Artificial Intelligence: Journey from Real to Virtual Radiologist

In current era, we all can sense that although machines have not taken the charge yet but these are seeping their way into our lives, affecting how we live, how we work and entertain ourselves. The behavior of these machines is called Artificial Intelligence (AI). AI is an important domain of computer science which deals with making computers behave like humans. Simply in AI machines are made to learn (the acquisition of information and rules for using the information), reasoning (using the rules to reach approximate or definite conclusions), and self-correction. The term was coined in 1956 by John McCarthy, an American computer scientist, in 1956 at The Dartmouth Conference where the discipline was born.[1] In 1958 he invented the computer programming language LISP *(derived from LISt Processor)*, the second oldest programming language after FORTRAN. LISP is still used today and is the programming language of choice for artificial intelligence.[2] Currently, AI is considered an umbrella term that encompasses everything from robotic process automation to actual robotics. AI can be categorized in many ways, but simply as Weak AI (designed and trained for a particular task) and Strong AI (multi-task, having human cognitive abilities and intelligence to find a solution for unfamiliar task).

In healthcare, diagnostic imaging is focused on improving patient's outcomes and reducing costs as well. Radiologists want a bigger role in healthcare, one that allows them a say in patient's management, ideally one that goes from diagnosis to therapy follow-up. They will get it only if they can demonstrate their involvement adds clinical value. Improving patient outcomes is one route to this goal. Artificial intelligence (AI) may be the vehicle. AI holds the potential for improved diagnosis. A San Francisco-based start-up called Enlitic® is already pursuing this opportunity.[3] So one day soon, machines powered by AI will interpret even the most complex clinical images as accurately as today's most experienced radiologists. Their interpretations will take into account all relevant prior imaging examinations and patient's complete medical histories. The robot radiologist's generated final reports will be uniformly structured without need for preliminary reads. These robot radiologists will work 24/7/365 and have no falloff in diligence due to fatigue, monotony, interruptions or distractions. So "Robot Radiologists are the major threat to Real Radiologists" is the most popular narrative in today's radiology. However, Recht and Bryan (pioneers of digital imaging) envision a future in which AI becomes a routine part of radiologist's daily lives, making their work more efficient, accurate, satisfying and valued.[4] Second narrative is about the accuracy of reports generated by Robot Radiologists. However, proponents claims that patients, referring physicians and federal regulators will have no less confidence in the competence of nonhuman medical diagnosticians than air travelers have today in computerized autopilots - which, by the way, already fly your plane more than 90 percent of the time you're in the air.

Keeping in view the growth and pace of development in AI, it is expected that just 10 years from now, no medical imaging study will be reviewed by a "real radiologist" until it has been pre-analyzed by a "robot radiologist". This pre-analysis will also select truly urgent items on image-interpretation work list for real radiologist from those exams that can wait.

AI will do automated data mining of patient's histories stored in the electronic health record (EHR), and free up radiologists to perform more value-added tasks, such as integrating patient's clinical and imaging information, having more professional interactions, becoming more visible to patients

and playing a vital role in integrated clinical teams to improve patient care.

So, "would AI replace or augment real physicians?" is the most popular debate not only in radiology but also in pathology, radiation oncology, cardiology and neurology. But radiology is once again at the forefront of a technology revolution with radiologists puzzled about their role in the revolutionized era.

References

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