

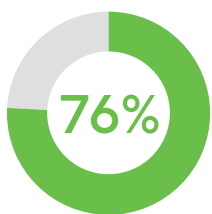
Introduction

In recent years, artificial intelligence (AI) has evolved from theoretical research to practical tools that are able to assist radiologists in their everyday tasks. **As healthcare continues to embrace digital transformation¹, radiology stands at the forefront, benefiting from the integration of AI-driven technologies and cloud computing.**

AI is proving to be a powerful tool in reducing diagnostic errors, particularly in high-pressure environments like emergency departments. Studies show that AI systems can match or even surpass the performance of radiologists in detecting abnormalities across a range of imaging modalities, including x-rays and MRIs. For instance, AI solutions have demonstrated sensitivity rates as high as 99.1%² in identifying abnormalities in chest x-rays, offering support for overburdened radiologists by accurately prioritizing cases that need immediate attention over routine cases. These tools not only help in detecting common conditions like fractures and tumors but also reduce the risk of missed diagnoses in challenging cases, such as subtle fractures or conditions in pediatric and elderly patients³. As AI continues to integrate into clinical

workflows, its role in minimizing human error and improving patient outcomes becomes more integral, without replacing human expertise, but rather, enhancing it. The synergy between AI and radiologists is key to optimizing diagnostic accuracy in modern healthcare settings.

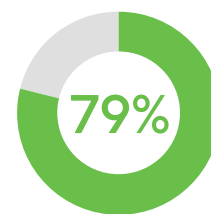
This white paper explores how AI is transforming radiology by enhancing image interpretation, automating routine tasks, and improving patient education⁴. AI algorithms detect subtle patterns, complementing radiologists' expertise, and speeding up diagnoses. AI alleviates healthcare professionals' increasing workload while enabling earlier disease detection. The paper also examines the benefits of cloud-based AI integration into RIS/PACS platforms, allowing practices to fully realize AI's advantages.



76% of all FDA-cleared AI/Machine Learning medical devices are intended for use in radiology⁵

\$150B
savings

\$150B potential annual savings
key healthcare AI applications provide U.S. healthcare economy by 2026⁶



79% of healthcare organizations presently utilize AI technology⁷

AI for Automated Detection in Diagnostic Imaging

AI applications enhance medical imaging by increasing diagnostic accuracy, accelerating reading speed, and improving accessibility. Machine learning (ML) models, especially deep learning (DL), are trained on large datasets to identify disease-related patterns.

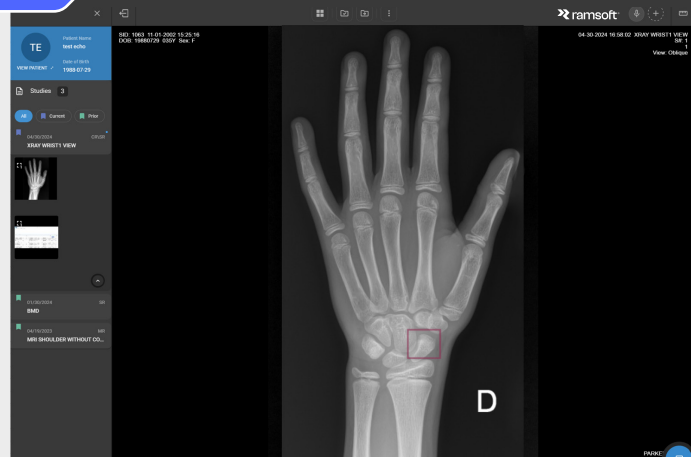
Convolutional neural networks (CNNs)⁸ excel at processing images, detecting anomalies like tumors and fractures with high precision⁹, often outperform or complement radiologists. AI enables real-time image analysis, crucial in emergencies¹⁰, and reduces radiologists' workloads by automating routine tasks. By integrating AI with cloud-based systems, suspicious cases can be prioritized for review. Overall, AI enhances diagnostic accuracy, accelerates care, and helps reduce healthcare costs.

ramsoft AI Spotlight

AI-Based Detection of Fractures in X-Rays

The integration of AZmed into RamSoft®'s zero-footprint **OmegaAI**® PACS platform provides a novel approach to AI-based detection of fractures in x-rays.

This AI tool identifies critical medical findings and then prioritizes them into the worklist. It is especially useful for diagnosing subtle fractures, addressing challenge diagnoses such as osteoporosis and subtle nondisplaced fractures in children. By ranking critical findings like pneumothorax at the top, it **can reduce the risk of oversight and help prioritize workflows**. The AI tool



ranks x-ray abnormalities and enhances trauma diagnosis, ensuring **even subtle anomalies are promptly addressed**, which is crucial for timely and accurate diagnoses.

