What does the competitive landscape for your areas of specialisation look like?

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What are the factors that drive innovation and change?

AI in radiology is at a crossroads. This crossroads represents a common fork in the path across all industries in which the technology is moving beyond the hype, separating the strongest solutions from those that eventually wane.

Given this context, the AI-medical imaging ecosystem is seeing tremendous growth, investment and innovation. With a great deal of hype dominating its inception, AI for radiology is now synthesizing into a tangible solution, trusted by physicians with proven clinical outcomes. On the one hand, the field is full of tech giants. IBM's Watson and Google's Deepmind are two famous players. More recently, imaging hardware manufacturers like Samsung and Phillips are looking at AI software too. However, focused startups have found that they have a competitive advantage, being able to develop, improve and market bespoke AI tools that are often more advanced than the big broad tech companies. At this stage, many startups are beginning with particular detections and there is little overlap, but as these companies mature and add detections, they will begin to move into each other's spaces.

Within this competitive landscape, there are three main criteria that set apart the solutions/vendors that will move beyond the hype into clinical practice from those whose solutions will not reach fruition: (1) Clinical relevancy (2) Easy to implement and (3) Transparent and assessable. These criteria are fundamental in driving innovation and change throughout the industry, paving the way for AI to become an integral part of standard of care.

Clinical relevancy

The massive increase in the amount of imaging performed on patients is pigeonholing radiologists into the darkroom, leaving them little space to exercise their clinical skills beyond reading scans. As CT and MRI become routine diagnostic tools, the number of images per patient have exploded: In 1999, an average patient CT contained 82 images; by 2010, the number had increased to 679 per patient. Radiologists are faced with an ever-increasing workload as medical imaging becomes less expensive, more accessible and more advanced.

This eruption of data is two-fold: On the one hand, big data has increased the amounts of demands on radiologists to perform their routine work. On the other hand, it's big data that will make the AI revolution possible. Those in the Radiology AI ecosystem who are able to identify the need and opportunity for artificial intelligence solutions to optimize the radiologist within the workflow while striving towards improving patient care are best situated towards widespread adoption.

The radiology workflow is ripe for AI disruption at various stages, including Patient scheduling, image acquisition, workflow orchestration, detection, diagnosis, reporting, follow up and peer review. The opportunity is here – it's up to vendors to come up with the best possible solutions.

Easy to implement

Equally as crucial, AI for healthcare, and specifically in radiology, must be easy to implement. For AI to significantly increase the value radiology professionals are able to provide their patients, the system must be integrated directly within the radiology workflow, allowing them to work in tandem without altering their existing work routine. These systems should be easy to use, allowing for physicians to begin seeing value and outcomes without major overhauls in training.

If we refer specifically to the detection stage of the radiology workflow, then AI should be tightly integrated with the PACs and RIS systems, allowing for seamless prioritization and read -assistance. The immediacy of AI as a detection aid is crucial, making 'Always-on' AI that constantly runs in the background a perfect fit for the radiology workflow integration. In this way, the AI results are waiting for the radiologists and the findings are displayed directly in the workflow. This draws the radiologists attention in an intuitive way, making a fully integrated, seamless user experience.

Transparent and assessable

The concern of the AI 'black box' is no different in radiology: a term referring to the unexplainably of sophisticated AI. In essence, a user must understand the basis for any advice or recommendation given. Explicability of an algorithm is essential not only for understanding the system's predictions but also for continuous improvement and optimization within the specific clinical context.

Initiatives like our 'Industry-first AI Validation Process' with the American College of Radiology Data Science Institute allow clinicians to assess the value of the AI solutions and to devise optimal ways to integrate them into their clinical practice. By assessing AI in actual clinical settings/ in a live environment, clinicians, regulatory bodies and AI vendors can work together to assess whether AI can be trusted across multiple data acquisition systems and across diverse patient populations. The goal is to ensure that AI doesn't just work in a specific clinical setting but in a variety of settings across imaging centers, emergency departments and more.

Driving innovation and change

Within Radiology AI, the most powerful driver of innovation is to save lives. While this altruistic motive is absolutely essential, the ability to adapt, listen to the radiology community and work within the scope of regulatory agencies is equally as crucial for truly driving innovation. In this context, artificial intelligence innovation isn't just some fancy new gadget that physicians will be able to test out. It is what will transform the medical imaging space, from data overload to data-driven.

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