



# IoT-enabled stacked ensemble of deep neural networks for the diagnosis of COVID-19 using chest CT scans

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## Abstract

The ongoing COVID-19 (novel coronavirus disease 2019) pandemic has triggered a global emergency, resulting in significant casualties and a negative effect on socio-economic and healthcare systems around the world. Hence, automatic and fast screening of COVID-19 infections has become an urgent need of this pandemic. Real-time reverse transcription polymerase chain reaction (RT-PCR), a commonly used primary clinical method, is expensive and time-consuming for skilled health professionals. With the aid of various AI functionalities and advanced technologies, chest CT scans may thus be a viable alternative for quick and automatic screening of COVID-19. At the moment, significant advances in 5G cellular and internet of things (IoT) technology are finding use in various applications in the healthcare sector. This study presents an IoT-enabled deep learning-based stacking model to analyze chest CT scans for effective diagnosis of COVID-19 encounters. At first, patient data will be obtained using IoT devices and sent to a cloud server during the data procurement stage. Then we use different fine-tuned CNN sub-models, which are stacked together using a meta-learner to detect COVID-19 infection from input CT scans. The proposed model is evaluated using an open access dataset containing both COVID-19 infected and non-COVID CT images. Evaluation results show the efficacy of the proposed stacked model containing fine-tuned CNNs and a meta-learner in detecting coronavirus infections using CT scans.

**Keywords** Internet of things (IoT) · Chest CT scans · COVID-19 Diagnosis · Stacking model · Fine-tuned CNNs · Deep learning

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