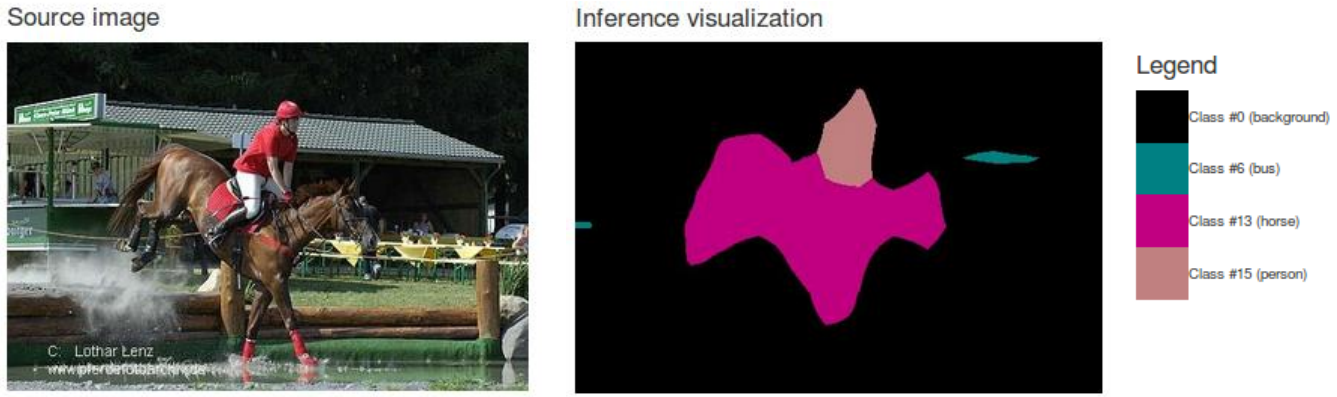
Using DIGITS to train a Semantic Segmentation neural network

Segmentation

PASCAL VOC 2012 data : 2GB tar file.



Use prepare_pascal_voc.sh script to create a train/val split of the labelled images:

```
$ ./prepare_pascal_voc_data.sh /data/VOCtrainval_11-May-2012.tar ./voc-data
Expanding /data/VOCtrainval_11-May-2012.tar
Copying data into ./voc-data
Processing train data
Processing val data
Done!
```

