

Abstract: As COVID-19 cases continue to climb, especially in developing countries, the quick and accurate diagnosis of COVID-19 plays a critical role in timely quarantine and medical treatment. Unfortunately, manual interpretation of CT Scans to screen for COVID-19 can be easily misdiagnosed due to the visual similarities with non-COVID bacterial pneumonia lesions, leading to mistreatment, further spread of infection, and death. Therefore, we propose a simple 2D multi-classification deep learning algorithm to diagnose COVID-19 pneumonia using a single chest CT image. We tested and validated our models with 105,000 pre-classified CT slices from the China Consortium of Chest CT Image Investigation public dataset. We assessed several state-of-the-art architectures including ResNet-50, ResNet 152V2, ResNet152V2 + GRU, ResNet152V2 + Bi-GRU, VGG-19, SqueezeNet, and GoogleNet InceptionV3 and chose best architecture using the F1-Score, AUROC, and Cohen's Kappa metrics. Furthermore, to test the effectiveness of our model in a clinical setting, we compared the performance of our model with three independent radiologists. Finally, with the ultimate goal of aiding with the diagnostic and treatment process for radiologists in developing countries with overburdened medical systems and undeveloped internet infrastructure, we developed a low-latency cloud based webpage to help radiologists diagnose COVID-19 using CT Scans and common clinical symptoms, and receive immediate feedback on treatment. As more data becomes available, radiologists all around the world can continuously train our model to further improve accuracy.