What Are the User Interface Considerations for Clinical AI?

Rasit Dinc

Rasit Dinc Digital Health & AI Research

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Abstract

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Author: Rasit Dinc

Artificial intelligence (AI) is poised to revolutionize healthcare, offering the potential for improved diagnostics, personalized treatments, and streamlined workflows. However, the successful integration of AI into clinical practice is not merely a matter of developing sophisticated algorithms. The user interface (UI) and user experience (UX) of these systems are paramount to their adoption, efficacy, and safety. For health professionals to trust and effectively utilize AI tools, the design of the interface through which they interact with this technology must be carefully considered. This article explores the key UI considerations for clinical AI, drawing on recent academic research to provide a professional overview for healthcare practitioners.

The Challenge of the "Black Box"

A significant barrier to the adoption of AI in clinical settings is the "black box" phenomenon, where the reasoning behind an AI's output is opaque to the user [1]. This lack of transparency can lead to a deficit of trust, particularly in high-stakes medical decisions. When a clinician cannot understand how an AI arrived at a particular diagnosis or treatment recommendation, they are less likely to rely on it. Therefore, a fundamental UI consideration is the incorporation of explainable AI (XAI). The interface must not only present the AI's conclusion but also provide a clear and understandable explanation of the factors that contributed to it. This might include highlighting key data points in a patient's electronic health record, presenting similar anonymized cases, or visualizing the decision-making process of the algorithm.

User-Centered and Context-Aware Design

Clinical environments are diverse, and the needs of a radiologist are vastly different from those of a primary care physician or a surgeon. A one-size-fits-all approach to UI design is therefore inadequate. User-centered design principles are crucial, requiring a deep understanding of the specific workflows, information needs, and cognitive loads of the intended users [2]. The UI should be tailored to the clinical context, presenting the most relevant information in a timely and intuitive manner. For example, an AI tool for radiologists might overlay heatmaps on medical images to indicate areas of interest, while a system for general practitioners could prioritize alerts for patients at high risk of a specific condition.

Furthermore, the interface must be context-aware, intelligently filtering information to avoid alert fatigue. An excess of non-critical notifications can lead to clinicians ignoring important warnings. A well-designed UI will leverage AI to prioritize alerts based on urgency and clinical significance, ensuring that the most critical information is brought to the forefront of the user's attention. This requires a sophisticated understanding of the clinical situation, integrating data from multiple sources to provide a holistic view of the patient.

Building Trust and Managing Uncertainty

Trust is a cornerstone of the clinician-patient relationship, and it is equally important in the relationship between clinicians and AI. The UI plays a critical role in fostering this trust. The system should be transparent about its limitations and uncertainties. When an AI model is not confident in its output, this should be clearly communicated to the user, along with the reasons for the uncertainty. This allows the clinician to exercise their own judgment and use the AI as a supportive tool rather than an infallible oracle.

The design should also empower the clinician, reinforcing their role as the ultimate decision-maker. The UI should facilitate a collaborative interaction, where the AI provides insights and recommendations, but the final clinical judgment rests with the human expert. This approach not only enhances safety but also promotes a sense of ownership and control, which is essential for user acceptance [3].

Ethical Considerations and Future Directions

As AI becomes more integrated into healthcare, ethical considerations surrounding data privacy and algorithmic bias become increasingly important. The UI must be designed to protect patient confidentiality and to mitigate the risk of biased recommendations. This includes providing users with control over their data and ensuring that the AI's outputs are fair and equitable.

In conclusion, the successful implementation of AI in clinical practice hinges on thoughtful and user-centered UI design. By prioritizing transparency, context-awareness, and trust, we can create AI-powered tools that empower clinicians, enhance patient care, and realize the transformative potential of this technology. The future of clinical AI is not just about building smarter algorithms, but about designing interfaces that are intuitive, reliable, and worthy of the trust of healthcare professionals.

References

[1] Jung, I. C., Schuler, K., Zerlik, M., Grummt, S., Sedlmayr, M., & Sedlmayr, B. (2025). Overview of basic design recommendations for user-centered explanation interfaces for AI-based clinical decision support systems: A scoping review. *Digital Health*, *11*, 20552076241308298. [https://doi.org/10.1177/20552076241308298] (https://doi.org/10.1177/20552076241308298)

[2] Gill, A., Rainey, C., McLaughlin, L., Hughes, C., Bond, R., McConnell, J., & McFadden, S. (2025). Artificial Intelligence user interface preferences in radiology: A scoping review. *Journal of Medical Imaging and Radiation Sciences*, *56*(3), 101866. [https://doi.org/10.1016/j.jmir.2025.101866] (https://doi.org/10.1016/j.jmir.2025.101866)

[3] Raoult, H. (2025, August 18). The Future of UX for AI-Driven Healthcare User Interfaces. *UXmatters*. [https://www.uxmatters.com/mt/archives/2025/08/the-future-of-ux-for-ai-driven-healthcare-user-interfaces.php] (https://www.uxmatters.com/mt/archives/2025/08/the-future-of-ux-for-ai-driven-healthcare-user-interfaces.php)

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