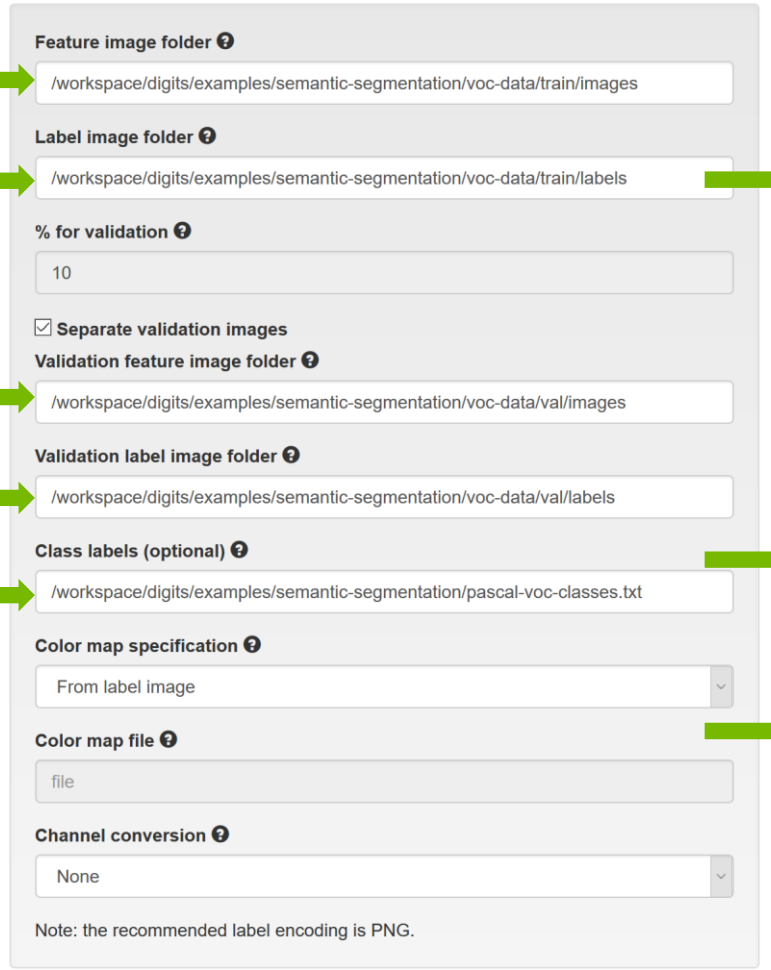
labels

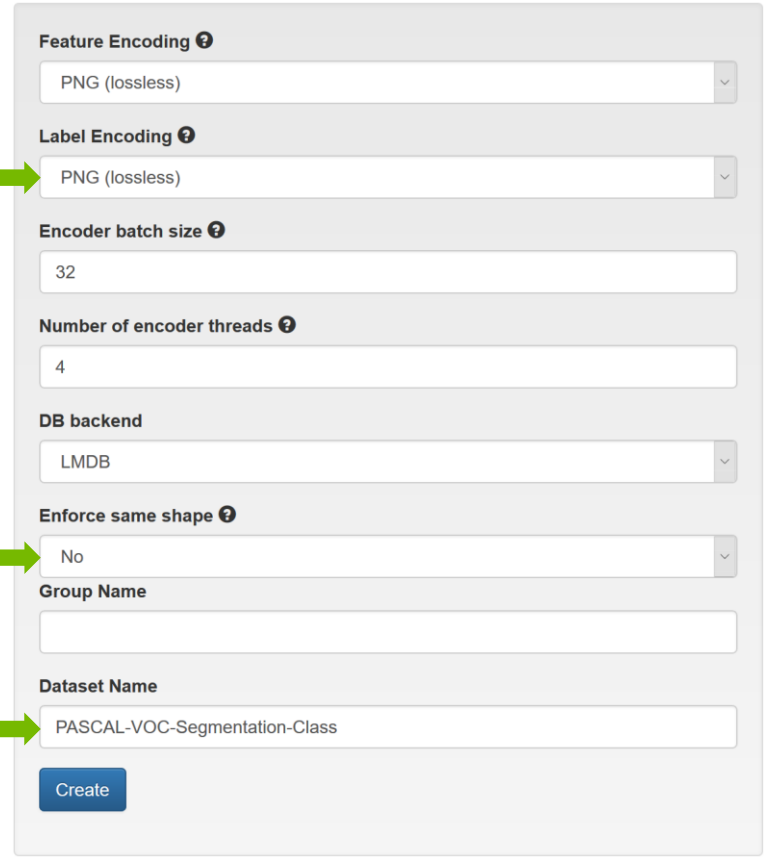
#0: background
#1: aeroplane
#2: bicycle
#3: bird
#4: boat
#5: bottle
#6: bus
#7: car
#8: cat
#9: chair
#10: cow
#11: diningtable
#12: dog
#13: horse
#14: motorbike
#15: person
#16: pottedplant
#17: sheep
#18: sofa
#19: train
#20: tvmonitor
#255: undefined/don't care

Loading dataset to DIGITS

Use the `prepare_pascal_voc.sh` script to create a train/val split of the labelled images:

```
$ ./prepare_pascal_voc_data.sh /data/VOCtrainval_11-May-2012.tar ./voc-data
Expanding /data/VOCtrainval_11-May-2012.tar
Copying data into ./voc-data
Processing train data
Processing val data
Done!
```





Feature / label database

Exploring PASCAL-VOC-Segmentation-Class (/home/greg/ws/digits/digits/jobs/20160808-152315-5e02/train_db/features) images

