Important Imports

In [1]:

```python
import sys

sys.path.append('../')

import cPickle as pickle
import re
import glob
import os
from generators import DataLoader
import time
import holoviews as hv
import theano
import theano.tensor as T
import numpy as np
import pandas as p
import lasagne as nn

from utils import hms, architecture_string, get_img_ids_from_iter

%pylab inline

rcParams['figure.figsize'] = 16, 6
# rcParams['text.color'] = 'red'
# rcParams['xtick.color'] = 'red'
# rcParams['ytick.color'] = 'red'

np.set_printoptions(precision=3)
np.set_printoptions(suppress=True)

dump_path = '../dumps/2015_07_17_123003.pkl'
model_data = pickle.load(open(dump_path, 'rb'))

# Let's set the in and output layers to some local vars.
l_out = model_data['l_out']
l_ins = model_data['l_ins']

chunk_size = model_data['chunk_size'] * 2
batch_size = model_data['batch_size']

#print "Batch size: %i." % batch_size
#print "Chunk size: %i." % chunk_size

output = nn.layers.get_output(l_out, deterministic=True)
input_ndims = [len(nn.layers.get_output_shape(l_in))
               for l_in in l_ins]
xs_shared = [nn.utils.shared_empty(dim=ndim)
             for ndim in input_ndims]
idx = T.lscalar('idx')

givens = {}
```

```
for l_in, x_shared in zip(l_ins, xs_shared):
    givens[l_in.input_var] = x_shared[idx * batch_size:(idx + 1) * batch_s

compute_output = theano.function(
    [idx],
    output,
    givens=givens,
    on_unused_input='ignore'
)

# Do transformations per patient instead?
if 'paired_transfos' in model_data:
    paired_transfos = model_data['paired_transfos']
else:
    paired_transfos = False

#print paired_transfos
```

```
Using gpu device 0: GeForce GTX 970 (CNMeM is enabled with initial size: 7
0.0% of memory, cuDNN 4007)
/home/sidharth/anaconda2/lib/python2.7/site-packages/theano/tensor/signal/d
ownsample.py:6: UserWarning: downsample module has been moved to the thean
o.tensor.signal.pool module.
  "downsample module has been moved to the theano.tensor.signal.pool modul
e.")
Populating the interactive namespace from numpy and matplotlib
```

We're going to test on some train images, so loading the training set labels.

need to repopulate with test

In [2]:

```
train_labels = p.read_csv('../data/new_trainLabels.csv')
```

In [3]:

```
print train_labels.head(20)
```

```
             image  level
0   9999_left.jpeg      0
1  9999_right.jpeg      0
```

In [4]:

```
# Get all patient ids.
patient_ids = sorted(set(get_img_ids_from_iter(train_labels.image)))

num_chunks = int(np.ceil((2 * len(patient_ids)) / float(chunk_size)))
```

In [5]:

```
# Where all the images are located:
# it looks for [img_dir]/[patient_id]_[left or right].jpeg
img_dir = '../test_resized/'
```

Using the DataLoader to set up the parameters, you could replace it with something much simpler.

In [6]:

```
data_loader = DataLoader()
new_dataloader_params = model_data['data_loader_params']
new_dataloader_params.update({'images_test': patient_ids})
new_dataloader_params.update({'labels_test': train_labels.level.values})
new_dataloader_params.update({'prefix_train': img_dir})
data_loader.set_params(new_dataloader_params)
```

The next function is going to iterate over a test generator to get the outputs.

In [7]:
```
def do_pred(test_gen):
    outputs = []

    for e, (xs_chunk, chunk_shape, chunk_length) in enumerate(test_gen()):
        num_batches_chunk = int(np.ceil(chunk_length / float(batch_size)))

        print "Chunk %i/%i" % (e + 1, num_chunks)

        print "  load data onto GPU"
        for x_shared, x_chunk in zip(xs_shared, xs_chunk):
            x_shared.set_value(x_chunk)

        print "  compute output in batches"
        outputs_chunk = []
        for b in xrange(num_batches_chunk):
            out = compute_output(b)
            outputs_chunk.append(out)

        outputs_chunk = np.vstack(outputs_chunk)
        outputs_chunk = outputs_chunk[:chunk_length]

        outputs.append(outputs_chunk)

    return np.vstack(outputs), xs_chunk
```

We get the default "no transformation" parameters for the model.

In [8]:
```
no_transfo_params = model_data['data_loader_params']['no_transfo_params']

#print no_transfo_params
```

And set up the test generator on the first 256 patients of the training set (512 images).

In [9]:
```
# The default gen with "no transfos".
test_gen = lambda: data_loader.create_fixed_gen(
    data_loader.images_test[:128*2],
    chunk_size=chunk_size,
    prefix_train=img_dir,
    prefix_test=img_dir,
    transfo_params=no_transfo_params,
    paired_transfos=paired_transfos,
)
```

Then we can get some predictions.

In [10]:
```
%%time
outputs_orig, chunk_orig = do_pred(test_gen)
```

```
Chunk 1/1
```

```
  load data onto GPU
  compute output in batches
CPU times: user 292 ms, sys: 220 ms, total: 512 ms
Wall time: 512 ms
```

In [11]:

```
d={}
for i,patient in zip(range(0,outputs_orig.shape[0],2),patient_ids):
    a=hv.RGB.load_image('../test_resized//'+str(patient)+'_left.jpeg')
    b=hv.RGB.load_image('../test_resized//'+str(patient)+'_right.jpeg')
    a=a + hv.Bars(outputs_orig[i])
    b=b+hv.Bars(outputs_orig[i+1])
    d[patient] = (a+b).cols(2)
```

In [12]:

```
hv.notebook_extension()
```

HoloViewsJS successfully loaded in this cell.

In [13]:

```
result=hv.HoloMap(d)
```

Legend

0 - No DR

1 - Mild DR

2 - Moderate DR

3 - Severe DR

4 - PDR

X axis for labels

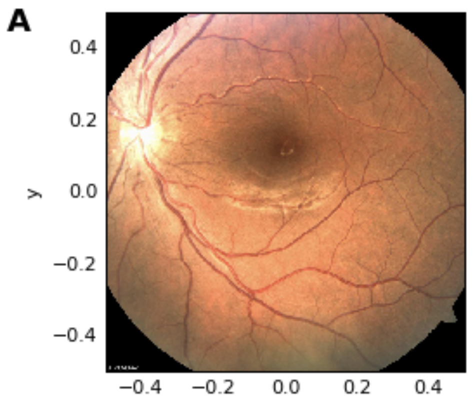
Y axis for probability

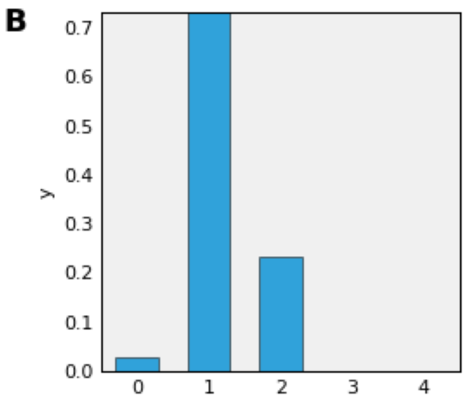
Results are for left and right eyes (A and C respectively)

In [14]:

```
result
```

Out[14]:




B
0.7
0.6
0.5
0.4
y
0.3
0.2
0.1
0.0
0
1
2
3
4