

Problem Statement : CT Scan Image Classification

Coronavirus (COVID-19) outbreak which is a global health pandemic occurred due to (SARS) Severe Acute Respiratory Syndrome and SARs-CoV-2 has an immeasurable impact on the entire world. In this century, COVID-19 is the third viral contagious disease caused due to SARS-CoV-2 along with Severe Acute Respiratory Syndrome-2(SARS-CoV-2) and Middle East Respiratory Syndrome (MERS).

DataSet:

The dataset contains 1252 CT scans that are positive for SARS-CoV-2 infection (COVID-19) and 1230 CT scans for patients non-infected by SARS-CoV-2, 2482 CT scans in total. These data have been collected from real patients in hospitals from Sao Paulo, Brazil. The aim of this dataset is to encourage the research and development of artificial intelligent methods which are able to identify if a person is infected by SARS-CoV-2 through the analysis of his/her CT scans.

Approach

- Residual neural network consisting of a total 50 layers called ResNet50 is used for the classification of covid-19 disease.
- Resnet50 captures essential features and description of images which can be reused with similar and smaller datasets.
- Initially the network is fine-tuned by resizing the images.
- The images taken from the input dataset are resized to 150x150x3.
- The entire network is fine-tuned by applying a discriminative learning rate for 5 epochs.
- Progressive resizing technique is most beneficial to train the model iteratively.
- For training Adam optimizer is used with a batch size of 64.
- We have used early stopping to halt the training of neural network at the right time.
- ModelCheckpoint callback is used in conjunction with training using model.fit() to save a model or weights (in a checkpoint file) at some interval, so the model or weights can be loaded later to continue the training from the state saved.
- Model is trained on the model and observed the results .