

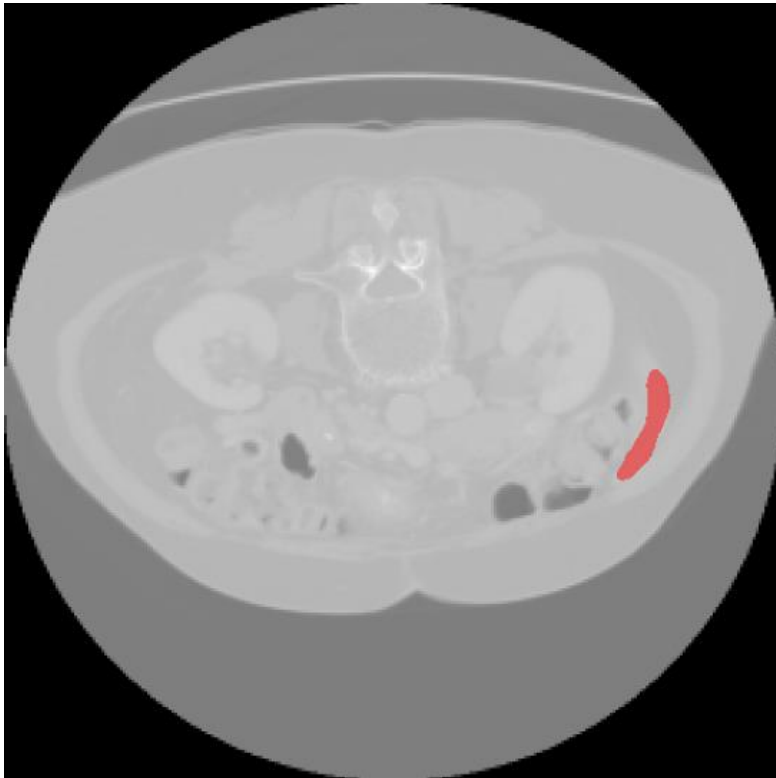
Image-Segmentation-UNet- Pytorch-GPL-Jupyter

Use UNet to segment the image. It can be applied to medical image analysis, defect image analysis, etc.

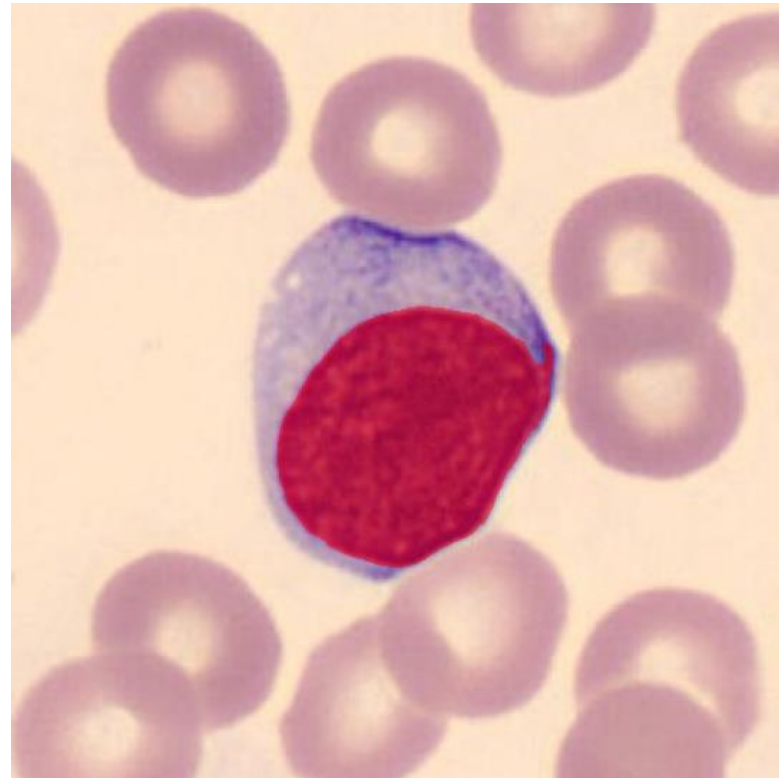
Version 20230130

Applications

- It can be applied to medical image analysis, defect image analysis, etc.



