

Setbacks:

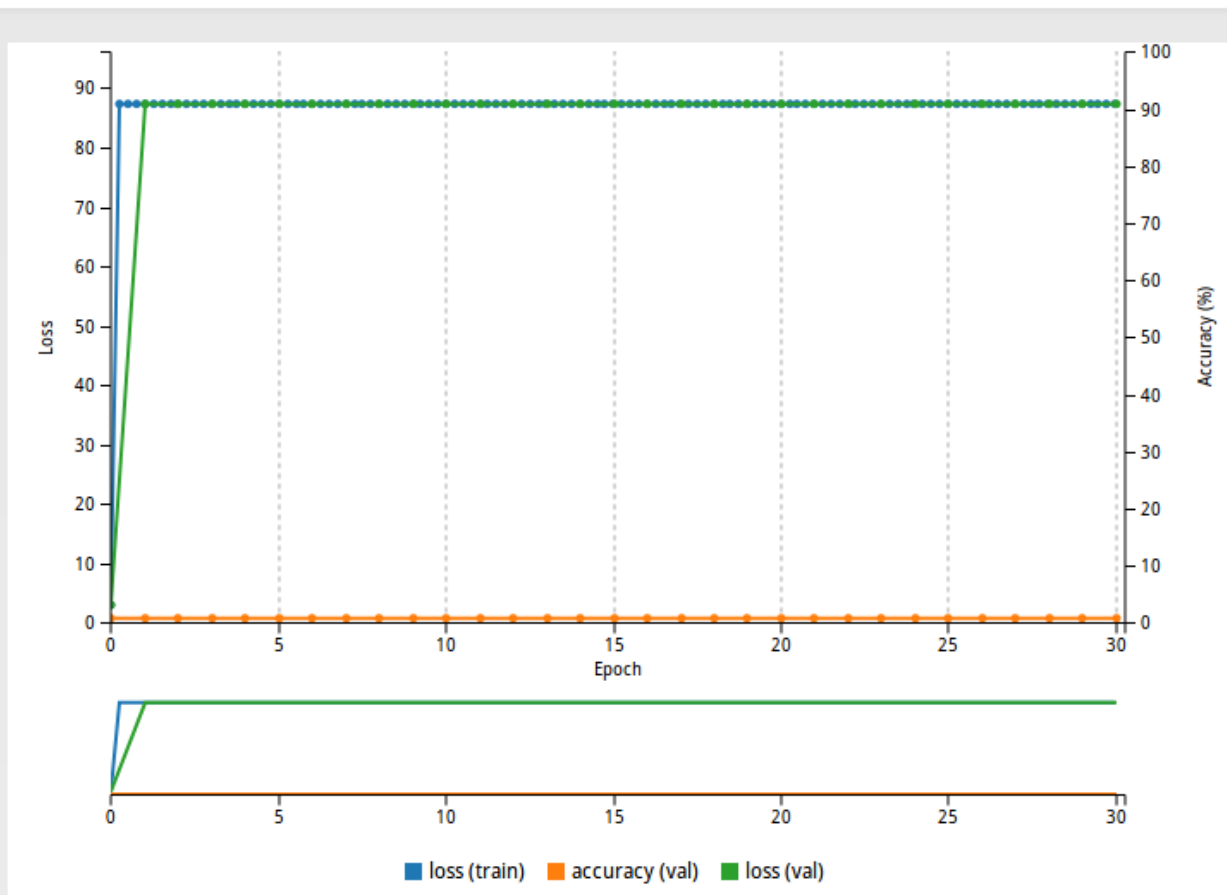
- 1). Different types of input n outputs to be fed into CNN/FCN networks;
- 2). Among end-to-end frameworks, the intermediate layers holds almost same type of data;
- 3). The works remained to be finish is to find out if softmax or other function can identify various inputs;

[Segmentation architecture is like an encoder followed by an decoder, former one refers to a pre-trained network, like VGG,ALEXNET; later one is to project the feature, which is learned by network onto pixel space]

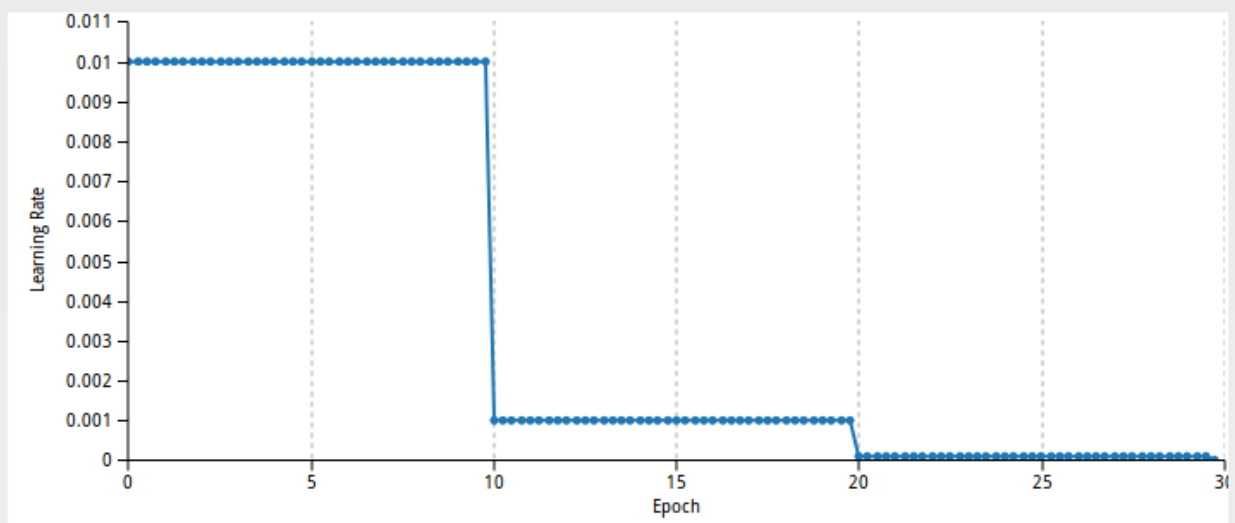
...

