Joint UK-Japan symposium on medical imaging and artificial intelligence

On Tuesday 23 January 2018, the Academy of Medical Sciences (AMS) and the Japan Society for the Promotion of Science (JSPS) jointly organised a one-day symposium on medical imaging and artificial intelligence, bringing together leading experts from Japan and the UK.

This event facilitated discussion of the areas where imaging research is using artificial intelligence (AI) to develop new ways of working which could lead to significant advances in healthcare, and provided the opportunity to foster UK-Japan collaboration. It was also a chance to reflect on the regulatory and ethical considerations needed to support the effective and impactful adoption of such technologies.

Co-chairing the event were Professor David Hawkes FMedSci, University College London, and Professor Kensaku Mori, Nagoya University. The co-chairs opened the symposium with their hopes for the day: that there would be stimulating conversations about how artificial intelligence and medical imaging can change the landscape for healthcare delivery, and that the working relationship between UK-based and Japan-based scientists would be enhanced.

The meeting was attended by over 70 delegates, including academics, individuals working in industry, and healthcare professionals. Speakers presented on a range of topics, including the use of machine learning in assisting medical procedures, the application of artificial intelligence to medical imaging, quantitative neuroradiology, and the use of machine learning in mental health prediction – but central to all talks was the desire to improve patient care and outcomes.

The audience were engaged, asking searching and innovative questions, and discussions were wide-ranging. However, the key themes from the symposium were clear, with the following three things identified as being required to drive innovation in this area:

High quality data

Issues surrounding data are critical to the advancement of this field; challenges exist around access to data, dataset quantity, quality and technical feasibility, and ethical and governance requirements. To drive innovation, large, high-quality, clearly labelled datasets are required, which will ideally involve the integration of multiple-sources of data (such as neuroimaging, genetics, behavioural measures).

Interdisciplinary Collaboration

Inter-disciplinary collaboration between academia, healthcare systems and industry is of critical importance to advancing the field. Clinical experts are needed to work with AI systems to ensure effective translation into clinical practice, and proof-of-concept studies should be used to test where the application of AI to imaging can have the biggest impact to improve healthcare before ways to scale them robustly are considered.

Public engagement

Patient and public engagement is needed to inform how these technologies develop and guide the use of patient data that is necessary to develop them. Ensuring that patients and the public are engaged will improve confidence about the use of AI in healthcare and the use of data. The consensus across the room was that AI has the potential to directly affect patient care and improve healthcare delivery significantly.

The symposium concluded with a stimulating panel discussion that encompassed some thought-provoking topics, including how academic solutions can be translated into clinical solutions, the role of academia and industry in the development of these technologies and the future of healthcare – how it might be provided and the skills the future healthcare workforce will need to interact with AI systems.

It was agreed that although having high quality data is the first step it should be combined with AI technologies to solve pressing questions for healthcare, focussing on where it can create the most benefit. The panel concluded that this is the beginning of a revolution in the application of artificial intelligence in healthcare and that it has the potential to improve the quality of healthcare delivery and streamline service provision. The panellists also noted that that AI is unlikely to replace human interaction in healthcare, but could support decision making and help identify at-risk groups.

The event was followed by a reception, generously hosted by the Japanese Embassy, where the Japanese Ambassador to the UK remarked on the great potential for collaboration between the UK and Japan to change healthcare and he hoped the reception would provide the perfect platform for networking to facilitate this.

Professor Hawkes summed up the success of the day, commenting on the stimulating discussions and exciting ideas that had been generated. He emphasised the importance of academia, the NHS and industry working together to progress the field of artificial intelligence and medical imaging to bring about effective healthcare delivery. Professor Hawkes also highlighted the critical issue of data sharing and how it is important that improvements in the way data is shared across borders are made.

"An effective 3-way collaboration between research undertaken by academia, industrial innovators and clinicians delivering healthcare is the key to realising healthcare benefits in the application of AI to medical imaging. This workshop has highlighted common interests and opportunities between the UK and Japanese communities working in this area." said Professor David Hawkes.

“International collaboration is now becoming more important in academic research. In the AI era, we are seeing the importance of data sharing and how this must be done in accordance with meeting regulations in each country. AI needs to consume a lot of data for training. This meeting provided an important opportunity to discuss problems in data sharing through the exchange of perspectives from experts in the UK and Japan.” said Professor Kensaku Mori.