June 5, 2020

<https://keras.io/api/applications/>

<https://keras.io/api/applications/inceptionresnetv2/>

<https://keras.io/guides/transfer_learning/>

Adapting pre-trained model

Train last layer,

Get the dataset really for Keras input, size of the tile, /shape

Figure out the target class, [kras, no-kras]

Loss calculation for whole slides?

Use Tensor Board to visualize

Script:

1. Keras\_transfer\_learning\_script\_One.py
2. Keras\_transfer\_learning\_script\_Two.py

/nfs/home/xwang/Transfer\_Learning\_April

cd r3\_LUAD\_sorted

/nfs/home/xwang/Transfer\_Learning\_April/r3\_LUAD\_sorted/Pre\_processing\_2nd\_Feb21

Pre\_processing\_2nd\_Feb21

Total # tiles: 612819

# of tiles: test 91923

# of tiles: train 427568

# of tiles: valid 9332

Proportion: test 0.1500002447704787

Proportion: train 0.6977068269750122

Proportion: valid 0.15229292825450907

Total # of images: 518

# of images: test 85

# of images: train 363

# of images: valid 70

--labels\_names=/nfs/home/xwang/Transfer\_Learning\_April/model\_1b/labelref\_r3\_2class.txt

--labels=/nfs/home/xwang/Transfer\_Learning\_April/model\_1b/labels\_r3\_2class.txt

nohup bazel-bin/inception/imagenet\_train --num\_gpus=4 --batch\_size=400 --train\_dir=/nfs/home/xwang/Transfer\_Learning\_April/model\_1b/transfer\_learning\_model1b\_2CLass/ --data\_dir=/nfs/home/xwang/Transfer\_Learning\_April/model\_1b/r3\_2class\_TFRecord\_train/ --pretrained\_model\_checkpoint\_path=/nfs6/deeppath\_models/checkpoints/run1b\_10way\_MutationClassifier/model.ckpt-81500 --fine\_tune=True --initial\_learning\_rate=0.001 --ClassNumber=2 --mode='1\_sigmoid' --NbrOfImages=427568 --save\_step\_for\_chekcpoint=1069 --max\_steps=106901

Created:

New data folder path:

/nfs/home/xwang/Keras\_Transfer\_Learning\_June/Dataset\_Keras\_Folder

Class – Kras PATH:

/nfs/home/xwang/Keras\_Transfer\_Learning\_June/Dataset\_Keras\_Folder/class\_kras

Class – no-kras PATH:

/nfs/home/xwang/Keras\_Transfer\_Learning\_June/Dataset\_Keras\_Folder/class\_nokras

Task 1: based on labeled file: slides --> gene mutation class,

Separate tiles into class\_kras and class\_nokras.

- Get the statistics of number of images and number of tiles.

- Rename the image in each class folder to its corresponding class.

All tiles: 612822

/nfs/home/xwang/Transfer\_Learning\_April/r2\_LUAD\_segmentation/LUAD/

🡺 Jupyter Lab: Data\_Prep\_June06.ipynb

Supposed you have image files sorted by class in different folders, like this:

main\_directory/

...class\_a/

......a\_image\_1.jpg

......a\_image\_2.jpg

...class\_b/

......b\_image\_1.jpg

......b\_image\_2.jpg

June 06-7

* Keras Application scripts done. – running

June 08

Tasks:

1. Make sure the plotting function work properly.
2. Have to build customized loss function. <use backend Keras> => per slides AUC not per tile.
3. Figure out the metrics, Accuracy vs. AUC
4. Also, the optimizers setting (hyperparameters)
5. The architecture, last pooling layer and then activation.
6. Accuracy is up and down in a batch (batch size = 200), setting to 300 and 400 will have out of memory error. Why?
7. Use GPU- parallel the computing to speed up the training.

June 15, 2020

Model: 50 epochs, still running. 40/50

* Develop the script so that it saves the intermediate print out message (history) and also save the model and plotting at the same time.
* Develop the scripts with proper evaluation metrics and its plotting.
* Develop the scripts for customize loss function Keras.
* Develop the scripts with GPU-parallel the computing to speed up the training.

June 16, 2020

Model, 50 epochs, 7:46 am -> 45/50.

Use simple example dataset to develop the scripts.

* Server always throw OOM error, with example dataset, it works fine with Colab.

Adjust the script for Histopathology image dataset! Maybe use AWS or colab for it.

<online server but with local dataset.>

Have to upload the dataset into any online big data storage service for cloud computing.