make_output_image_reconstruct-with_interpolation-simple

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In [1]:
```
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import Image
import scipy
import time
from scipy import interpolate
from scipy.interpolate import griddata

# Make sure that caffe is on the python path:
caffe_root = '/home/axj232/caffe/'
import sys
sys.path.insert(0, caffe_root + 'python')

import caffe

# configure plotting
plt.rcParams['figure.figsize'] = (10, 10)
plt.rcParams['image.interpolation'] = 'nearest'
plt.rcParams['image.cmap'] = 'gray'
```

In [2]:
```
#load our fully convolutional network
net_full_conv = caffe.Net('deploy_full.prototxt',
                          'full_convolutional_net.caffemodel', caffe.TEST)
```

In [3]:
```
#load our mean file and get it into the right shape
transformer = caffe.io.Transformer({'data': net_full_conv.blobs['data'].data.shape})

a = caffe.io.caffe_pb2.BlobProto()
file = open('DB_train_w32_1.binaryproto','rb')
data = file.read()
a.ParseFromString(data)
means = a.data
means = np.asarray(means)
means = means.reshape(3, 32, 32)


transformer.set_mean('data',means.mean(1).mean(1))
transformer.set_transpose('data', (2,0,1))
transformer.set_channel_swap('data', (2,1,0))
transformer.set_raw_scale('data', 255.0)
```

In [4]:
```
#set the mode to use the GPU
caffe.set_device(0)
caffe.set_mode_gpu()
```

In [5]:
```
im_orig = caffe.io.load_image('8914_500_f00021_original.tif')

nrow_in=im_orig.shape[0] #we'll be doing padding later,
ncol_in=im_orig.shape[1] #so lets make sure we know the original size
```

In [6]:
```
patch_size = 32 #the patch size that trained the network
hpatch_size = patch_size / 2 #half patch size...this is how much we need to mirror
                             #the edges by to produce the same size outptu

im_orig = np.lib.pad(im_orig, ((hpatch_size, hpatch_size), \
                               (hpatch_size, hpatch_size), (0, 0)),  'symmetric')
print im_orig.shape
#IMPORTANT: note here that the shape is 2032 x 2032, which is the same size
#as we specified in our deploy_full text!
```

```
(2032, 2032, 3)
```

In [7]:
```
start=time.time()

#get the output
out = net_full_conv.forward_all(data=np.asarray([transformer.preprocess('data', im_orig)]))

#i'm only interested in the "positive class channel"
# the negative is simply 1- this channel
im_out=out['prob'][0][1,:,:]
print "Time since beginning (after DL):\t %f"% (time.time()-start)
```

```
Time since beginning (after DL):         1.530253
```

In [8]:
```
#what size image did our DL produce after the pooling  / convolution reductions
nrow_out=im_out.shape[0]
ncol_out=im_out.shape[1]

#we know that the first pixel in the DL image coincides with the disired
#first pixel in the final output image
#normally this isn't the case because we loose some of the edges, but we've
#padded it above to take this into account
start_spot_row=0
start_spot_col=0

#we know how bit the input image is
end_spot_row=nrow_in
end_spot_col=ncol_in

#we scale the 2 spaces appropriately
rinter=np.linspace(start_spot_row,end_spot_row,num=nrow_out)
cinter=np.linspace(start_spot_col,end_spot_col,num=ncol_out)
```

In [9]:
```
#now we can make an interpolation function on the rigid
#grid of this space using the output image
f = interpolate.interp2d(rinter, cinter, im_out, kind='cubic')
```

