List of programs and scripts all is for 3d stuff

TRAINING

**Classification VGG:**

From a segmentation/prediction on ct images, predicts the malignancy

*dataset\_gen\_VGG.py*

Reads the ‘LIDC-IDRI’ folder, extracts annotations with 50% consensus, cuts out the regions with nodules, and saves the dataset in .hd5

*smistad\_imgaug\_VGG.py*

A batch generator Erik Smistad created. Added Flip and Rotate for the 3d arrays.

*VGGnet\_3d.py*

A 3d version of Erik’s VGG net. Creates a 3D VGG network.

*train\_VGG.py*

The script that trains the model and saves the best validation loss.

*predict\_VGG.py*

Script that predicts on the VGG model, to test how well it does on the test\_set

in *unet\_VGG.py* - *pred\_VGG*

Predicts the malignancy of a segmented nodule.

**Segmentation UNET:**

*dataset\_gen\_unet.py*

Reads the annotations from the xml files, and the dicom images. Saves the ground truth with 50% consensus, and the images in .hd5.

*batch\_generator\_unet.py*

A batch generator with 3d augmentation. And function to find the step length. Works but needs some love. *smistad\_imgaug.py* is better, but 3d augmentation is not implemented.

*unet.py*

Creates the unet model. Works for 2d and 3d networks

*train\_unet.py*

Script for training the unet.

*predict\_generator.py*

predict\_gen() is a generator th3at yields: ct images and the predictions on these images. i reads the lidc dataset directly, and predicts on that. Can be used with the functions in *plot\_functions.py* and *score\_functions.py and lungmask\_pro.py*

Post training

*unet\_vgg.py*

* import\_images(), imports dicom image and returns them in a 3d array, along with the resolution and offset.
* pred\_unet(), takes in the ct images, unet model, and returns the prediction
* pred\_vgg(), takes in the prediction for unet, resolution and the vgg model and returns the classification on the same format as the prediction from unet.
* pred\_to\_stl(), saves the prediction in .stl format
* pred\_to\_raw(), saves the prediction in raw and mhd format

*main.py*

A way to use the functions in unet\_vgg.py

Models:

*Unet\_model.hd5*

Takes in a 5d array: [batch, 64, 256, 256, 1] ([batch, z, y, x, 1]), with hounsfield capped at [-1024, 400]. Returns an array shaped [batch, 64, 256, 256, 2], with the last dimension [background, tumor].

VGG\_model.hd5

Takes in a chunk of [batch, 64, 64, 64, 2]. The last dimension is [ct values, binary segmented tumor]

Returns an array with 9 elements that represent the confidence that the tumor has the following malignancy: [1,s 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5].