Quantification of Disease Burden

AI technologies are transforming disease burden¹¹ measurement through accurate, automated monitoring of illness progression.

Unlike conventional radiology, which relies on subjective interpretation, AI, particularly deep learning (DL) algorithms¹², analyzes medical images with high accuracy and consistency. These systems detect and quantify lesions, tumors, and other pathological features, providing objective measurements of disease burden. AI tools track a patient's disease progression by comparing sequential studies. This is particularly valuable for monitoring chronic conditions like cancer and cardiovascular diseases¹³, which uses current manual image review process and is a time-consuming process prone to errors and missed diagnosis. By automating image analysis, AI reduces radiologists' workload and improves accuracy, by integrating imaging with clinical data¹⁴.

Quality Assurance

AI-enhanced applications are transforming the accuracy and consistency of imaging in clinical practice¹⁵.

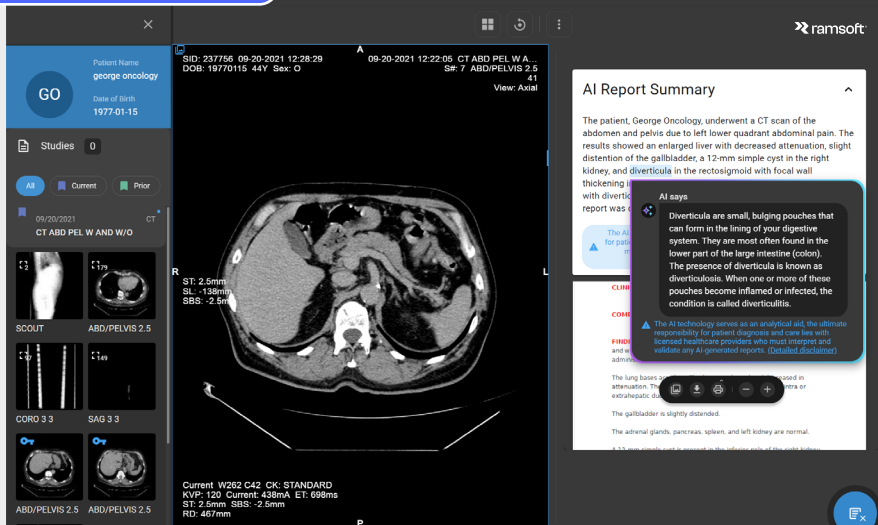
Traditionally, quality assurance (QA) in radiology relied on manual reviews prone to human error and time constraints. AI automates QA, improving consistency and reducing mistakes¹⁶. AI-driven tools can adjust imaging parameters in real-time, ensuring consistent, high-quality scans, thereby minimizing misdiagnoses and repeat scans. AI analyzes images with precision, and can identify missed lesions and measurement errors, providing a reliable secondary check. AI also tracks trends to improve individual and departmental performance within a healthcare institution¹⁷. By automating key processes, AI improves diagnostic accuracy and patient outcomes.

AI Tools Integrated with Cloud-Based PACS

RamSoft's OmegaAI is a novel, cloud-native, zero-footprint RIS/PACS and VNA solution developed to facilitate **the acceleration of diagnostic imaging across multiple healthcare settings**. Built upon the Microsoft Azure cloud, OmegaAI's architecture leverages advanced AI automation to enhance radiology workflows, providing significant benefits to both radiologists and imaging practices.

OmegaAI's AI capabilities (such as ChatGPT-enhanced report understanding for patients) are further amplified by its solutions from RADPAIR, brainreader, and Augnito™.

RADPAIR integrates **AI-driven radiology report**



generation directly into OmegaAI, automating the creation of detailed, patient-specific reports, thereby **saving radiologists significant time and improving clinical throughput**. Brainreader contributes **advanced neuroimaging tools (brain volumetrics) that assist in the analysis of complex brain scans**, while Augnito offers **state-of-the-art voice recognition** technology that streamlines report dictation and enhances workflow efficiency in radiology report generation.

In a recent video, RamSoft's CEO & Co-Founder, Vijay Ramanathan, and Principal Product Manager, Mahdi Keyhani, MD, discussed how AI within OmegaAI is presently being utilized to advance accelerated imaging and diagnosis towards helping healthcare organizations deliver faster, empowered care: reducing mundane and repetitive manual tasks, assisting ("co-piloting") in the diagnosis of serious disease, assisting in patient engagement, and improving patient outcomes.



