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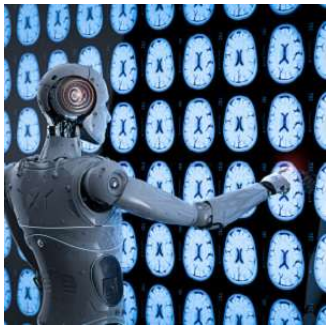
Radiologists' role in developing AI tools for clinical use



Artificial intelligence (AI) is increasingly being used to improve patient care. Radiology professionals can play an important role in promoting an AI ecosystem for radiology by delineating AI use cases, which can assist developers in creating algorithms that will be useful and safe in clinical practice, according to Bibb Allen, MD, chief medical officer of the ACR Data Science Institute.

"Over the past year and a half, an important role of the ACR Data Science Institute (DSI) has been to leverage the value of diagnostic and interventional radiologists, radiation oncologists, and medical physicists to develop clinically relevant AI use cases designed to promote the development of AI algorithms that will address important needs in our specialities in order to improve patient care and increase the value of radiology professionals to their healthcare systems," says Dr. Allen.

A structured AI use case includes a narrative description and flowcharts that define exactly how an AI algorithm takes in images and/or other information from the clinical workflow and provides specific output to end users. Structured AI use cases also include parameters for how algorithms are trained, tested, and validated for regulatory approval and clinical use; how they are deployed into clinical workflows; and how their effectiveness can be monitored in clinical practice.

Currently, most AI algorithms are developed to meet the needs of individual health systems. One central challenge for the widespread implementation of AI in clinical practice will be understanding and demonstrating whether these single-site AI applications will be generalisable to routine clinical practice across a wide range of patient populations, electronic health records, imaging equipment systems, and imaging protocols.

To address this problem, ACR DSI has developed a standardised process, Technology Oriented Use Cases in Healthcare AI (TOUCH-AI), which is an open-framework authoring system for defining clinical and operational AI use cases for the radiologic sciences that intersect high-value clinical needs with problems that are solvable by AI.

"TOUCH-AI converts the human language in narrative descriptions and flowcharts to machine-readable formats using structured data elements to provide structure and standardisation for AI developers," explains Dr. Allen. "Integrated with the ACR's existing open framework for authoring and implementing computer-assisted reporting tools in clinical workflows, Computer Assisted Reporting Data Science (CARDS) and TOUCH-AI combine to provide an end-to-end AI use-case authoring platform for the development of ACR DSI use cases for the AI developer community."

To facilitate the involvement of radiology professionals in the AI use-case development process, ACR DSI established 10 data science subspeciality panels that were composed of clinical experts, many with data science backgrounds, to evaluate and choose the highest value use-case proposals for development.

This month, the ACR DSI released the first instalment of its TOUCH-AI Use Case Directory, which includes about 50 structured use cases for the developer community. These include use cases in radiation oncology, interventional radiology, and all subspeciality areas of diagnostic radiology as well as a number of noninterpretive use cases. As Dr. Allen notes, all ACR DSI use cases will be available to the developer community at no cost.

Dr. Allen also says ACR DSI has been working closely with the FDA to define ACR DSI use cases as part of the FDA Medical Device Development Tool programme for facilitating FDA clearance of AI software.

"Moving AI tools in the radiologic sciences to routine clinical practice requires cooperation and collaboration between developers, physicians, regulators, and health system administrators," Dr. Allen adds.

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