What Are the Integration Challenges of AI in PACS Systems?

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Published: June 10, 2018 | AI in Medical Imaging and Diagnostics

DOI: 10.5281/zenodo.17998907

Abstract

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Introduction

Artificial Intelligence (AI) is rapidly transforming the landscape of medical imaging, promising to enhance diagnostic accuracy, streamline workflows, and improve patient outcomes. Picture Archiving and Communication Systems (PACS), the backbone of modern radiology departments, are at the center of this transformation. The integration of AI into PACS offers the potential to unlock unprecedented efficiencies and capabilities. However, this integration process is not without its challenges. Healthcare professionals and IT administrators face a complex array of technical, operational, and ethical hurdles that must be overcome to fully realize the benefits of AI in radiology. This article provides an academic and professional overview of the primary challenges encountered when integrating AI into PACS systems and offers insights into potential solutions.

Technical Challenges: The Foundation of Integration

Technical issues form the bedrock of AI-PACS integration challenges. **Data quality and standardization** are paramount, as AI performance is directly tied to the data it is trained on. Heterogeneous data, inconsistent metadata, and non-standardized formats can degrade algorithm accuracy [1, 2]. **Compatibility with legacy systems** is another major hurdle. Many existing PACS infrastructures are not equipped to handle modern AI applications, requiring costly custom solutions or upgrades [2]. Finally, **interoperability** remains a significant barrier. The lack of standardized communication

protocols between different AI and PACS vendors hinders the creation of a scalable and unified AI ecosystem [1].

Operational and Workflow Challenges: The Human Factor

Operational and workflow issues are equally critical. **Seamless workflow integration** is essential for adoption; AI tools must augment, not disrupt, the radiologist's daily routine. Embedding AI outputs directly into the PACS viewer is key to maintaining efficiency [2]. **User resistance and training** are also significant factors. Overcoming skepticism requires comprehensive education on the capabilities and limitations of AI to foster trust and effective collaboration [1]. Lastly, **over-reliance and algorithmic bias** present ethical risks. Unchecked trust in AI can lead to errors, while biased algorithms can perpetuate health disparities [3].

Ethical and Legal Hurdles: Navigating the Regulatory Landscape

Ethical and legal hurdles further complicate AI-PACS integration. **Patient data privacy and security** are paramount, requiring strict adherence to regulations like HIPAA and GDPR when handling data for training and clinical use [2]. The issue of **liability and accountability** for AI-related errors remains a significant legal gray area, creating a deterrent for adoption [1]. Finally, the **“black box” problem**, where AI decision-making processes are opaque, erodes trust and complicates the validation of these tools [1].

Conclusion and The Path Forward

The integration of AI into PACS systems holds immense promise for the future of radiology, but the path to achieving this vision is fraught with challenges. Overcoming the technical barriers of data standardization and interoperability, addressing the operational hurdles of workflow integration and user training, and navigating the complex ethical and legal landscape are all critical steps in this journey.

A collaborative approach is essential. Standards bodies, technology vendors, healthcare institutions, and clinicians must work together to develop and adopt universal standards for AI in medical imaging. A focus on user-centered design, comprehensive training programs, and the development of clear ethical and legal frameworks will be crucial for fostering trust and ensuring the responsible and effective use of AI in clinical practice. By proactively addressing these challenges, the radiology community can pave the way for a future where AI and human expertise combine to deliver the best possible care for patients.

References

[1] Kotter, E., & Ranschaert, E. (2020). Challenges and solutions for introducing artificial intelligence (AI) in daily clinical workflow. *European Radiology*, *31*(1), 5–7.

[2] RamSoft. (2025, August 15). *How to Integrate AI with PACS and RIS*

Systems? RamSoft. https://www.ramsoft.com/blog/integrate-ai-with-ris-pacs

[3] Stogiannos, N., Cuocolo, R., D'Antonoli, T. A., & et al. (2025). Recognising errors in AI implementation in radiology: A narrative review. *European Journal of Radiology*, *191*, 112311.
