**Summary of the article: “*Review and classification of AI-enabled COVID-19 CT imaging models based on computer vision tasks*”**

In the middle of the second wave of the pandemic in November 2020, I decided to work on a project with my colleagues: COVID-19 detection using x ray images. We implement a ResNet54 to classify between COVID-19/normal. We struggle to get data, and this is due to the lack of data at that time. We got 2500 labelled images, 2000 for normal person and 500 for covid person. So, I still interested in this subject, for this reason I choose to summarize the last paper I read in this field: **“Review and classification of AI-enabled COVID-19 CT imaging models based on computer vision tasks”.**

The authors review the existing literature on AI-enabled CT imaging models for COVID-19. They focus on studies that have used deep learning techniques, which are a subset of machine learning algorithms that are particularly well-suited for image analysis tasks. The authors classify the studies into three categories based on the computer vision tasks performed: image segmentation, image classification, and object detection.

Une image contenant diagramme

Description générée automatiquement

**Figure 1: Categories of methods for Covid 19 Ct Diagnosis**

* Image Segmentation Models:

Image segmentation is an important task for CT imaging because it can help identify specific regions of interest, such as areas of the lung that are affected by COVID-19. They find that these models can be effective at identifying areas of the lung affected by COVID-19 and can provide valuable information to clinicians.

* Image Classification Models:

Image classification involves categorizing an image based on its content. In the context of COVID-19 CT imaging, image classification models can be used to distinguish between CT scans that show evidence of COVID-19 and those that do not. The authors report that these models effectively distinguish the presence or not of COVID-19 in CT scans.

* Object Detection Models:

Object detection models are designed to identify specific objects within an image. In COVID-19 CT imaging, these models are used to detect features associated with the disease, such as ground glass opacities. Several studies have investigated the effectiveness of object detection models in COVID-19 CT imaging and have demonstrated their ability to recognize disease-specific features, providing useful insights for medical professionals.

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| --- | --- | --- | --- | --- | --- |
| **Type** | **Performed Tasks** | **Datasets** | **Framework** | **Classes** | **Performance (ACC)** |
| **Classification** | Classification of COVID + or - | 19685 CT slices | VGG16, DNN, | 1.COVID-19 +  2. COVID-19 – | 94.6 % |
| Classification of COVID + or − | 2482 CT images  1252 positive images  1230 negative images | ADECO-CNN method | 1.COVID-19 +  2. COVID-19 – | 99.99% |
| **Segmentation** | COVID-19 abnormalities  segmentation | Medseg dataset | CNN and U-Net | Lung extraction and COVID-19 abnormality segmentation | 99.1 % |
| 1.COVID/non Classificat  2. Lesion segmentation  3. Image reconstruction | 449 COVID-19, 425 normal, 98 lungs cancers, and 397 other pathologies | U-Net and multi-task  learning architecture | COVID-19 infected region | 95.23% |
| **Detection** | COVID-19 detection with binary classification e.g., COVID and Non-COVID | 349 positive CT images and 397 CT images of non-COVID patients | ResNet18, ResNet50, ResNet101, | Positive cases abnormality localization | 99.4% |
| An automated tool for COVID detection, quantification, and tracking | Normal slices = 1036 Abnormal slices n = 829 | Resnet-50, Grad-CAM technique | Opacities quantitative measurements and heat maps visualization | 99.6 % |

**Figure 2: COVID-19 detection methods and their selective information**

In conclusion, this article provides a comprehensive review of the existing literature on AI-enabled CT imaging models for COVID-19, with a focus on computer vision tasks. The authors demonstrate the potential of AI and computer vision techniques for analyzing CT scans in the context of COVID-19 and highlight the importance of these tools in situations where radiology experts are in short supply. The authors also identify several challenges that need to be addressed to develop more accurate and efficient models for COVID-19 CT imaging. These challenges include the need for large datasets, robust validation methods, and explainable AI models like Invertible Interpretaion Network.