Show all images

Items per page: 10 - **25** - 50 - 100

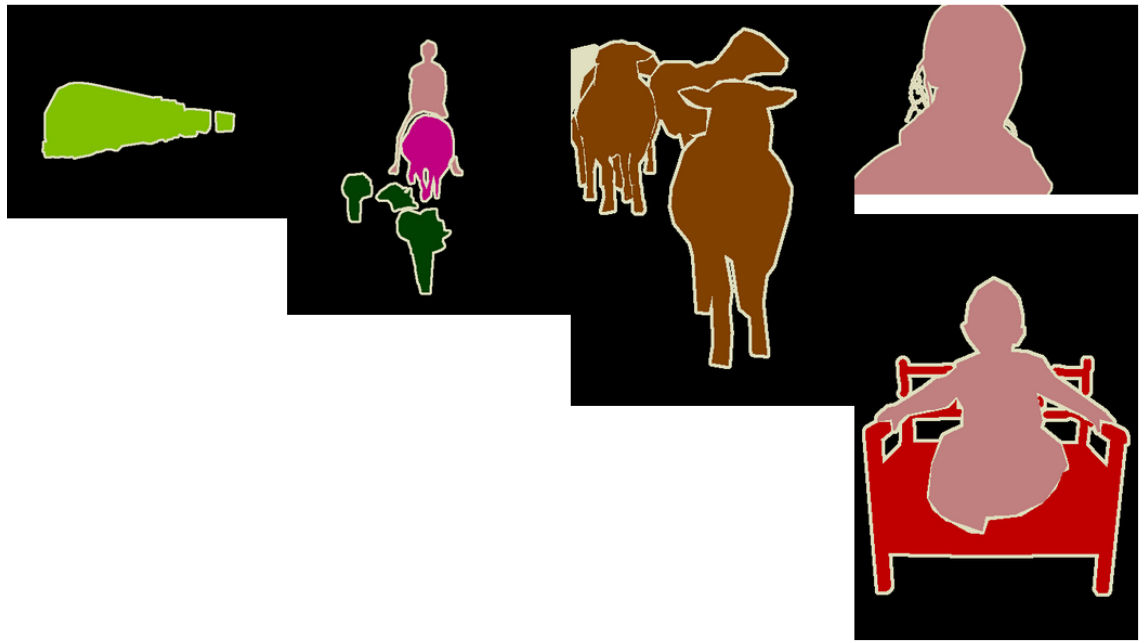
« 0 1 2 3 4 5 ... 58 »

Exploring PASCAL-VOC-Segmentation-Class (/home/greg/ws/digits/digits/jobs/20160808-152315-5e02/train_db/labels) images

Show all images

Items per page: 10 - **25** - 50 - 100

« 0 1 2 3 4 5 ... 58 »



