Emerging Technology Commission on AI report

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or evolving technologies that impact abdominal radiology. The first ETC was focused on artificial intelligence (AI) and was proposed in 2019. The primary goals of the SAR ETC on AI are to validate, develop, and educate on AI, machine learning, and deep learning technologies that will impact the clinical practice of abdominal radiologists and the quality of patient care they deliver. A diverse group of abdominal imaging faculty with experience in AI was assembled to take on this challenge.

In anticipation of the 2020 SAR Annual Meeting, the ETC on AI proposed the SAR AI Challenge, a competition and collaboration with the American College of Radiology (ACR) Data Science Institute (DSI). Prior to the annual meeting, members proposed use cases or clinical scenarios in abdominal radiology where AI tools should be developed. Over 50 use cases from 30 institutions and 4 countries were submitted and reviewed by relevant disease-focused panels (DFPs) and the ETC on AI. The top three abdominal use cases were presented at the “SAR Tank” event at the 2020 Annual Meeting, and the winners were selected by a panel of judges.

The SAR ETC on AI created a homepage on the SAR website that includes the SAR Tank competition from 2020, a photo of the winners, and multiple video presentations from those receiving honorable mention [1]. The SAR ETC on AI had a series of plenary lectures and workshops at the 2020 Annual Meeting and held an AI Master Class where participants had hands-on experience running a variety of AI algorithms.

Members of the SAR ETC on AI conducted a multi-institutional study entitled “Comparative effectiveness of advanced cancer longitudinal response evaluation methods: artificial intelligence-assisted vs. standard-of-care.” The project included 28 radiologists and 20 oncologic providers from 21 institutions and won the Best New Frontiers Scientific Presentation Award at the 2020 SAR Annual Meeting.

Initial challenges for the SAR ETC on AI were in identifying appropriate projects to pursue, but that hurdle was crossed by superb ideas from members. There have been challenges on how to handle conflicts of interest from members and challenges with finding a fair and equitable method to incorporate industry consultants in the SAR ETC on AI. Other challenges include lack of funding for most research projects, decreased activity during the COVID-19 pandemic, and difficulties in sharing and gathering multi-institutional data sets, annotating or preparing data sets for AI algorithm training, and information technology hurdles for distributed sharing of AI algorithms or federated learning.

Look back

The Emerging Technology Commission (ETC) was created by the Society of Abdominal Radiology (SAR) as a mechanism to improve patient care, education, and research in new

Look ahead

The SAR ETC on AI plans to provide another series of plenary lectures and workshops on AI topics and will offer an additional hands-on workshop. Team members are also

working on educational manuscripts including a strengths, weaknesses, opportunities and threats (SWOT) analysis of AI in abdominal radiology. Other team members are working educational activities for medical students and residents interested in AI and abdominal radiology.

The SAR ETC on AI has several collaborative projects planned to include the following:

1. Develop and validate a multi-institutional distributed AI sharing model for automated body composition metrics.
2. Establish a partnership between the SAR and the Radiological Society of North America (RSNA) for an AI challenge focused on a topic in abdominal imaging.
3. Develop and validate an open-source AI algorithm for CT image series identification using a multi-institutional data set of single energy and dual/spectral CT abdominal images.
4. Validate the use of deep learning reconstruction to reduce noise and improve detection of cancer-related image findings on a multi-institutional data set of dual energy/spectral CT images. The emphasis will be on the low energy images that have high contrast and high noise.
5. Explore AI algorithm development for prostate MRI in combination with the SAR DFP on prostate cancer using the award winning use case from the SAR Tank as a point of reference [1].

The early success and challenges faced by the SAR ETC on AI are expected to lead to future work that will positively impact the clinical practice of abdominal radiologists and the quality of patient care they deliver.

Reference

1. Society of Abdominal Radiology Emerging Technology Commission on Artificial Intelligence (2021, January 21). Retrieved from <https://abdominalradiology.org/sar-subpages/dfp-panels/>.

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