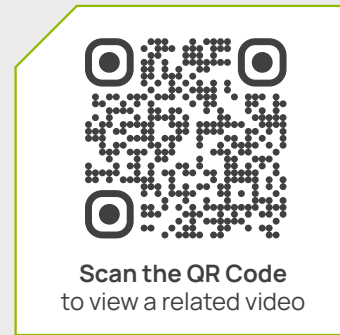
Vijay Ramanathan
CEO & Co-Founder,
RamSoft

“The only way we can continue to make the improvements in healthcare is by incorporating AI. The way we see this is that we’re an enabler of AI to make healthcare providers more efficient, to make radiologists more efficient. That is what we strive to do.”

These integrated partner solutions, combined with OmegaAI's inherent AI capabilities, transform radiology workflows by automating routine tasks, accelerating diagnostic processes, and enabling real-time decision-making.

Radiologists can access imaging data from any device, at any time, from OmegaAI, ensuring timely and accurate diagnoses. This improves clinical experiences for patients.

Working together, RamSoft and Microsoft are committed to implementing leading-edge technologies to promote patient empowerment in healthcare.



Predictive Analytics

AI-driven tools, powered by machine learning and deep learning (DL) algorithms, are revolutionizing radiology by analyzing medical imaging data with speed and accuracy¹⁸.

AI enables efficient analysis of large data sets¹⁹, improving disease detection and diagnosis and even the mitigation of outpatient appointment no-shows²⁰. It also streamlines tasks like image segmentation, allowing radiologists to focus on complex decisions. AI's predictive analysis capability optimizes resource management, tracks patient volumes, and reduces workflow bottlenecks, making healthcare delivery more efficient while improving patient care outcomes.

Segmentation and Registration

AI excels in automating image segmentation and registration, making these processes faster, more accurate, and less reliant on manual input. Traditionally, image segmentation required significant time and effort from radiologists, often leading to variability.

Deep learning models, such as convolutional neural networks (CNNs), automate this task with high precision²¹. AI also enhances image registration, crucial for tracking disease and planning treatments, by handling complex deformations between images²². This improves alignment accuracy, especially for radiation therapy or surgery. Open-source AI models, supported by stakeholders like Nvidia, are expanding access to advanced radiology solutions, improving abnormality detection and treatment planning.

Radiomics

Radiomics²³ in radiology is advancing through AI applications that enhance the extraction and analysis of quantitative features.

These quantitative features include analysis of medical images, improving diagnostics, prognostics, and treatment planning. Previously, radiomics involved converting images into data to reveal tumor characteristics, but this manual process was time-consuming and subjective. AI, particularly deep learning, automates radiomics, efficiently identifying complex patterns from CT, MRI, and PET scans. AI

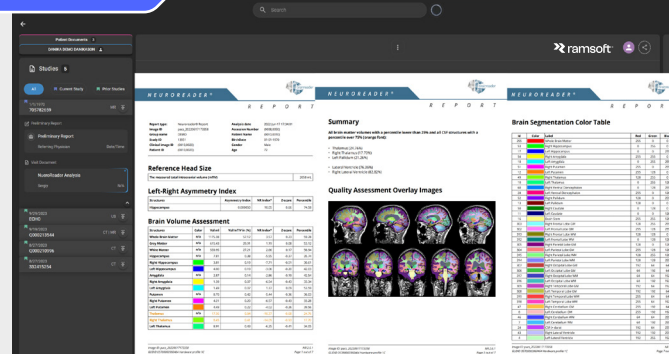
extracts features like tumor shape and texture (crucial for predicting disease progression and response to treatment²⁴) and reduces variability across radiologists. By integrating radiomics with genomics and clinical records, AI creates comprehensive models, resulting in data-driven treatments and improved patient outcomes.

ramsoft AI Spotlight

Automated Analysis of Brain Structure in MRI

The seamless integration of brainreader's Neuroreader[®] solution into RamSoft's OmegaAI platform facilitates neurological diagnostic imaging by promoting AI-enhanced brain volumetrics. Using Neuroreader from within OmegaAI, **neuroradiologists can automate the analysis of brain structures**, including computing structures of the entire brain in less than 10 minutes – to receive objective evaluations of MRI findings that are accurate, and detailed...resulting in early detections of dementia and other pathologies.

The AI automation technology offered with the OmegaAI-brainreader integration provides an essential tool in providing timely patient care



and informing clinical decision-making. OmegaAI users can access The Neuroreader[®] Report, a **customized and automated volumetric report**, which features the volume of 45 brain structures along with color coded overlay images that are valuable for quality assurance, ensuring the most accurate results are reported for patients.

