**Machine learning using UNet to extract faults and fractures satellite images (Keras Code)**

The programming language : Python (Keras)

Required packages:

tensorflow>=2.0.0

keras>=2.3.1

rasterio>=1.1.0

scikit-image

**In the utils folder:**

**Code Execution**:

The main files to execute the code are:

1. **train.py**

The algorithm will execute training with the following command on Ubuntu:

python3 train.py –data\_root ../path\_to\_the\_processed\_train\_valid\_dataset –mean\_list 123.68 116.779 103.939 161.54 –tile\_channels 4 –num\_classes 1 –tile\_size 256 –batch\_size 6 –epochs 20 --optimizer ADAM --checkpoints\_folder\_path ../path\_to\_store\_the\_checkpoints –checkpoint\_name name\_of\_checkpoint

optional arguments:

-h, --help show this help message and exit

--data\_root DATA\_ROOT

Select the root of the folder that contains the (train, valid) subfolders

--tile\_size TILE\_SIZE

Select the size (heightxwidth) for the tiles used in the decompostion (default: 256)

--mean\_list MEAN\_LIST

Select the mean list (Mean RGBT bands) for IamgeNet dataset (default: [123.68, 116.779, 103.939, 161.54])

--tile\_channels TILE\_CHANNELS

Select the number of classes for the segmentation (default: num\_classes=1 for binary segmentation task)

--num\_classes NUM\_CLASSES

Select the number of classes (default: 1 for binary segmentation)

--batch\_size BATCH\_SIZE

selected batch size (default: 12)

--optimizer OPTIMIZER

default ADAM optimizer (list of optimizers: sgd, adagrad, adadelta, rmsprop, adam)

--checkpoints\_folder\_path CHECKPOINTS\_FOLDER\_PATH

Select the path of checkpoints to store the data

--checkpoint\_name CHECKPOINT\_NAME

Select the name of the checkpoint (default: test)