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Sanjay Gandhi

Southmead Hospital, UK

The role of computer-assisted detection (CAD), artificial intelligence and machine learning in the medical imaging data overload problem: Current practice, limitations and new developments

The demand for diagnostic imaging has continued to increase dramatically over the past few decades. More than 5 billion diagnostic tests are performed globally each year. Replacement of older modalities such as Barium enema with CT colonoscopy and isotopeVQ-scans with CT pulmonary angiography has also massively contributed to increased image datasets per examination. As a result, the majority of Radiologists and other healthcare professionals have to review tens of thousands of images every day. Fortunately, technologies such as Computer Aided Detection (CAD), 3D processing and automated image analysis have also continued to develop. These are becoming increasingly more reliable and affordable. Computer-assisted polyps and cancers detection on virtual-colonography, nodules on lung cancer screening and analysis of breast lumps on MR mammography are just a few of the examples. We will discuss the accuracy and use of different CAD programmes. Our research has shown that a large variation exists in sensitivity and PPV of commercially available software. Some programmes suffer from very long analysis times. Hence, companies producing CAD tools need to address these issues. The role and potential of new technologies such as Artificial Intelligence (AI) and machine learning in coping with the massive increase in the medical imaging workload will be explored. This talk will cover the pitfalls and provide practical tips on the use of these techniques. Such information is useful for Radiologists and Radiographers/Technicians. In addition, CAD developers and other healthcare sector's entrepreneurs might find this discussion useful in order to develop future products.

Biography

Sanjay Gandhi in his 30-year career spanning over the UK, India and the USA, has won several outstanding awards for his contributions to the Healthcare Innovations and Education. Times TV Network honoured him as a Global Academic Icon and the British Medical Association honoured him as a Highly Commended Editor. He has published 8 textbooks and written several papers on the use of cutting-edge technology to improve patient care. He has expertise in innovative Telehealth products including CAD, Diagnostic & Assessment Tools, PACS, etc. and has been an advisor to multinational organisations. He has also been involved in numerous research projects and collaborative trials. He has regularly published accomplished articles, rare medical conditions and research papers in reputable indexed international journals such as *British Journal of Radiology (BJR), British Journal of Hospital Medicine (BJHM) and British Medical Journal (BMJ)*. He is on the Editorial Boards of four peer-reviewed medical journals. His current research areas are Computer-Assisted Detection (CAD) to find polyps on CT colonography and he is supervising PhD Research on the use of Artificial Intelligence and Machine Learning.

GandhiS@doctors.org.uk

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