Radiology

Letter to the Editor

Regarding "Artificial Intelligence Distinguishes COVID-19 from Community Acquired Pneumonia on Chest CT"

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Editor:

We read with great interest the article by Dr Li and colleagues (1), published in March 2020 in *Radiology,* in which they report a deep learning (DL) model applied to chest CT images to identify COVID-19 from community-acquired pneumonia and other lung diseases. However, we believe that some methodological comments are appropriate.

First, the core of the DL framework adopted in this paper relies on the popular *ResNet50* as backbone. Future initiatives may benefit from other *state-of-art* architectures that, with the same computational cost, are able to outperform the latter. Moreover, similar performance could also be achieved with far less computational cost (2).

Second, it is of concern that results from a traditional *U-net* architecture used for lung segmentation were not reported. Performance evaluation of this preprocessing step is also relevant, as eventual errors from the segmentation model can propagate throughout the pipeline. It is of note that the *U-net* model has been iterated and improved upon several times over the years (3) and, hence, may also be considered in prospective studies.

Finally, we appreciate that the authors provided public access to their code. However, it has come to our attention that some procedures (eg, lung windowing, as seen in the file *dataset.py*, line 56) are not entirely described in the article. Similarly, some important methods are not included in the source code (eg, the *U-net* based lung segmentation*)*. Ideally, the full source code, as well as the trained weights of the neural networks, could be provided. This is particularly important to ensure reproducibility, as one would also require access to their dataset in order to train its model or to refine their proposed algorithm.

Nevertheless, these small issues in no way detract from the outstanding work of Dr Li et al that sheds light on the utmost challenge of developing a rapid and accurate screening for positive COVID-19 cases.

1. Li L, Qin L, Xu Z, et al. Artificial Intelligence Distinguishes COVID-19 from Community Acquired Pneumonia on Chest CT. Radiology. Radiological Society of North America ; 2020;200905http://pubs.rsna.org/doi/10.1148/radiol.2020200905. Accessed March 23, 2020.
2. Bianco S, Cadene R, Celona L, Napoletano P. Benchmark analysis of representative deep neural network architectures. IEEE Access. Institute of Electrical and Electronics Engineers Inc.; 2018;6:64270–64277.
3. Azad R, Asadi-Aghbolaghi M, Fathy M, Escalera S. Bi-Directional ConvLSTM U-Net with Densley Connected Convolutions. Institute of Electrical and Electronics Engineers (IEEE); 2019;406–415http://arxiv.org/abs/1909.00166. Accessed March 23, 2020.