EE 4211 Computer Vision

Project

Semester A, 2020-2021

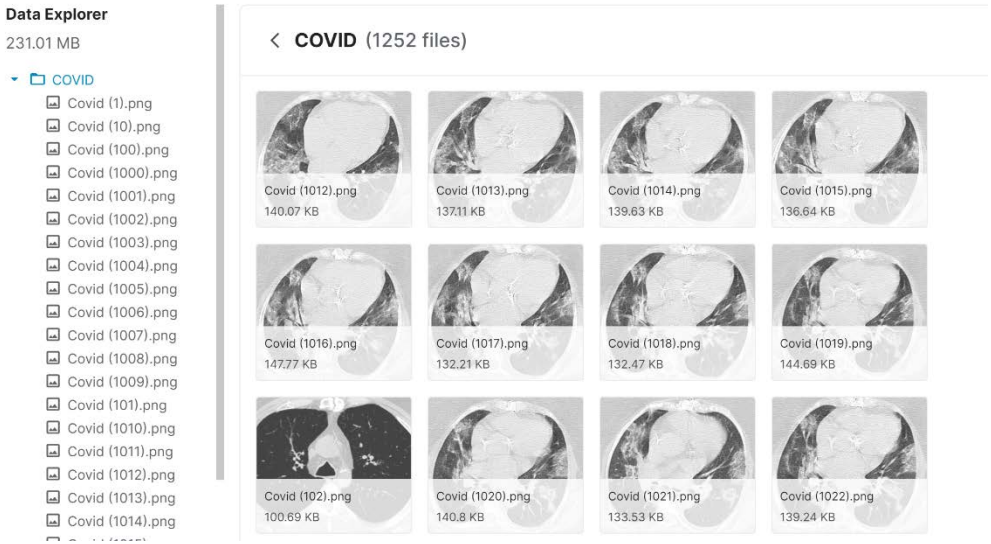
Introduction

- In this project, we are going to work on a simple computer vision related task (classification, segmentation) with deep learning methods.

- Programming language is not limited
- Google cloud for this project
- 5 students form a group

Task 1: COVID-19 classification

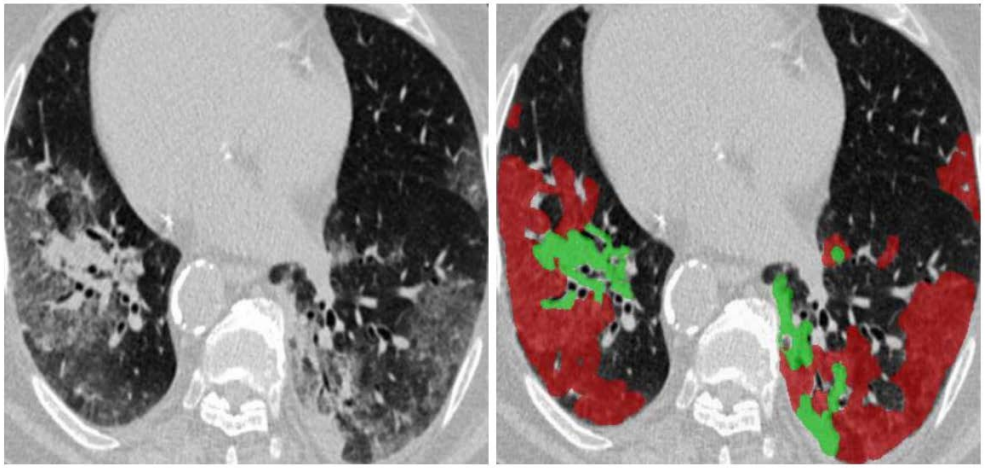
- Basic codes & paper:
  - Classify normal CT images and COVID ones
  - Paper1: SARS-CoV-2 CT-scan dataset: A large dataset of real patients CT scans for SARS-CoV-2 identification
  - Dataset: https://www.kaggle.com/plameneduardo/sarscov2-ctscan-dataset
  - Paper2: COVID-CT-Dataset: A CT Image Dataset about COVID-19
  - Dataset: https://github.com/UCSD-AI4H/COVID-CT
  - etc.



Task 2:COVID-19 segmentation

- Dataset:
  - Paper1: COVID-19 CT Lung and Infection Segmentation Dataset
  - Dataset1 : https://gitee.com/junma11/COVID-19-CT-Seg-Benchmark#3https://zenodo.org/record/3757476#.X5FwEWgzaUk
  - Paper2:Inf-Net: Automatic COVID-19 Lung Infection Segmentation From CT Images
  - Dataset2: http://medicalsegmentation.com/covid19/
  - Choice 3: Online challenge: https://covid-segmentation.grand-challenge.org/
  - Challenge timeline:

November 2nd, 2020: Launch of challenge and release of training and validation data.
December 7th, 2020: Release of test data.
December 10th, 2020: Deadline for submission of test results and abstract.
December 2020: Ranking of results will be available.



More inforamtion in TASKS

- Review paper on COVID-19:
  - Paper: Review of Artificial Intelligence Techniques in Imaging Data Acquisition, Segmentation and Diagnosis for COVID-19
- Read recent published papers to change the loss functions, compare corresponding results
  - (https://mp.weixin.qq.com/s/ra2qpFSbSuuJPDj39A5MWA)
- Modify the corresponding layers by adding attention strategy
  - (https://mp.weixin.qq.com/s/t6IboWbX5ztdscDqUjdxXg)
- Read related papers to improve the performance
  - ECCV 2020: https://eccv2020.eu/posters/
  - CVPR 2020: https://openaccess.thecvf.com/CVPR2020
  - AAAI 2020: https://aaai.org/Conferences/AAAI-20/wp-content/uploads/2020/01/AAAI-20-Accepted-Paper-List.pdf

Workflow

- Get familiar with the data and task
- Search for a suitable code for this task
- Run the codes with the data and see the results
- Modification of the methods to improve the performance
- Re-evaluate the methods
- Write the paper

Evaluation

- Project presentation
  - 10 mins presentation+5 mins Q&A
  - Evaluated by me and other students
- Reports:
  - Use standard latex template for a conference
  - http://ras.papercept.net/conferences/support/tex.php
  - **Overleaf** is good way to write a paper with latex
  - Around 6 pages
  - Including abstract, introduction, method, results and conclusion
  - Submit before Dec. 10th by email per group with zip file, including all materials for the paper
- Algorithm Performance
- All the codes should be open (a link)

Topic selection

- One group send me one email within this week, including the team members, the priority for the topics (1st or 2nd).
- I will assign the final project task based on your priority and your email in order.
- For those who don’t send me an email related to the group information, I will assign their team members.
- Will upload group information and project number before the next class