive data (McLennan, 2022). For example, while AI systems can help document and analyse trauma experiences, there is a danger that such information could be misused by entities seeking to capitalise on data or manipulate emotional narratives. Therefore, a robust ethical framework is essential, emphasising informed consent, data protection, transparency, and the prevention of any form of exploitation. Ensuring that AI applications adhere to these principles not only protects individuals but also builds trust, which is crucial for the effective implementation of AI in trauma care.

Ethical Standards and AI Principles

To ensure responsible AI use, ethical guidelines from sources like the United Nations, the World Health Organization, and IEEE's Ethically Aligned Design were reviewed. Key principles such as informed consent, privacy, cultural sensitivity, and transparency were applied to AI-driven trauma applications to address potential risks and ethical dilemmas (Saeidnia, 2024).

Privacy concerns in AI-driven trauma processing extend beyond individual data protection

to encompass collective privacy rights. Communities affected by shared trauma may have specific cultural protocols regarding how their stories are shared and preserved. AI systems must be designed to respect these protocols while still maintaining their effectiveness as healing tools (Martinez, 2021). The development of culturally sensitive AI frameworks that can adapt to different community needs while maintaining data security represents an ongoing challenge in the field.

AI Ethical Concerns

Privacy and data security are crucial in trauma processing, as users of AI-driven mental health tools may share sensitive information (Martinez, 2021). The analysis addressed how data protection laws and AI ethics frameworks must be integrated to protect users. Additionally, the potential for bias in AI responses was considered, as cultural and linguistic biases could misinterpret or mishandle trauma expressions from diverse populations (Straw, 2020).

Alignment with SDG's

- a. SDG 3 (Good Health and Well-being): Focused on the responsibility of AI to provide equitable and compassionate mental health care.
- b. SDG 10 (Reduced Inequalities): Addressed the accessibility of AI trauma support for all, especially marginalised communities.
- c. SDG 16 (Peace, Justice, and Strong Institutions): Emphasised the importance of using AI to uphold justice, trust, and cultural sensitivity in digital trauma processing.

Case Study Analysis on AI-Driven Trauma Applications

The analysis of real-world case studies provided valuable insights into how AI is currently used to support trauma survivors and communities affected by collective hardship (Vinuesa, 2019). The Shoah Foundation's project, which preserves Holocaust testimonies through interactive AI-driven digital avatars, exemplifies how natural language processing and machine learning can be employed to create "living" archives, allowing future generations to engage with survivor narratives dynamically (USC Shoah Foundation, 2024). This approach demonstrates AI's role in documenting trauma with empathy and historical sensitivity, fostering collective memory and understanding. Similarly, Replika and Wysa AI chatbots designed for emotional support offer trauma survivors accessible, virtual therapeutic interactions, particularly beneficial in regions where traditional mental health resources are scarce (Replika & Wysa, 2024). These platforms use adaptive algorithms to recognize and respond to users' emotional states, simulating human empathy and making mental

health support more widely available (Sharma, 2020). Another example, Project Rewind for Refugees, uses AI to help displaced individuals document their personal stories and preserve cultural memories, emphasising AI's potential in sustaining identity and resilience amidst displacement. Together, these case studies reveal AI's diverse applications in trauma processing and underscore its alignment with Sustainable Development Goals, such as SDG 3 (Good Health and Well-being), SDG 10 (Reduced Inequalities), and SDG 16 (Peace, Justice, and Strong Institutions), by making mental health care, historical preservation, and cultural empathy more accessible on a global scale.

Another critical application of AI can be seen in AI-driven narrative therapy, which uses natural language processing to analyse trauma narratives and provide personalised feedback (Szalai, 2020). These systems can help individuals articulate their feelings, track progress over time, and identify core issues that may be too painful to address directly in traditional therapy. AI can also assist therapists by providing real-time analysis of patient interactions, alerting them to signs of distress or anxiety that might not be immediately visible (Blyler, 2023). This partnership between AI and therapists not only enhances the therapeutic process but also helps in making therapy more efficient and focused.

RESULT AND DISCUSSION

AI's role in trauma documentation and preservation offers new ways to capture the stories of those affected by collective hardships, going beyond simple data collection to create "living archives." By utilising natural language processing and interactive digital avatars, AI can preserve the voices of trauma survivors and integrate diverse cultural narratives into collective memory (Ma, 2017). This approach aligns with SDG 16 (Peace, Justice, and Strong Institutions) by ensuring that marginalised perspectives are included in historical records, contributing to justice and inclusivity. The Shoah Foundation's use of AI to preserve Holocaust testimonies illustrates how technology can facilitate meaningful remembrance, offering future generations a way to interact with and learn from survivors' experiences (USC Shoah Foundation, 2024). This documentation preserves collective trauma as part of human history, fostering empathy and resilience.

One of the fundamental benefits of AI in trauma documentation is its ability to standardise and systematise data while maintaining the nuances of individual experiences. By creating comprehensive databases, AI enables researchers and policymakers to identify patterns and correlations that can inform broader societal interventions. For instance, identifying recurring

themes in trauma narratives can help in recognizing systemic issues that contribute to collective trauma, such as racial discrimination or gender-based violence, prompting more effective policy responses (Valle, 2019). Moreover, the use of AI can reduce the emotional burden on human therapists who otherwise might have to listen to distressing stories for extended periods, thus preserving the mental health of support providers as well.

