

Artificial Intelligence in the Era of COVID-19

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Artificial intelligence as it relates to radiology has been in the headlines for some time, for reasons both pessimistic and optimistic. Prior to the COVID-19 pandemic, for example, doomsday statements that AI would bring about the end of radiology as we know it and replacement of doctors by algorithms were popular.¹

The AI showcase at RSNA 2019, meanwhile, highlighted the promise of new AI technology to revolutionize the field; many radiologists, trainees, and investors walked through shiny displays and booths showing FDA badges of clearance and the promise of a new era.

Yet, just a few short months later COVID-19 struck; attention switched to managing the day-to-day crises of the pandemic. Hospital budgets have thinned, and enthusiasm for AI has waned. At least, that is what many believe, as stories emerge of hospitals furloughing physicians and staff in an effort to avert budget crises and stay afloat.

However, in reality there are many examples of AI being deployed in radiology departments around the world to help fight COVID-19. AI-based tools, facilitated by compassionate use approvals, are playing a prominent role in

the pandemic. In China, for example, an AI model has been deployed at 34 hospitals across the nation that immediately flags chest CT scans suspicious for COVID-19 so that those patients can quickly be isolated and tested.²

Similarly, in the United Kingdom, Mexico, and Italy, an algorithm is being used to classify patients as low, medium, or high risk for COVID-19 based on the pattern of opacities appearing on chest X-rays. Another algorithm that monitors progression of lung disease on the chest x-rays of ICU patients is also being used in these countries.³ In addition, many AI companies are allowing hospitals to use their technology for free or on a trial basis for research that is mutually beneficial to patients and the companies.

Current research suggests that radiologists play an important role in helping identify patients with suspected COVID-19 and how they are progressing.⁴ Sometimes radiologists are the first to raise the suspicion of the infection in patients undergoing other imaging procedures or presenting with atypical symptoms. The FDA recently cleared an AI tool that helps detect COVID-19 on partially imaged lungs as an incidental finding.⁵ In New York City, Mount Sinai Hospital is studying the capabilities of AI to detect COVID-19 by evaluating

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imaging findings in conjunction with patient clinical history and demographic characteristics.⁶

Diagnostic imaging AI tools frequently get attention because they are easy to display to non-radiologists and appear almost capable of working on their own. However, many radiologists have different aspirations for AI: that it can dramatically improve radiology workflows and efficiencies.

One aspect of their interest focuses on the role quantitative AI tools can play in achieving these goals. As COVID-19 spread, it became increasingly apparent that the time required for scans to be completed had — and continues to have — implications beyond simply patient throughput. Image acquisition time is an important consideration in relation to the exposure time of technologists and scanner equipment to live virus particles, even from presymptomatic patients.

Thus, many imaging sites are hoping to decrease the amount of time patients spend in the radiology department to help reduce the risk of virus exposure and enable more patients to safely be imaged under social distancing guidelines. One company has received FDA clear-

ance of AI technology that can shorten MRI, PET/CT, and other imaging exams without adversely impacting image quality.⁷

Despite COVID-19's impact in the U.S. and around the world, innovations such as these continue to be made, thanks in large measure to investments in AI.⁸ As the pandemic continues, it is reassuring to know that every possible weapon, including AI, is being brought to bear both in this battle and beyond.

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