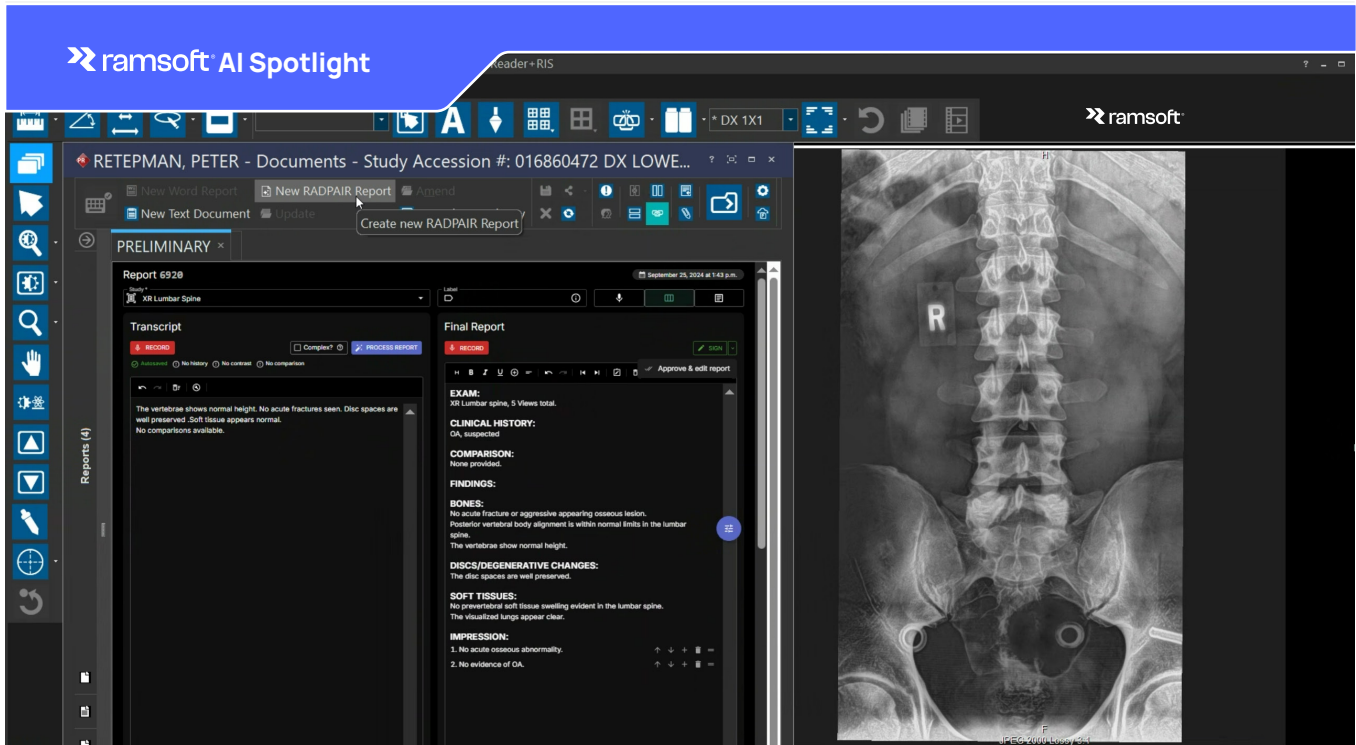
“ This solution uses MRI data to detect early signs of neurodegenerative disorders years before clinical symptoms appear. ”

Virtual Assistants & Generative AI

AI-powered radiology applications, utilizing generative AI and virtual assistants, streamline processes and improve reporting accuracy. Generative AI²⁵ analyzes large imaging datasets, generating preliminary reports and detecting patterns that may be difficult for humans to detect. This allows radiologists to refine reports rather than creating them from scratch.

In addition to assisting radiologists, generative AI can write personalized reports for patients. Virtual assistants in combination with generative AI can edit complex medical terminology into more accessible language for patients. This will improve patient health literacy and help patients better understand their diagnoses and next steps.

Virtual assistants act as real-time aids²⁶: they provide real-time data access, suggest diagnoses, and highlight concerns in images. These tools enhance diagnostic precision, minimize human error, and standardize reporting. With increased efficiency, radiologists can handle more cases, meeting growing demand while maintaining high-quality, timely, and accurate diagnoses for better patient outcomes.



AI-Based Automated Radiological Reporting with RADPAIR

From within PowerServer, radiologists can use generative AI via RADPAIR's AI engine, which uses natural language for an improved reading experience. AI inserts punctuation and formatting and incorporates Radiopaedia guidelines and classifications into reports, **enhancing consistency.**

This innovative integration of RADPAIR's AI reporting with the PowerServer platform enables healthcare providers to **transform radiological**

diagnostics, enhance patient care and establish new benchmarks for throughput and reporting precision, leading the way to better patient outcomes, reduced workload for radiologists, and more efficient healthcare delivery.