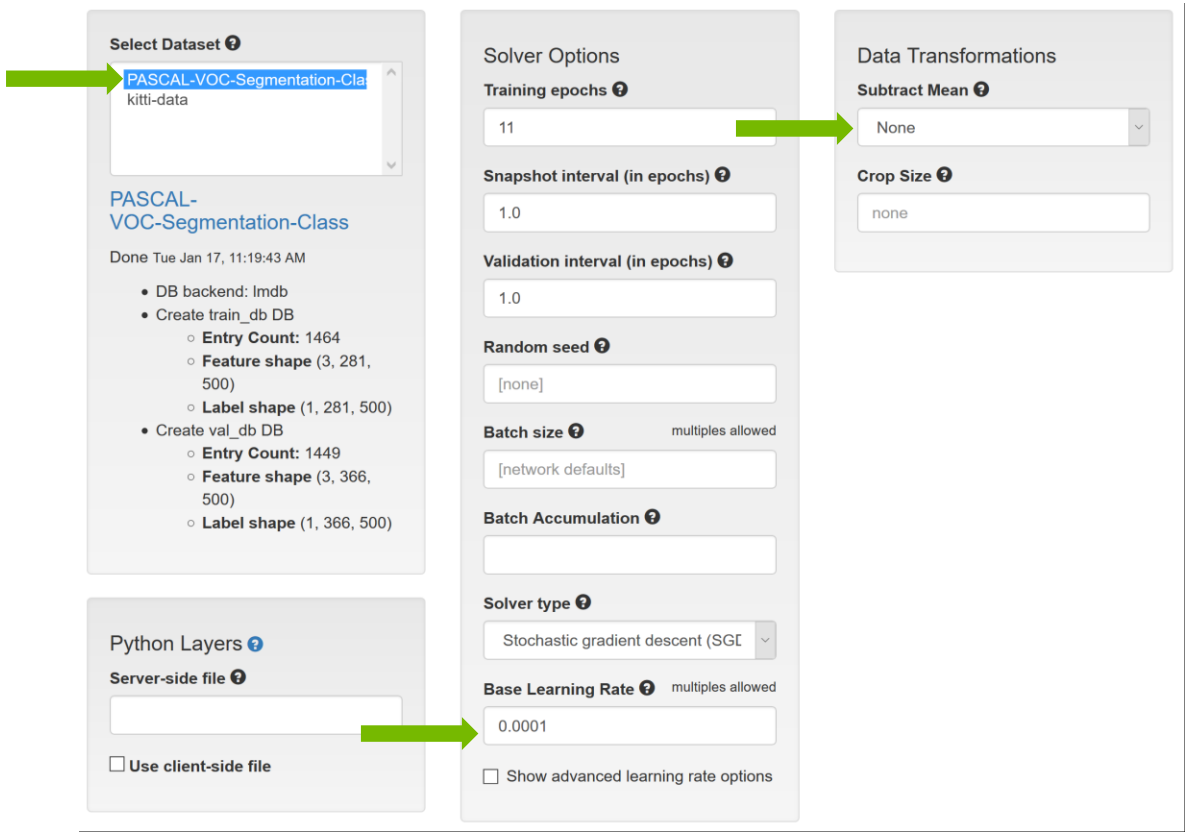
Model creation

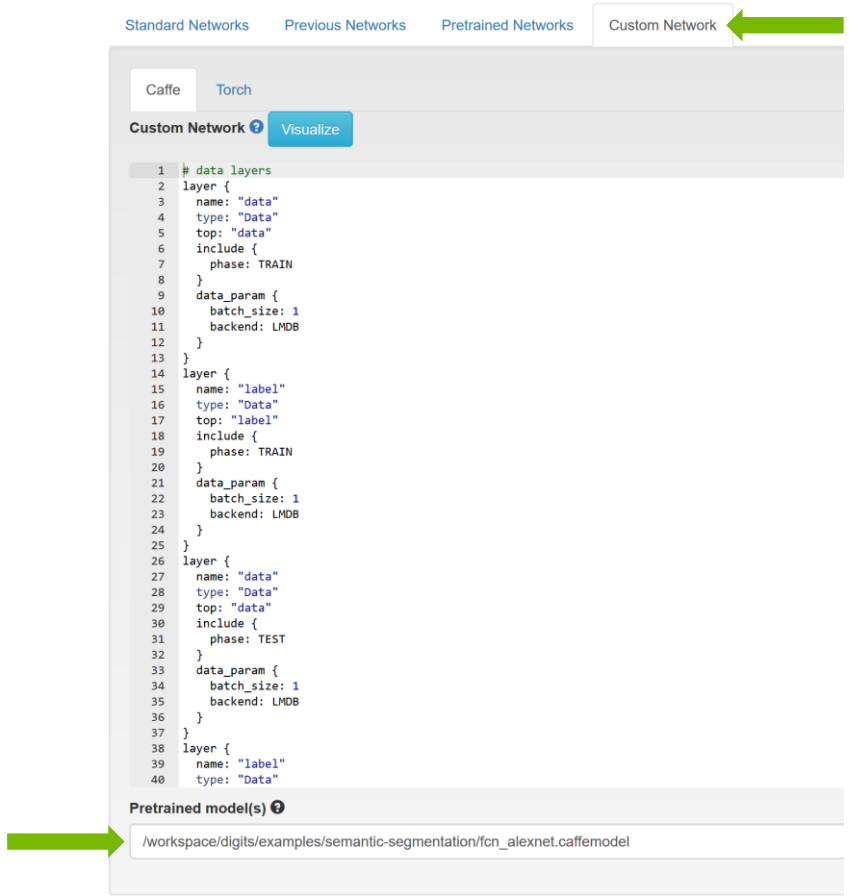
- Use the net_surgery.py

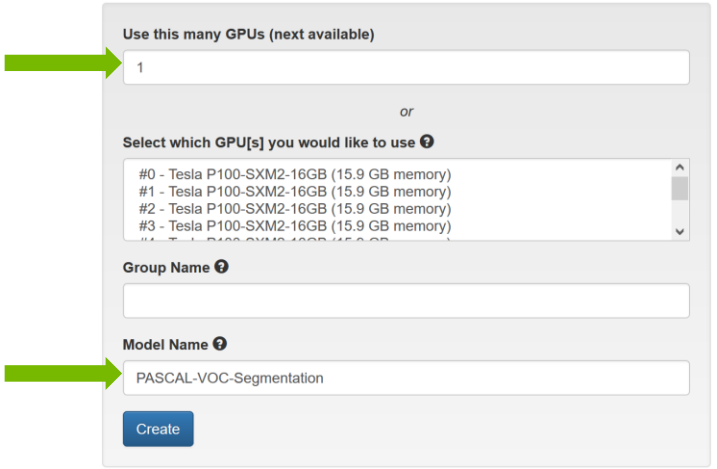
```
$ ./net_surgery.py
Downloading files (this might take a few minutes)...
Downloading https://raw.githubusercontent.com/BVLC/caffe/rc3/models/bvlc_alexnet/deploy.prototxt...
Downloading http://dl.caffe.berkeleyvision.org/bvlc_alexnet.caffemodel...
Loading Alexnet model...
...
Saving FCN-Alexnet model to fcn_alexnet.caffemodel
```

- Set Subtract mean to none
- Select the dataset that was created in the previous section
- Set the base learning rate to 0.0001
- Select the Custom Network tab
- Make sure the Caffe sub-tab is selected
- Copy/paste this prototxt
- In Pretrained model(s) specify the path to the pre-trained FCN-Alexnet
- Note that since we are using a batch size of 1 it is not possible to train this network on multiple GPUs

