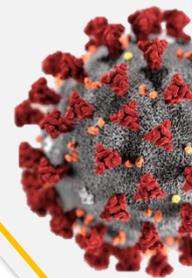




## Artificial Intelligence CT Scan for Covid 19 Detection and Monitoring



### INTRODUCTION

Although the current gold standard of diagnosing COVID-19 is reverse-transcription polymerase chain reaction (RT-PCR), there was growing evidence regarding the role of Chest Computed Tomography (CT) in early detection and diagnosis. Accuracy of Artificial intelligence (AI) in CT scan in diagnosing COVID-19 recently being studied on its ability to differentiate COVID-19 with other types of pneumonia and its usefulness in early detection and monitoring of the disease. Therefore, we conducted literature review on the topic to determine the diagnostic accuracy of Artificial Intelligence of CT scan in diagnosis of COVID-19.

### EVIDENCE ON EFFECTIVENESS AND SAFETY

Two studies were identified:

A retrospective experiment on a testing set of CT scans from 157 patients from China and the US. The results showed the developed deep learning image analysis system was able to develop classification points and detect suspicious COVID-19 thoracic CT features. Classification of coronavirus vs non-coronavirus cases was excellent: 0.996 AUC per thoracic CT studies (95%CI: 0.989-1.00) on Chinese control and infected patients with possible working points of 98.2% sensitivity and 92.2% specificity.<sup>1</sup>

A retrospective, multi-center study of the deep learning model of COVID-19 detection neural networks (COVnet) from a hospital in Shenzhen, China showed that this model is able to distinguish COVID-19 from community acquired pneumonia (CAP) and other lung diseases. For COVID-19, the sensitivity was 90% (95% CI: 83%, 94%) and specificity was 96% (95%CI: 93%, 98%). The AUC was 0.96 (95%CI: 0.94, 0.99).<sup>2</sup>

Li L et al (2020) also included hundreds of CT scans in the dataset, which displayed community-acquired pneumonia and other lung ailments. Their model also scored high marks in differentiating such diseases from novel coronavirus, with a 87% sensitivity rate and 92% specificity rate.<sup>2</sup>

### CONCLUSION

1. Limited evidence available to show accuracy of CT scan with artificial intelligence or deep learning model using detection networks in screening/detecting COVID-19 patients among non-COVID-19 or community acquired pneumonia.

2. Different model of detection network uses different clinical dataset and CT scan dataset samples in hospitals treating COVID-19 patients. Hence, the sensitivity, specificity and diagnostic accuracy varies.
3. Overall, the diagnostic accuracy of CT with AI/deep learning model in determining COVID-19 patients with non-COVID-19 and community acquired pneumonia is good, between 0.96 to 0.99.
4. Other important issues that need to be considered include : training in using the deep learning method and AI, feasibility in detecting the suitable CT scan datasets (different methods used), and most importantly, local protocols on determining which patient should go for CT scan examinations in COVID-19 management.

## REFERENCE

1. Gozes O, Frid-Adar M, Greenspan H, et al. Rapid AI Development Cycle for the Coronavirus (COVID-19) Pandemic: Initial Results for Automated Detection & Patient Monitoring using Deep Learning CT Image Analysis. arXiv preprint arXiv:2003.05037. 2020 Mar 10. (Accessed on 24/3/2020) Link : <https://arxiv.org/ftp/arxiv/papers/2003/2003.05037.pdf>
2. Li L, Qin L, Xu Z, et al. Artificial Intelligence Distinguishes COVID-19 from Community Acquired Pneumonia on Chest CT. Radiology. 2020 Mar 19:200905. (Accessed on 24/3/2020) Link : <https://pubs.rsna.org/doi/pdf/10.1148/radiol.2020200905>

Based on available evidence up to 24 March 2020

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**Disclaimer:** This rapid assessment was prepared to provide urgent evidence-based input during COVID-19 pandemic. The report is prepared based on information available at the time of research and a limited literature. It is not a definitive statement on the safety, effectiveness or cost effectiveness of the health technology covered. Additionally, other relevant scientific findings may have been reported since completion of this report.

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