HealthManagement.org
The Journal
LEADERSHIP • CROSS-COLLABORATION • WINNING PRACTICES
VOLUME 19 • ISSUE 5 • 2019 • € 22
ISSN = 1377-7629

Silver Tsunami

Erik Ranschaert
Radiologist
The Netherlands Cancer Institute - Antoni van Leeuwenhoek
Amsterdam, The Netherlands
President of EuSoMII
Vienna, Austria

me@erikranschaert.com

erikranschaert.com

eusomii.org

@eranrad

Game-Changing Meeting of Minds: Radiology and Imaging Informatics

A visionary radiologist explains how the European Society of Medical Imaging Informatics is bringing imaging and informatics together for best practices and patient outcomes.

What is the mission of the European Society of Medical Imaging Informatics (EuSoMII)?

Today, everything is related to the development of Artificial Intelligence (AI) solutions. This is a really hot topic and stakeholders are looking for the correct way to implement this technology. There are many possibilities with the application of AI in radiology. On the one hand, there is a huge volume of images and data available and, on the other hand, there are a great number of AI developments. However, data is not being shared with AI developers. This is the conflict between research and commerce too: data is currently mainly being used for research in the hospital/institutions and data needed for commercial products is much more difficult to obtain. A new market is developing, including companies specialised in curating this data. In healthcare, the majority of and most important AI solutions are the models being implemented in medical imaging. This makes sense as deep learning took off in image analysis.

The demand for medical imaging is increasing and the workload is rising, so we need solutions to facilitate a more efficient workflow. In short, we need technology and other tools that can assist us in analysing images more accurately and quickly.

There is a lot of interest from the computer scientist and software engineer side in AI, which is clearly visible in the research arena, but they don't really know how this can be implemented in the real world of radiology. The research setting is totally different from the clinical work environment.

EuSoMII brings radiology and informatics professionals together to exchange knowledge and expertise and to join the forces of these specialties for better healthcare. Uniquely, we don't just have radiologists among our members but other experts in the field such as clinical physicists and computer scientists.

We also give members the chance to increase their networks beyond the clinical and informatics fields.

How is EuSoMII bringing healthcare and technology stakeholders together to improve cooperation for better radiology work processes?

Our main objective is to help radiologists become more acquainted with imaging informatics in its broadest sense, including AI, and to teach them how to use it to optimise their services. Experts in the field are providing training and insights. At our annual meeting, we invite speakers from different disciplines and hold scientific sessions to show what is being developed in research. We address the difficulties, pitfalls and, importantly in this age of data protection, ethical and legal issues. We also organise classes about how to use and even develop AI solutions for clinical practice. It is essential that radiologists are informed about what tools are available to make use of their own data for creating custom-made AI-solutions, without the need to learn any software developer's skills. Because the ability to do that will certainly facilitate the introduction of AI into radiological practice. That way they will be able to develop products which are optimally adapted to the local needs.

What AI training routes is EuSoMII offering?

Radiology is split up into subspecialties based on different body areas. We could say that imaging informatics has also become a subspecialty. In this era of AI, there are (and will be) more and more tools we can use to analyse and evaluate data. When you start using this, you have to know what is happening with the data and how it is being processed. You really need some basic knowledge – as much as you need knowledge about an MRI machine that you are using to examine the body. As much as every radiologist should be able to detect the MRI "artefacts" that can occur by knowing the basic physics of the technique, they should be able to know where AI-tools can go wrong and what the underlying reason is. For this reason Charles Kahn, editor of the RSNA Journal on AI is asking the developers to produce "explainable systems" (explainable AI or XAI), making it possible to understand the rationale behind the results produced by these tools (Kahn 2019a).

In our events, seminars and webinars, we're focusing on the necessary skills for radiologists to become more familiar with imaging informatics and show that you don't need to be a computer scientist to understand and work in this area. We are also cooperating with the European Society of Radiology on the

EuSoMII Annual Meeting 2018 Rotterdam - The Board

curriculum content. Owing to EuSoMII efforts, Imaging Informatics has now been included in the European training curriculum as a subspecialty. This means that we have to provide content to train residents in becoming experts in imaging informatics.

It won't be necessary for every radiologist to learn but, in each department, there should be at least one Imaging Informatics expert, otherwise it will be missing the tools to go ahead and invest in the future.

What leadership skills do radiologists increasingly need?

Better-integrated informatics will lead to more targeted treatment, adhering to the principle of personalised medicine. This linking of patient genomic data and imaging is known as radiogenomics, which is the direction in which medicine, including radiology, is going in long-term. The more accurately we are able to analyse the data being provided through imaging, the more accurately we will be able to see how a disease is evolving.

In this framework, radiologists are increasingly involved in multi-disciplinary meetings, so solid leadership skills will be needed in supporting the integration of all patient related digital data and in using this data so that, for each patient, we will be able to advise our colleagues concerning the best treatment path to follow.

What could radiologists learn from other sectors or hospital specialties about AI development and application?

First of all, other hospital specialties could learn from radiology. The more standards you have, the easier it is to use data. Like radiologists, dermatologists and ophthalmologists also use a lot of images, but they don't yet have standards for organising, sharing and archiving. Radiologists have refined standardisation and can share their experience.

