deep_learning_motion_mask_segmentation

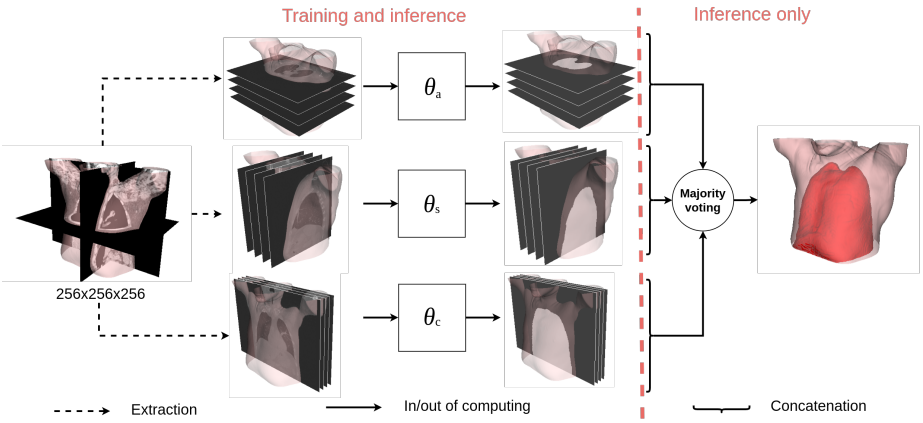

Figure 1: image from web

This repository is used to demonstrate the method published in : http://link-to-paper.com
Authors : Ludmilla Penarrubia, Nicolas Pinon, Emmanuel Roux, Eduardo Enrique Davila Serrano, Jean-Christophe Richard, Maciej Orkisz and David Sarrut.

This repository has several usages :

1- Use our trained model on the data we provide, as a proof of concept.

2- Test our trained model on your data, to get the motion mask segmentations on your data.

3- Train our model on your data and test it on your data

Pre-requisites and installations

- Make sure you have python3 installed
- Clone this repository on your machine and go in it:

  `cd deep_learning_motion_mask_segmentation/`
- Create a virtual environments

  `python3 -m venv motion_mask_seg`
- Activate the virtual environment

```
source motion_mask_seg/bin/activate
```

- Update pip3 repository and install dependencies listed in the requirements.txt

```
pip3 install --upgrade pip
python3 -m pip install -r requirements.txt
```

- Install Gatetools for preprocessing (optional)

```
pip3 install gatetools
```

Case 1 : Use *our* trained model on *our* showcase data

Run :`python3 trained_model_on_showcase_data.py`
Motion mask as .mhd and .raw files will be located in : `results_showcase/`

Case 2 : Use *our* trained model on *your* data (work in progress)

Put all your .nii or .mgh or .mhd in the directory `data/`
(optional) Run : `gatetools/bin/gt_affine_transform -i input_data.mhd -o output_data.mhd --newspacing "2.0" --force_resample --adaptative -p "-1000.0"`
Edit the file `infer_motion_masks.py` (l. 62-63) with the path to your data and its size:

```
python        params.input_img_path = "./data/PATH_OF_THE_IMAGE_TO_SEGMENT.mhd"
# EDIT THIS LINE        params.input_size = [256, 256, 256] #
EDIT THIS LINE
```

Run : `python3 infer_motion_masks.py`

Motion mask as .nii files and figures will be located in : `results/inference_on_your_data/`
We suggest skipping the preprocessing step only if your data is sampled as isotropic 2mmˆ3

(Advanced) Case 3 : Train and test our model on *your* data

For this use-case, we recommend pluggin in your code the model located in model.py, we do not provide the data management part of the code, as it is really specific to each user.

Acknowledgments

Thanks to the authors of this repository : https://github.com/milesial/Pytorch-UNet for providing an efficient implementation of U-net.

This work was performed within the framework of the LABEX PRIMES (ANR-11-LABX-0063) of Université de Lyon, within the program "Investissements d'Avenir"(ANR-11-IDEX-0007) operated by the French National Research Agency (ANR).

Thanks to Olivier Bernard for getting us started with the project by providing examples of his codes.