

Artificial Intelligence, Real Radiology

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Glendower: I can call spirits from the vasty deep.
Hotspur: Why, so can I, or so can any man;
 But will they come when you do call
 for them?
 – William Shakespeare, *Henry IV,*
Part I

Welcome to this inaugural issue of *Radiology: Artificial Intelligence*. Our journal's mission is to publish high-quality scientific work that advances our understanding of artificial intelligence (AI) in radiology.

AI has become a topic of great interest—especially the application of machine learning techniques to medical images—but AI itself is not new. The term *artificial intelligence* was proposed in 1956 to describe efforts to understand, simulate, and improve upon human qualities such as reasoning, learning, solving problems, understanding verbal and written language, processing visual information, and playing games like chess and poker.

What is new is a resurgence of interest in AI, particularly in the use of machine learning to recognize patterns in images. And, curiously, it is game playing that has opened this new frontier—but not the games of chess, checkers, or Go. Rather, think Xbox and PlayStation. Video games require a rapidly changing three-dimensional scene to be transformed into two-dimensional images shown in real time. The need to compute images efficiently spurred the development of highly parallelized graphics processing units. These specialized processors, in turn, have powered software for increasingly complex and sophisticated “deep” artificial neural network models. Whereas neural networks developed 10 years ago typically had three or four layers, today's deep networks comprise hundreds of layers (1).

Deep learning models have engendered both great excitement and a great deal of hyperbole. After all, if AI systems can pick out pictures of cats on the web, then surely such systems are ready to replace radiologists, right? Well, perhaps not, at least not right now. There is much work to be done to build and validate systems that can detect and characterize the thousands of imaging findings and their associated diseases that can be seen across a panoply of radiology studies.

And that brings us to the quote from Shakespeare. Anyone can claim to build an AI system, but that doesn't mean that the system will do their bidding as imagined. Our journal is here to assure that the science and applications

of AI in radiology are built on thoughtful, innovative, and well-validated research.

What sorts of topics will this journal publish? We will bring you the same high caliber of research that is found in RSNA's flagship scientific journal, *Radiology*, but focused here on AI, machine learning, and data science in radiology. In particular, we seek to publish first-rate work that provides rigorous evaluation of AI's applications to clinical problems in radiology.

We invite manuscripts that show the impact of AI to extract information, diagnose and manage disease in patients, streamline radiology workflow, or improve health care outcomes. We're interested in image segmentation, image reconstruction, automated detection of abnormalities, diagnostic reasoning, natural language processing, clinical workflow analysis, radiomics, and radiogenomics. We also invite manuscripts that demonstrate novel applications of AI in radiology or highlight innovative AI methodologies. Developers of publicly available sets of radiologic images, image annotations, radiology reports, or algorithms can present their work as a Data Resources report.

AI and radiology do not exist in isolation: they are part of broad endeavors to advance knowledge and improve health. As such, this journal will feature articles on the ethical, legal, social, and economic implications of AI in radiology.

AI is and must be a human—and humane—activity (2). We must engage in this work with an eye to how these technologies will help us care for our patients more effectively and humanely. Our goal is not to replace, but rather to extend our human abilities to provide medical care—and to improve the lives of those we are privileged to serve.

All RSNA members receive access to this online bi-monthly journal. We invite all readers (RSNA members or not) to sign up for our Editor's Blog, The Vasty Deep (<https://pubs.rsna.org/page/ai/blog>) and to follow us on Twitter (@Radiology_AI). These social media platforms will augment the journal and offer innovative online features.

Again, welcome!

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