If you look at what imaging could learn from industry, I can give an example of a Belgian company that is very active in image analysis in multiple sectors. It works in agriculture, automotives and smart city sectors. In farming, it has robotised tools to sort the good produce from the bad. This company is looking at how they could use this software in the medical sector. Techniques similar to those they developed for agriculture and successfully implemented for selecting and categorising different plants, can be applied to analysis of medical images. They have already developed a tool to automatically segment kidney tumours on CT images of the organs for example. This way radiology can learn from technologies that have already successfully been applied in other sectors.

How do you see the role of the radiologist changing in the future?

Radiologists will have to become more data-savvy and gain more skills in using all available image and patient data. They will move in the direction of data analysts. Now, we are still merely looking at morphological findings. But we are not doing enough with the other data that we have available to examine a lesion. How can we get more information an abnormality than just the morphology? How can we see if a tumour is active or inactive, malignant or non malignant? Through optimal integration of imaging informatics for analysing the data, our diagnoses will be more accurate and our treatment pathways personalised for the patients. We will also have to familiarise ourselves with the concept of patients able to use their own health data and other types of services directly offered to patients for analysing those data, which means that there will be other players active in the healthcare market that probably might compete with radiologists, which by some could be perceived as a threat of the profession. Therefore, radiologists will need to be proactive and cut off the road of those competitors by actively engaging with the new technologies.

How will the field develop over the next decade?

AI will have a serious impact on the medical profession and, along with other medical specialists, radiologists will have to reevaluate their role. How will we inte-

grate and how should we invest in these new developments, both from a knowledge and financial point of view? The demand for medical imaging is continuously growing and in several countries there is already a capacity problem for performing and reading all examinations. AI-tools are needed to assist radiologists in dealing with this increasing workload. An essential task for AI-developers will be to provide tools that can help radiologists in prioritising the reporting of those examinations in which life-threatening abnormalities can be found, such as pulmonary emboli for example.

There are not enough radiologists to do all of our image reading. In breast cancer screening for instance, there are always two reads. In the future, maybe the first read will be done by AI which will facilitate the radiologists in dealing with the large volumes of mammograms that need to be dealt with by filtering out the normal cases and offering them only the highly suspicious cases for validation.

Think of Moorfields Eye Hospital in London. They are collaborating with DeepMind, Google (Suleyman 2018) on patients with diabetes. They are currently developing an algorithm to analyse these scans automatically because, each day, 1000 of these scans are being made, which makes it very difficult to leave this to the ophthalmologist himself/herself. This is a huge number so many tasks will be automised to facilitate better service to patients, reduce waiting lists and make diagnoses more accurate.

What can healthcare and AI stakeholders expect from EuSoMII in the future?

Our next objective will be to develop cooperation on an international level. We will cooperate more intensively with other societies such as the Society for Imaging Informatics in Medicine (SIIM) and will also increase our importance in assisting other subspecialty societies. Alongside this, we are focusing on our educational role and advisory role in imaging informatics and all its related aspects. For example, we have just contributed to a major international, multi-society paper on the ethics of AI for radiology, which will most likely be published this autumn in several major radiological journals (Kahn 2019b). ■

REFERENCES

Kahn C (2019a) Explainable AI. RSNA. Available from pubs.rsna.org/page/ai/blog/2019/8/explainable_ai#

Kahn C (2019b) Do the Right Thing. RSNA. Available from pubs.rsna.org/doi/full/10.1148/ryai.2019194001

Suleyman M (2018) A major milestone for the treatment of eye disease. Deep Mind. Available from deepmind.com/blog/article/moorfields-major-milestone.

Continuation from p.383

key success factors for real innovation in the hospital sector. I want to identify three factors, as follows, that need to be addressed with particular attention in the Belgian context.

Speed of Innovation

We are struggling with the lengthy period needed to develop, make decisions on, and implement reforms in healthcare policy. This is not only a responsibility of state structure or political decision-making, but also an issue of our healthcare sector system as a whole. Stakeholders and decision-makers are convinced that we need change, but when we try to operationalise, decide on and implement change, we encounter multiple hurdles and these cause us to lose time. I am not convinced that today we are moving forward quickly and efficiently enough to ensure that our healthcare system will be future-proof in time.

Long-Term Thinking

In comparison to Singapore, where, according to Prof. Fidelis, health authorities are thinking up to 100 years ahead, we are lucky if we can think a legislature of maximum five years ahead. For innovation to be successful, we need to give these changes time to happen, however, we need to know where we will be in 20 or more years. It is essential that we learn to look as far forward as possible.

Mindset

Even if challenges are multiple and complex, as Dr Stoffels said, 'It can be done.' Western Europe and countries like Belgium have a great deal of well-developed policy structures and social security mechanisms. These are clearly under pressure and this requires policy updates. But we do dispose of so many resources to face these challenges successfully.

We need to believe it ourselves and act upon it. Let me be clear that as a regulator we are ready to tackle all of this together with you. Let's innovate and build our future together. ■

KEY POINTS

- Healthcare has always faced operational, financial and staffing challenges; the key is how to face them with an innovative mindset.
- Policy and healthcare sector red tape is frustrating innovation to a degree that could abort attempts to transform the industry.
- We need to look a minimum of 20 years ahead to innovate effectively now in healthcare.