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Title: Use of Chest CT and Machine Learning for Diagnosis and Management of COVID-19 Patients

Project Summary

New papers cite the need and high sensitivity of chest computed tomography (CT) in diagnosing patients with suspected COVID-19, and note the presence or absence of nine CT imaging features as representative of COVID-19, seen in both symptomatic and asymptomatic patients. Additionally, some medical practices request CT for appropriate management of confirmed and unconfirmed cases. Therefore, it is of utmost importance to identify the most reliable imaging and diagnostic attributes specific for COVID-19, and to build a diagnostic model for assessing the presence, severity, and management of COVID-19 in suspected or confirmed patients. We propose to develop such a diagnostic software model for radiologists, with 3 specific aims. First, we will develop a correlation model between radiological/background data and presence/severity of COVID-19. Once a sizable number of CT scans is collected along with patients' background information, we will develop, train and verify a machine learning model for the automatic detection and staging of COVID-19 patients and ruling out other diseases. We will further develop a user interface and visualization tool for radiologists for an effective inspection of the imaging features indicative of COVID-19, as well as the COVID-19 probabilities derived from the correlation and detection models.