## Deep GRU-CNN model for COVID-19 detection from chest X-rays data

## ABSTRACT

In the current era, data is growing exponentially due to advancements in smart devices. Data scientists apply a variety of learning-based techniques to identify underlying patterns in the medical data to address various health-related issues. In this context, automated disease detection has now become a central concern in medical science. Such approaches can reduce the mortality rate through accurate and timely diagnosis. COVID-19 is a modern virus that has spread all over the world and is affecting millions of people. Many countries are facing a shortage of testing kits, vaccines, and other resources due to significant and rapid growth in cases. In order to accelerate the testing process, scientists around the world have sought to create novel methods for the detection of the virus. In this paper, we propose a hybrid deep learning model based on a convolutional neural network (CNN) and gated recurrent unit (GRU) to detect the viral disease from chest X-rays (CXRs). In the proposed model, a CNN is used to extract features, and a GRU is used as a classifier. The model has been trained on 424 CXR images with 3 classes (COVID-19, Pneumonia, and Normal). The proposed model achieves encouraging results of 0.96, 0.96, and 0.95 in terms of precision, recall, and f1-score, respectively. These findings indicate how deep learning can significantly contribute to the early detection of COVID-19 in patients through the analysis of X-ray scans. Such indications can pave the way to mitigate the impact of the disease. We believe that this model can be an effective tool for medical practitioners for early diagnosis.