Cardiovasc Intervent Radiol (2019) 42:1208–1209
https://doi.org/10.1007/s00270-019-02249-y

COMMENTARY

AI in Interventional Radiology: There is Momentum for High-Quality Data Registries

Anna M. Sailer[1] · Marcello Andrea Tipaldi[2] · Miltiadis Krokidis[3]

Received: 13 March 2019 / Accepted: 20 May 2019 / Published online: 4 June 2019

The news are filled with applications of artificial intelligence and machine learning algorithms that are reshaping and improving workflows among industries and open novel possibilities by uncovering new insights in unseen speed, especially in a data-heavy field such as medicine.

Deep learning in Radiology is especially useful for diagnosis decision support by classifying imaging features as well for outcome and risk prediction models based on individual patient characteristics and imaging data.

In a recently published article by Letzen et al. [1], the authors give a great overview on the current state and future applications of convolutional neural networks (CNNS) in Interventional Oncology (IO) such as patient selection and automated intra-operative image co-registration for fusion guidance as well as automated tumor staging.

AI is a fundamental tool for improving diagnostic accuracy and interventional planning. Automation in medical imaging may offer on one side of the possibility to become more time effective and on the other side to create predictive models. "Images are more than pictures, they are data" as stated a couple of years ago by pioneers of Oncologic Imaging [2], initiating a new concept that may radically change the decision workflow of oncologic patients. Radiomics require image acquisition, standardization, and multicenter verification. IO would move a step ahead toward outcome prediction. The future and present of IO treatments are featured by combining clinical and imaging data to predict response to treatment as demonstrated by Kim et al. [3] in a recent study. The authors, in fact, concluded that a Radiomics approach combined with conventional clinical variables could be effective in predicting the survival of patients with HCC treated with TACE. When combined with genetic features, Radio-genomics analysis could be used to guide individualization of treatment for individual tumors [4]. Furthermore, texture analysis-guided biopsies may also help to identify heterogeneity and individualize treatment.

Equally, deep learning and machine learning may be used in body or neurovascular procedures to identify patients at risk and outcome measures, for example to predict late adverse events of uncomplicated aortic dissection or to optimize selection of elderly patients for endovascular thrombectomy [5, 6].

AI offers a tremendous chance for Interventional Radiology to take a central role in patient management over the entire patient lifecycle from diagnosis to personalized treatment and follow-up regimen. It is therefore of utmost importance that IRs take an active role in the research and are on top of the output of the "blackbox" of convolutional neural networks by proving the highest quality input data possible. Ideally, such data are gathered multi-institutional. "Distributed algorithms" open new possibilities by distributing the algorithm to the data sources and learn and improve its accuracy.

✉ Miltiadis Krokidis
mkrokidis@hotmail.com

[1] Department of Radiology, Stanford University School of Medicine, Stanford, CA, USA

[2] Department of Radiology, Sant'Andrea University Hospital La Sapienza, Rome, Italy

[3] Department of Radiology, Cambridge University Hospitals NHS Foundation Trust, Cambridge, UK

In this rapidly evolving area, IR needs to play a central role given the momentum toward high-quality data registries that would gather outcome information toward AI in Interventional Radiology.

Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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