RET Project: CT Lung Segmentation of Patients with COVID-19

Sharon Stefan[1], Wolfgang Stefan[2], Rosemary Renaut[3]

[1] Estrella Mountain CC, [2] Mayo Clinic, [3] School of Mathematical and Statistical Sciences at Arizona State University

Motivation:

Hospitals and radiologists overwhelmed with COVID-19 cases for assessment the severity of lung damage due to COVID-19

Previous Literature and Conclusions:

Classified 5 CT scans using Chaotic-Bat-Algorithm and Kapur's Entropy for CT enhancement [1]

Choice of feature vectors had larger impact on accuracy levels than choice of ML used

Our contributions:

Use simple segmentations of lung CT to compare dependence of classification accuracy on number of feature vectors and ML method

Compare accuracy levels to [1] from our heuristic approach to compare possible trade offs such as extreme high accuracy of ML and costs to ML on data sets

Implications:

Project serves as a Teaching Design for Undergraduate Lesson Plan and Research project

Increase interests in ML and careers in Data Science/Artificial Intelligence

References:
[1] Kadry, Seifedine, et al. "Development of a machine-learning system to classify lung CT scan images into normal/COVID-19 class." arXiv preprint arXiv:2004.13122 (2020).
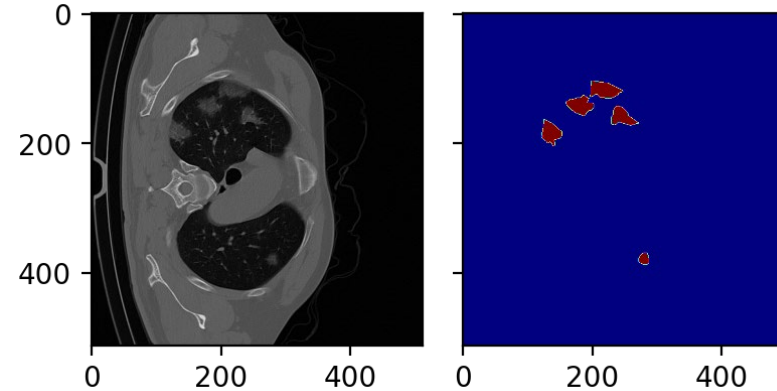[2] https://www.kaggle.com/datasets/andrewmvd/covid19-ct-scans

Fig 1: Training image and segmentation of COVID infection [2]
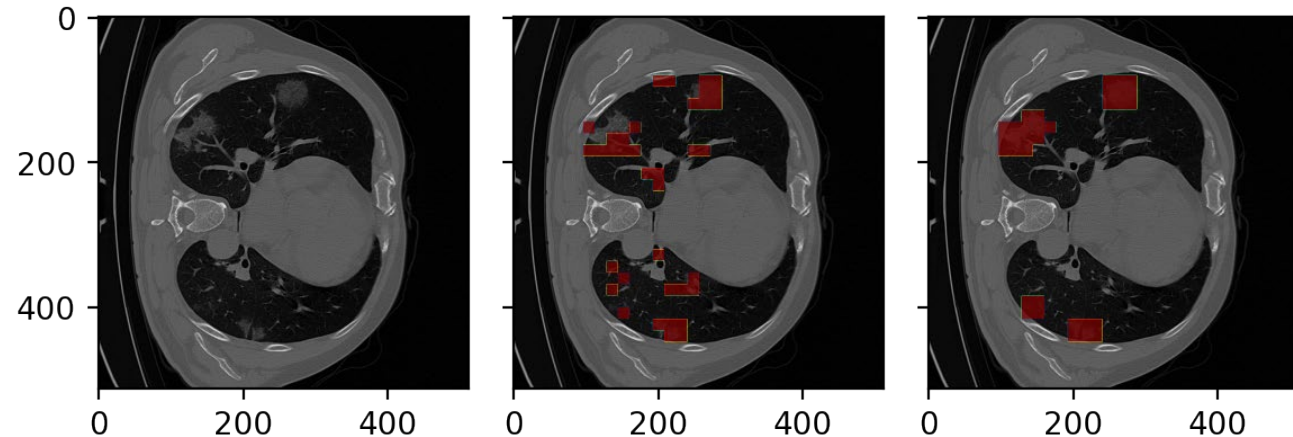
Fig 2: From left to right: Original CT, Predicted Classification with Simple KNN, True Label