■ liver, count=970



■ nucleus, count=22292

Process

- Preprocessing
 - Data preparation.
 - Annotate images (1_annotation_labelme_json.ipynb).
 - Convert file format (2_labelme_json_to_dataset.ipynb).
- Train (3_train.ipynb).
- Inference
 - Infer a single image (4_inference.ipynb).
 - Inference folder (5_inference_folder.ipynb).

Dataset

- Prepare training, testing, and validation images and place them in corresponding folders. The recommended image size is 512*512.
- data/CT
 - data/CT/train
 - data/CT/train/image : training images.
 - data/CT/train/label : the training label file.
 - data/CT/val
 - data/CT/ val /image : image for verification.
 - data/CT/ val /label : the label file used for verification.
 - data/CT/test
 - data/CT/ test /image : test image.
 - data/CT/ test /label : label file for testing.
 - data/CT/model : model folder.

1_annotation_labelme_json.ipynb

- Purpose : open the annotation tool.
- Parameter setting
 - dataset_name : the name of the dataset.

2_labelme_json_to_dataset.ipynb

- Purpose : convert the marked files into files required for training.
- Parameter setting
 - dataset_name : the name of the dataset.

3_train.ipynb

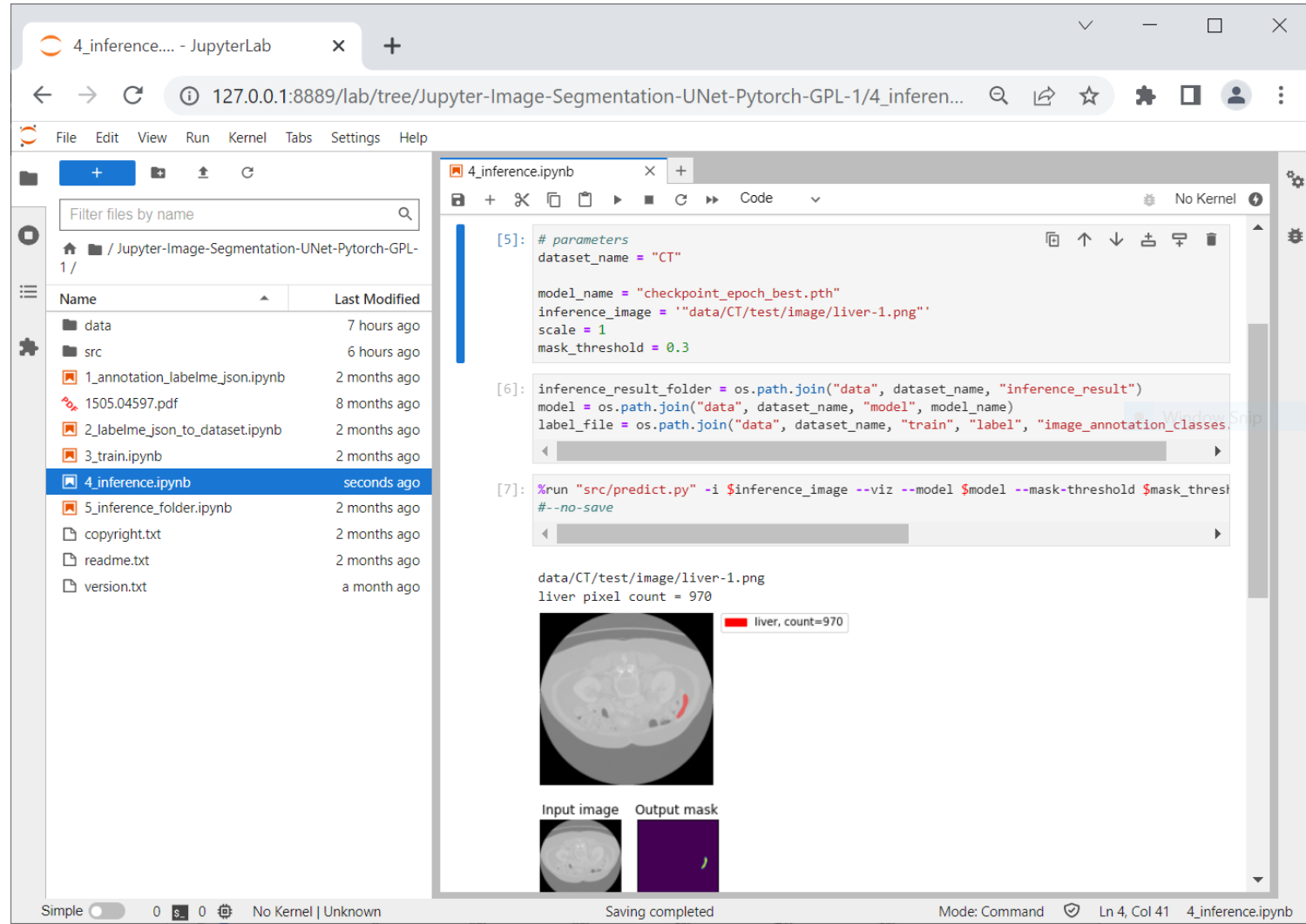
- Purpose : to train. The model path of the training output is in the model folder of the dataset.
- Parameter setting
 - dataset_name : the name of the dataset.
 - Epochs.
 - bath_size.
 - learning_rate : learning rate.
 - scale : training image size scaling.
 - is_resume : whether to continue training.
 - resume_model : model for continuous training.