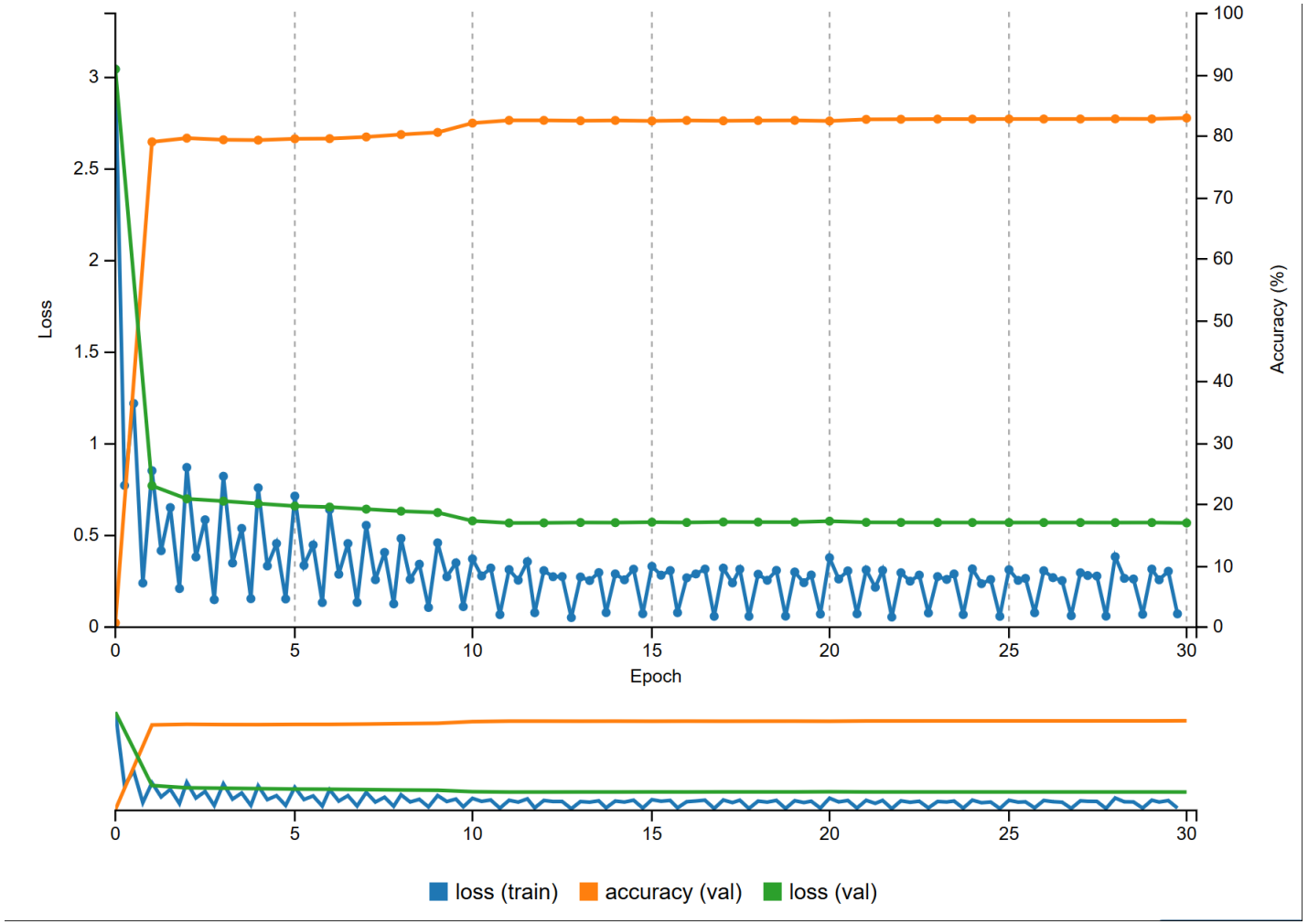
Model creation form







Training


Loss
Accuracy (%)
Epoch
0
0.5
1
1.5
2
2.5
3
0
10
20
30
40
50
60
70
80
90
100
0
5
10
15
20
25
30
loss (train)
accuracy (val)
loss (val)

Inference

Trained Models

Select Model

Epoch #30

Download Model

Make Pretrained Model

Select Visualization Method

Image Segmentation

Visualization Options

Display segmented image.

Colormap

From dataset

Inference Options

☑ **Do not resize input image(s)**

Test a single image

Image Path

Upload image

Browse… 2008_000142.jpg

☐ **Show visualizations and statistics**

Test One

Test a list of images

Upload Image List

Browse…

Accepts a list of filenames or urls (you can use your val.txt file)

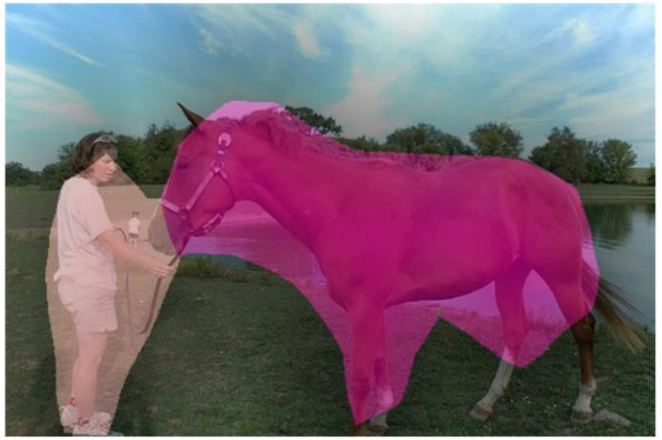
Image folder *(optional)*

Relative paths in the text file will be prepended with this value before reading

Number of images use from the file

Source image

Inference visualization



cow horse person