Cornell University – Submitted on 27th March 2020

Screening Chest X-ray images using machine learning techniques like deep learning in order to detect COVID-19

* Coronavirus is rapidly spreading worldwide and threatening billions of humans
* Most covid patients suffer from lung infection
* Real time polymerase chain reaction (RT-PCR) is the accepted diagnostic method
* However, there are not sufficient testing kits available to check thousands of patients
* Chest CT scans are far more effective but chest x-rays are widely and faster available in terms of time and cost
* X-rays play a crutial role in clinical care and epidemiological studies
* X-ray units are found in urban and rural areas of all countries
* X-rays would significantly increase screening of covid-19
* Deep learning is a successful AI technique to analyze these images and are effective and reliable covid screening
* I aim to develop a detection model for fast reliable screening
* To create a high sensitivity model for covid-19, we use data in the form of pneumonia images as non covid19 cases
* An xray based screening model to be made to differentiate between covid and non covid cases as a binary classification
* the model is composed of three components, namely, a backbone network, a classification head, and an anomaly detection head.
* Reduce the false positive cases and increase the accuracy rates by splitting the data and conducting the experiments

Py images search

* Data is not only images but also patient vitals, location, medical history etc being considered.
* This is majorly for educational purpose only and not meant to be a robust covid detector

A deep learning algorithm using CT images to screen for Corona Virus Disease (COVID-19) - Yale University

* Convolutional Neural network (CNN) is used
* CNN enhances low light images. This is applied to the images
* Although covid might look similar to other lung diseases, CNN helps us identify unique features that are difficult for visual recognition
* Basic features of covid in an xray are small patchy shadows and interstitial changes in the early stage, multiple ground glass and infiltrates in both lungs in the progression stage,

Correlation of Chest CT and RT-PCR Testing in Coronavirus Disease 2019 (COVID-19) in China: A Report of 1014 Cases

* <https://www.who.int/health-topics/coronavirus#tab=tab_1>
* <https://www.kaggle.com/paultimothymooney/chest-xray-pneumonia> - normal xrays
* <https://github.com/ieee8023/covid-chestxray-dataset> - github covid data
* <https://www.worldometers.info/coronavirus/> - stats
* <https://www.nationalgeographic.com/science/2020/02/here-is-what-coronavirus-does-to-the-body/>

Backpropagation Applied to Handwritten Zip Code Recognition