4_inference.ipynb

- Purpose : to infer a single image.
- Parameter setting
 - dataset_name : the name of the dataset.
 - model_name : model filename for inference.
 - inference_image : image Paths for Inference.
 - scale : the size scaling ratio of the inferred image, it is recommended to be the same as the train setting.
 - mask_threshold : used for inferences with only a single class, only detected when the score is greater than this threshold.

4_inference.ipynb

- Result :



The screenshot shows a JupyterLab interface with the following components:

- File Browser (Left):** A sidebar showing a file tree for the directory `/ Jupyter-Image-Segmentation-UNet-Pytorch-GPL-1 /`. The file `4_inference.ipynb` is selected and highlighted in blue. Other files include `data`, `src`, `1_annotation_labelme_json.ipynb`, `1505.04597.pdf`, `2_labelme_json_to_dataset.ipynb`, `3_train.ipynb`, `5_inference_folder.ipynb`, `copyright.txt`, `readme.txt`, and `version.txt`.
- Code Editor (Center):** The main area displays the code from `4_inference.ipynb`.
 - Cell [5]:

```
# parameters
dataset_name = "CT"

model_name = "checkpoint_epoch_best.pth"
inference_image = "data/CT/test/image/liver-1.png"
scale = 1
mask_threshold = 0.3
```
 - Cell [6]:

```
inference_result_folder = os.path.join("data", dataset_name, "inference_result")
model = os.path.join("data", dataset_name, "model", model_name)
label_file = os.path.join("data", dataset_name, "train", "label", "image_annotation_classes
```
 - Cell [7]:

```
!run "src/predict.py" -i $inference_image --viz --model $model --mask-threshold $mask_thres
#--no-save
```
- Output (Bottom):** The execution output shows the file path `data/CT/test/image/liver-1.png` and the result `liver pixel count = 970`. Below this, there are two side-by-side images: `Input image` (a grayscale CT scan slice) and `Output mask` (a binary mask where the liver is highlighted in red). A legend indicates `liver, count=970`.

5_inference_folder.ipynb

- Purpose : to infer all images in the folder.
- Parameter setting
 - dataset_name : the name of the dataset.
 - model_name : model filename for inference.
 - inference_folder : folder path to use for inference.
 - scale : the size scaling ratio of the inferred image, it is recommended to be the same as the train setting.
 - mask_threshold : used for inferences with only a single class, only detected when the score is greater than this threshold.

5_inference_folder.ipynb

- Result :

The screenshot shows a JupyterLab environment with a file explorer on the left and a code editor on the right. The file explorer lists files in the directory `/ Jupyter-Image-Segmentation-UNet-Pytorch-GPL-1 /`. The code editor displays the output of the `5_inference_folder.ipynb` script, showing two examples of liver segmentation results.

Input Image Path	Liver Pixel Count
<code>data\CT\train\image\liver-1.png</code>	970
<code>data\CT\train\image\liver-10.png</code>	22542

Each example consists of an input CT scan image and an output mask where the liver is highlighted in red. The output masks are shown in a grid format with labels 'Input image' and 'Output mask'.

Reference

- Please refer to the readme.txt in the SDK folder.
- LEADERG AppsForAI : <https://www.leaderg.com/appsforai-windows>
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