AI-driven mental health support applications, such as virtual therapy bots and emotion-recognition systems, provide scalable solutions to trauma care, addressing mental health needs where traditional services may be inaccessible (Nair, 2024). These AI tools simulate empathetic responses, offering guidance to individuals processing trauma, and can be accessed globally, making them particularly valuable in remote or underserved regions (Van, 2023). By offering low-cost, accessible mental health support, these applications contribute directly to SDG 3 (Good Health and Well-being) and SDG 10 (Reduced Inequalities). For example, Replika and Wysa are AI platforms that deliver emotional support to users through real-time, adaptive interactions, enabling personalised care on a mass scale (Replika & Wysa, 2024). Such tools democratise mental health services, breaking down geographic and economic barriers to trauma support and creating equitable health access.

Beyond individual care, AI can facilitate collective healing by creating digital spaces for community-based memorialization and remembrance (Tomasev, 2020). These virtual environments such as interactive digital memorials and public art installations offer communities a shared space to process trauma, supporting societal resilience (Zhang, 2024). Through immersive and interactive experiences, AI allows individuals to engage deeply with collective memories, making the healing process both accessible and meaningful. By fostering community cohesion and promoting empathetic dialogue, these AI initiatives advance SDG 16, as they build social solidarity and encourage peaceful, inclusive interactions. Project Rewind, which documents refugees' personal stories, exemplifies this capacity for AI to strengthen community bonds by preserving cultural memory and enabling displaced communities to stay connected to their identities.

However, using AI in trauma processing requires stringent ethical considerations, particularly regarding privacy, cultural sensitivity, and the authenticity of "digital empathy." AI applications must safeguard personal data, respect cultural differences, and ensure that responses feel genuine to avoid the risk of impersonal or insensitive interactions (Pizzi, 2020). Ethical frameworks such as those from the United Nations and IEEE advocate

for informed consent, privacy, and cultural inclusivity in AI implementations, which are essential to building trust in these technologies (Hogenhout, 2021). By adhering to these ethical principles, AI can support SDG 16 by creating just and transparent systems that honour individual and community identities. For instance, localised AI adaptations can provide culturally tailored responses, offering trauma processing approaches that are sensitive to specific community values and practices, further aligning AI initiatives with a globally inclusive ethos.

One of the most innovative potentials of AI lies in its capacity to foster "digital empathy" through systems trained to understand and respond to human emotions. Advanced emotion-recognition technology allows AI to detect subtle emotional cues and adjust responses accordingly, simulating empathetic engagement in trauma processing (Talbot, 2021). This "digital empathy" could serve as a bridge in areas lacking human therapists, providing trauma survivors with a semblance of emotional connection that can aid in their recovery. Such applications contribute to SDG 3 (Good Health and Well-being) by expanding mental health resources and creating supportive, compassionate environments. For example, AI systems designed for emotional response training could help trauma survivors feel acknowledged and understood, thereby enhancing their recovery journey in ways that respect and honour their emotional experiences.

Lastly, AI's capacity to analyse trauma data can inform trauma-sensitive public policy, allowing governments to identify community needs and allocate resources for mental health and resilience-building initiatives (Valle, 2019). By analysing data on trauma impacts, AI can highlight "hotspots" of distress and recommend policies that proactively address vulnerable populations' needs. This approach aligns with SDG 16 (Peace, Justice, and Strong Institutions) by promoting evidence-based policies that support social harmony and resilience. For instance, AI-generated insights can guide mental health funding to regions experiencing high trauma rates, thereby creating more responsive and trauma-informed public services. In this way, AI not only aids in individual trauma processing but also becomes a resource for systemic change, driving progress toward a compassionate, resilient society.

CONCLUSION

In conclusion, AI holds transformative potential for helping societies process collective trauma, with applications that range from trauma documentation and virtual therapy to community-centred healing and policy-making. When aligned with ethical principles and the guiding SDG's, AI in trauma processing can contribute to a more resilient, compassionate, and just global society. By adhering

to the goals of SDG 3, SDG 10, and SDG 16, AI can become an indispensable ally in building a future where societies are equipped to heal from trauma collectively, fostering a world that honours the past while looking toward a compassionate future.

The future of AI in trauma care is not just about technological advancement but about the integration of these innovations into everyday life in a way that complements traditional methods. For true healing, societies must not only rely on the accuracy and efficiency of AI but also maintain the irreplaceable value of human empathy and connection. Thus, collaboration between AI developers, mental health professionals, and community leaders is essential to create systems that are not only effective but also respectful and humane. As AI continues to evolve, ensuring ethical oversight and continuous improvement will be vital in mitigating the risks of bias and misuse, essentially allowing AI to be a true partner in the journey toward global healing.

Furthermore, the role of AI in collective trauma processing must be viewed as part of a broader strategy that incorporates diverse cultural perspectives and respects the unique ways different communities experience and express trauma. By creating tools that are culturally sensitive and adaptable, AI can help foster an inclusive approach to healing, where every community's narrative is acknowledged and preserved. This respect for diversity not only promotes social cohesion but also encourages a deeper understanding of shared human experiences, strengthening the global fabric of empathy and solidarity. Such inclusive AI initiatives can bridge gaps between cultures, helping to heal divisions that may have been exacerbated by past collective traumas.

Finally, the integration of AI into trauma care has the potential to revolutionise how societies approach mental health and well-being. However, this potential will only be realised if AI systems are designed with ethical considerations at the forefront. Establishing clear guidelines on privacy, data security, and cultural sensitivity is crucial to gaining the trust of users and ensuring that AI applications are genuinely beneficial. Through responsible and thoughtful deployment, AI can help build a future where collective trauma is met with empathy, understanding, and effective support, enabling individuals and communities to recover, rebuild, and thrive together.

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