

AI: Opportunities, Capabilities and Limits

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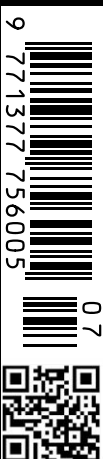
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Artificial Intelligence in Radiology: Realities, Challenges and Perspectives from a Tertiary Cardiac Centre in Greece

Sai Pavan Kumar Veeranki et al.
Learning From Each Other: An Artificial Intelligence Perspective in Healthcare

Elmar Kotter
Integrating Decision Support and AI in Radiology

†Werner Leodolter
Clinical Decision Support – Benefits and Application in Healthcare





Decision Support



Integrating Decision Support and AI in Radiology

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How would you define clinical decision support and its use in radiology?

In a broad sense, clinical decision support is the use of information technology to help clinicians make better decisions and improve the diagnostic and therapeutic process. In radiology, the primary use of decision support systems is to support diagnostic decision-making. There has been an exponential growth of information in radiology, but

this is not accompanied by an equivalent increase in the number of radiologists. Therefore, radiologists have to deal with a growing amount of increasingly complex information, making decision-making more and more complex. This is where decision support systems come in, as they can help radiologists handle this huge amount of information and better analyse this information that is getting more complex year after year.





What fundamental characteristics should decision support systems have for greater application in radiological practice?

The main characteristic required is that the reliability of decision support systems is proven. This is an important issue as many Artificial Intelligence (AI) systems on the market do not have proven reliability. Integrating those decision support systems into the daily workflow of radiologists is also important. A remote decision support system not integrated into the workflow is not useful for radiologists. In addition, the recommendations that the decision support systems make need to be transparent so that the radiologists

the pathways where other patients have been. All these are complex activities that require integrating a lot of information. This is where decision support systems stand out and can be more effective.

What are the main benefits for radiologists when using a clinical decision support system?

First, it can act as a safety net for radiologists in terms of simple detection. It can enhance the work of radiologists by helping them not to miss lesions in the images they evaluate. There is also the efficient handling of complex information that can help radiologists make better decisions.

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understand how the system produced the decision or the recommendation.

What are the most important factors considered by a radiologist when evaluating clinical decision support tools?

There are different ways to analyse decision support systems. One would be the scientific way, by evaluating the system and checking for accuracy. The other aspect is their use in the daily workflow. Radiologists must feel comfortable with the system and must be convinced that the system is helping. It is often a matter of perception. For example, a radiologist will always feel happier if they are the ones detecting a fracture rather than the AI system doing it. Hence, it is important for radiologists to feel comfortable with the clinical decision system they intend to use.

Computer-aided detection (CAD) systems have already been in use within the radiological practice. What is the distinction between CAD systems and decision support systems?

CAD systems, which are not based on AI systems, have been in use for almost 20-25 years, have been working quite well, and are considered very reliable. However, decision support systems have much more to offer than only computer-aided detection. Decision support systems can help understand and manage complex information and data. Think about longitudinal information, the evolution of the tumour burden for a given patient, or a patient pathway where there is a need to make decisions on therapeutic measures, analyse where the patient stands on this pathway, and comparing this to

Decision support may have some trust issues. What are the primary criteria for doctors to be able to trust and adopt such tools?

It is very important for AI solutions to have reliability. This reliability can be achieved through scientific evaluation, application, and practice. It is also important to effectively integrate these tools within the radiology workflow. But if there is one key element, it is trust, and this trust is built over time. It is not possible to trust AI or a particular system by simply using it and trusting it from the first day. It will happen gradually. Radiologists have to get used to the idea of AI and decision support systems and how these tools can help them in their daily work. They also have to get used to the particular decision support systems or AI systems used in their workplace.

The future of healthcare will be an intelligent mix of human computers and technology. What major trends do you foresee?

