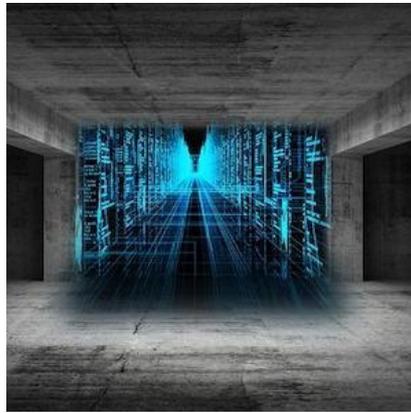## Radiologists as Data Scientists of Medicine

Emerging technologies – such as machine learning and data analytics – will provide enormous opportunities for radiologists to augment and improve the quality of care they provide to their patients, according to a report to appear in Journal of the American College of Radiology. The report urges radiologists to maintain an active role in guiding the development of these technologies.

The report provides a summary of the 38th Intersociety Summer Conference held in Olympic Valley, California. The meeting focused on the current state and future direction of clinical data science and its application to radiology practice.

Data science already informs radiologists' traditional roles and offers innumerable opportunities and innovations. "With the exponential growth in imaging data, radiology knowledge bases, and data from other sources such as electronic health records (EHR) and the Internet of Things, how we effectively manage, analyse, and use these data will define radiologists' practice going forward," the report notes. "Radiologists will likely transform from image interpreters to machine-augmented radiology data scientists."

Radiologists' goal is to produce actions based on new insights from data. This process is a synergy of human and machines. Roentgen's discovery of x-rays first enabled this. Each new technological advancement, from fluoroscopy to CT to the latest complex imaging device, has augmented the relationship between radiologists and the use of technology.

Machine-generated insights will be the foundation for future data-driven radiology advancements, the report says. This "new paradigm" requires sophisticated data management, including the ability to integrate disparate data sources, robust understanding of machine learning (ML) algorithms and their underlying structure and statistics, and better computing power and technology. Radiologists have access to growing quantities of machine-consumable data from EHRs, PACS, and new sources such as the Internet of Things, genomics, and social media.

"ML and data analytics will provide new insights to facilitate the selection, scheduling, and performance of the most appropriate imaging tests," according to the report. In particular, data analytics can help radiologists

measure and control variability, and improvements in decision support at dictation time will help radiologists conform to standards of care.

Although ML will be useful to guide recommendations and patient care, the report says "radiology societies should explore potential legal and ethical issues. For example, what happens if a machine's recommendations result in an adverse outcome?"

The report emphasises that radiologists will not be replaced by machines. "Radiologists of the future will be essential data scientists of medicine. We will leverage clinical data science and ML to diagnose and treat patients better, faster, and more efficiently," report authors write.

The conference ended with a call to action to develop educational strategies for future leaders, communicate optimism for radiology's future, and engage with industry to ensure the ethics and clinical relevance of developing technologies.

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