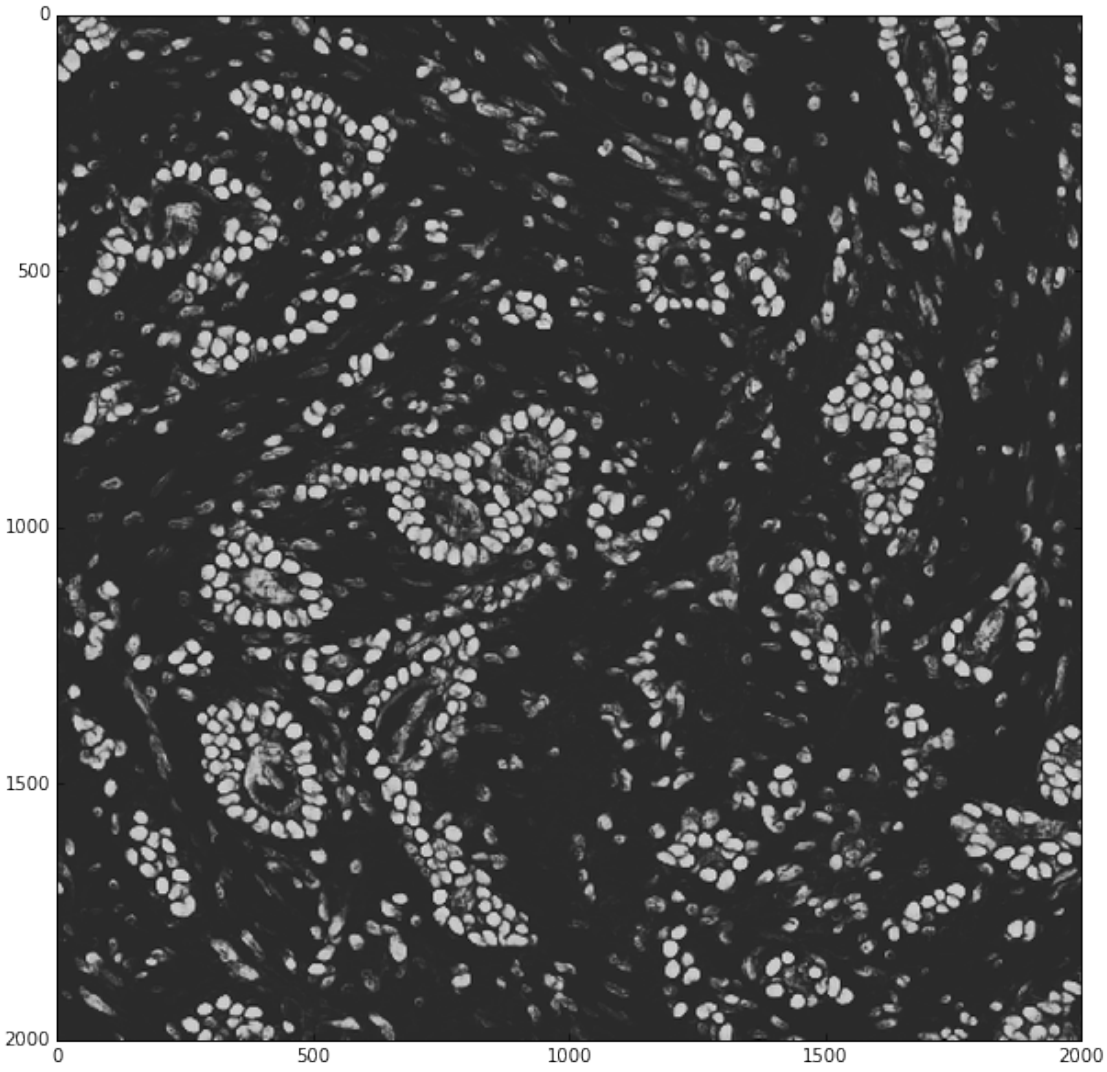
In [10]:
```
# we want to interpolate it on all integers in the final rigid
 #grid the size of the image
 rnew = np.arange(start_spot_row, end_spot_row, 1)
 cnew = np.arange(start_spot_col, end_spot_col, 1)
```

```
        #run the interpolation to create the final output image
        im_out_final = f(rnew, cnew)
        print "Time since beginning (after interpolation):\t %f"% (time.time()-start)
```

```
Time since beginning (after interpolation):         2.102489
```

In [11]:
```
        #check it out to see if its sane
        plt.imshow(im_out_final)
```

Out[11]: <matplotlib.image.AxesImage at 0x7fe8b7791f90>



In [12]:
```
        # if we want, we can save it
        scipy.misc.toimage(im_out_final, cmin=0.0, cmax=1.0).save('output.tif')
```