Experiment:

- 1).Try FCN-8 with pretrained weight loss model, giving error of:



[View Large](#)



[Value Error]: range parameter must be finite.(Lack of dice layer to evaluate)

2). [On-going]Try HHA images feed into CNN, noticed that only depth input can't serve more info than a RGB one.

HHA is not suitable for small scale scenario, due to it definition that geocentric properties comparison was made with reference to ground, which is oversize for condition such as blood detection or other surgical scene.

1st method, command line train model with image data(.png) and label(.mat)

(1). Resize image data to 80*80, however label can't be converted to such scale due to it's .mat format, which can't be changed even not convertible to .png;

(2). Reduced number of dataset to 100 pictures, still overflow of memories, even same parameter as original dataset;

(3). Input HHA dataset, with no label supported, using pre-trained model from RGB images;

(4). Transfer learning...

3). [Finished] Since memory overflow is an essential problem in deep learning process, so here's a method to calculate memory required for specific tasks: $32 \times 3 \times 256 \times 256$ (B*C*H*W) in float32(4 byte), requires 24M.

Memories occupied for networks, including parameter from networks and output from model.

Layers require memory:

conv, FC, Batch norm, Embedding

Layers require no memory:

Sigmoid, ReLU, pooling, Dropout

4). Memory can be settled via resizing images, even labels(mat2png).

(1). [Settled] Feed images and label(gray) to fc7-pretrained model, find that `error:CUBLAS_STATUS_MAPPING_ERROR` appears. Which may be caused by unmatched or unnormalized label pixel values. This can be fixed by creating colormap for label images, of which each pixel represents an array of class.

(2). [Confusing] After trying nyu-fcn-color with 80*80 images of 60 pictures, still overflow memory with same magnitude of data. Apart from that, the overflow values are the same as 224*224 dimensional data set.

```
copying conv1_1 -> conv1_1 0
copying conv1_1 -> conv1_1 1
copying conv1_2 -> conv1_2 0
copying conv1_2 -> conv1_2 1
copying conv2_1 -> conv2_1 0
copying conv2_1 -> conv2_1 1
copying conv2_2 -> conv2_2 0
copying conv2_2 -> conv2_2 1
copying conv3_1 -> conv3_1 0
copying conv3_1 -> conv3_1 1
copying conv3_2 -> conv3_2 0
copying conv3_2 -> conv3_2 1
copying conv3_3 -> conv3_3 0
copying conv3_3 -> conv3_3 1
copying conv4_1 -> conv4_1 0
copying conv4_1 -> conv4_1 1
copying conv4_2 -> conv4_2 0
copying conv4_2 -> conv4_2 1
copying conv4_3 -> conv4_3 0
copying conv4_3 -> conv4_3 1
copying conv5_1 -> conv5_1 0
copying conv5_1 -> conv5_1 1
copying conv5_2 -> conv5_2 0
copying conv5_2 -> conv5_2 1
copying conv5_3 -> conv5_3 0
copying conv5_3 -> conv5_3 1
coercing fc6 0 from (4096, 25088) to (4096, 512, 7, 7)
copying fc6 -> fc6 1
coercing fc7 0 from (4096, 4096) to (4096, 4096, 1, 1)
copying fc7 -> fc7 1
dropping fc8
I1031 18:25:45.720732 3044 solver.cpp:242] Iteration 0 (0 iter/s, 0.433419s/20 iter), loss = 195060
I1031 18:25:45.720768 3044 solver.cpp:261] Train net output #0: loss = 195060 (* 1 = 195060 loss)
I1031 18:25:45.720780 3044 sgd_solver.cpp:106] Iteration 0, lr = 1e-10
F1031 18:25:45.725942 3044 gpu_memory.hpp:27] Out of memory: failed to allocate 411041792 bytes on device 0
*** Check failure stack trace: ***
Aborted (core dumped) #almost 0.4GB
```

The image above shows the process that parameters were copied from data layer to hidden layers sequentially. While when met FC layer, which is fc8, the memory required will abruptly increase to some value that overflows the memory.

Several ways to reduce memory required:

- Resize image dimension (which has been tried from 224*224 to 80*80)
- Reduce number of images (also tried from 1449 to 60 pics)
- Reduce batch size (Already set to 1)

If above is still causing problems, then resize the network, fc7-alexnet requires minimum 6GB.

5). Looking for some other nets that can settle memory problems.