It's difficult to identify one major trend. There are many applications of decision support systems in radiology when you think about the whole workflow in radiology. This can range from scheduling, optimisation of examination protocols, the diagnostic applications of AI etc. I think the trend will be having many of these systems assisting radiologists, technologists, and the administrative people in radiology departments to do their work more efficiently and more reliably.

There has been a great deal of hype about AI in healthcare. Is there any key metric to successfully implementing AI in radiology?

The one metric would be reimbursement for AI. There is no



doubt that AI systems work quite well and can help radiologists in their clinical routine. But in Germany and many other European countries, there is no additional payment for using AI. It is important to understand that AI systems are not for free. You have to pay for them. It can be very difficult to convince the administration to invest in these AI systems. They will immediately question if such an investment would reduce the need for radiologists or administrative personnel. But this is not the goal. The goal is to enhance the work of radiologists with the use of AI. Hence, if there is one key element, it is the reimbursing of the use of AI in some way.

How does AI support radiology workflow? Is there an improvement in efficiency, patient outcomes or patient safety?

There are many applications that could enhance patient safety. Think about secure identification of patients. The new CT systems today have a camera on the ceiling to help with patient positioning. In the future, these cameras could be used to identify the patient - to ensure that the patient on the table is the right patient. This is a simple example of enhancing security. AI can also help optimise protocols to lower the dose for a specific patient. This could be done by considering the previous examination of a given patient to optimise the dose for their next examination. Hence, there are many examples where AI can enhance security, help lower doses, and enhance the workflow.

Are there any limitations or risks in using AI in radiology? And if yes, how should these be addressed?

The discussions about the ethics of AI are very broad. There could be risks of bias and discrimination, and inequality in healthcare. On the other hand, AI has the potential to individualise healthcare and make better care accessible for a larger portion of the world population. Also, AI can play an important role in developing countries, where, for example, there are not enough radiologists, and other medical disciplines are practicing radiology. In these situations, AI can be very helpful. Therefore, it is important to discuss the risks and reach a consensus within the radiologist and general population about how these risks should be handled. But we must be aware of the possibilities that AI has to enhance healthcare.

How would you address concerns that AI could one day replace radiologists?

There is no reason to be afraid that AI will replace radiologists.

But this needs to be discussed. People are afraid because they don't know enough about AI. I believe that AI will not replace but augment radiologists. As Curtis Langlotz, a radiologist at Stanford, once said, "AI won't replace radiologists, but radiologists who use AI will replace radiologists who don't." Think about the time before PACS. When I learned radiology, half of my time was spent finding the films with the examinations and hanging them onto light boxes. There is no need to do that today because of PACS. These days, the way residents learn radiology is much more intensive since they are free from these tasks. Back in those days, switching to PACS was a huge step forward, and something similar will happen with AI. Fast forward 20 years, and we would wonder how we spent our time looking at those images to detect nodules or other lesions without having AI assistance to do it.

What does the future of radiology look like in terms of digital transformation?

The future looks really bright for radiology. Radiology is one of the most digitised medical disciplines, and radiologists are already at the forefront of digital transformation. It is important to be active and visible in this transformation. Only then can we have a chance to be at the centre of patient care in the future. I believe that the future of healthcare will be about how we handle data. In this regard, the discipline of radiology already has a huge advantage compared to others.

Is there anything else you would like to add?

There is a lot of discussion about AI in radiology and healthcare today. During the 1990s, there were many concerns whether it was possible to report a CT or a chest x-ray from a monitor instead of film. Then we saw the introduction of modern CT scanners that could produce examinations with 400, 500, and 600 images per examination. That stopped the discussion very quickly because it was impossible to handle this amount of images on film hard copies. It was the tipping point for the introduction of monitor reporting and PACS systems. In the near future, there will be a similar tipping point for the introduction of AI in healthcare, where we realise that it would be simply impossible to continue to practice healthcare and radiology without the use of AI systems. ■

Watch the full interview [here](#).