Together with RADPAIR, PowerServer provides workflows that enable radiologists to quickly generate detailed reports and access advanced analytics.

“ RADPAIR's integrated solution with PowerServer's reporting module has the potential to reduce reporting time by more than 50%. ”

Mahdi Keyhani, MD - Principal Product Manager, RamSoft

Image Reconstruction & Enhancement

AI deep learning algorithms²⁸ can optimize image reconstruction by learning from large datasets, producing clearer and more accurate images.

A key advantage is the ability to enhance low-quality images from lower-resolution modalities. When advanced imaging technologies like high-end CT or MRI scanners²⁹ aren't available, AI can improve the resolution and clarity of images from lower-dose equipment. AI fills in missing data, reduces noise³⁰, and sharpens images, making them comparable to those from advanced systems. This innovation improves diagnostic accuracy and expands access to quality imaging while minimizing radiation exposure³¹.

Adding AI to Cloud-Based PACS

Radiologists face overwhelming workloads due to ongoing staff shortages, and RamSoft aims to address these challenges with software solutions focused on both patients and clinicians.

By improving clinical workflows and care delivery, RamSoft prioritizes seamless integration of new technology without adding to radiologists' burdens. As the industry shifts towards remote access for mammography reading and advanced post-processing, RamSoft's product line offers a single sign-on, single worklist solution. This approach allows clinicians to manage AI tools efficiently and integrate them into the workflow without disruption.

Recognizing that FDA approval is the first step, RamSoft is committed to testing and refining AI tools in real-world clinical settings. The goal is to enhance, not replace, radiologists' expertise by embedding AI into a cloud-based PACS, ensuring the technology meets radiologists' needs while advancing medical imaging and transforming healthcare.

Conclusion

In summary, AI is reshaping the field of radiology by improving diagnostic precision, enhancing workflow efficiency, and supporting patient care.

Its integration into RIS/PACS platforms and cloud computing has enabled radiologists to harness the full potential of AI, allowing for earlier detection of diseases and more informed clinical decisions.

As AI continues to advance, it will play an increasingly vital role in radiology, empowering professionals to deliver faster and more accurate care while mitigating growing workloads in healthcare settings.

Additional Considerations

AI Stewardship

AI breakthroughs have led the FDA to expand its "**Artificial Intelligence and Machine Learning Software as a Medical Device Action Plan**" with guiding principles. In collaboration with Health Canada and the UK's Medicines and Healthcare products Regulatory Agency, the FDA identified 10 guiding principles for Good Machine Learning Practice (GMLP). This initiative aims to support the development of safe, effective AI/ML technologies that learn from real-world use, improving device performance while ensuring transparency and high-quality healthcare outcomes³².

Transparency in AI

Increasing utilization of AI raises concerns over potential misuse of sensitive patient data. Developers must disclose details about their AI system's training data and validation process while also ensuring patient privacy is protected. For greater transparency, all vendors must clearly outline their system's intended purpose, evaluation criteria, and limitations³³. In the continuously evolving use of AI in medical imaging, balance between innovation and patient safety is necessary for ongoing successful integration.

Cost and Access

While AI offers significant advancements in radiology, barriers to adoption remain, particularly around financing. Policymakers may need reimbursement models that incentivize AI use without risking overutilization³⁴. A potential solution is bundled payments for diagnostic categories for which AI has proven effective, with separate compensation for AI costs³⁵. CMS has introduced an add-on payment for hospitals using new technologies³⁶, but broader coverage is needed. Without insurance coverage, AI diagnostics may increase costs for low-income patients, worsening disparities in healthcare access.

Ready to implement AI-enhanced workflows in your imaging practice?

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About RamSoft

RamSoft is a global provider of innovative cloud-based radiology software solutions for imaging centers, radiology departments and teleradiology providers. PowerServer™ is utilized by over 500 sites and thousands of customers worldwide and offers a flexible, scalable design enabling imaging operations of all sizes to leverage comprehensive cloud-based RIS (Radiology Information System)/PACS (Picture Archiving and Communication System) capabilities. RamSoft's latest offering, OmegaAI®, is a cloud-native AI-driven platform delivering rapid, secure, and robust RIS and PACS capabilities that are completely zero footprint. Powered by Microsoft Azure, RamSoft's solutions provide the highest levels of security, HIPAA compliance, and protection against cybersecurity threats. Additionally, Blume™ - Patient Portal, available for OmegaAI and PowerServer, allows patients to access, share, and book appointments for their diagnostic imaging studies.



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