

NVIDIA Korea DL Day 2016

Hands on Session

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QWIKLAB

Sep1.

Step2.

The screenshot shows the QwikLAB web interface. The browser tabs include 'DIGITS', 'class2/', 'Untitled', and 'nvlabs.qwikLAB - NV'. The address bar shows 'https://nvlabs.qwiklab.com/live'. The navigation bar includes 'qwik LABS', 'CLASSES IN SESSION 4', 'UPCOMING CLASSES 0', 'CLASSES TAKEN', and 'CLASS MATERIALS'. There are buttons for 'Standard View', 'Trainer', and 'MY ACCOUNT Sign out'. The main content area has a header with 'In-Session Class: Korea Deep Learning Day' (highlighted with a red dashed box), '533.6 Total Hours', '131 Completed Labs', and '24 Classes Taken'. Below this, there's a 'Labs' tab and a 'Class Details' section. The 'Class Details' section shows 'Deep Learning Lab' (highlighted with a red dashed box). To the right, there's a 'Deep Learning Lab' card with a 'Select' button (highlighted with a red dashed box). The card also displays 'Need a description!', 'Duration: 240 min.', 'Access Time: 240 min.', 'Setup Time: 3 min.', and 'Level:'. A 'Support' button is visible on the right side. The footer includes 'About Privacy Policy', 'Classes In Session Upcoming Classes', and social media links.

Step3.

QWIKLAB

The screenshot shows the QwikLAB web interface. The browser address bar displays <https://nvlabs.qwiklab.com/focuses/720>. The navigation bar includes the QwikLAB logo, tabs for 'CLASSES IN SESSION', 'UPCOMING CLASSES', and 'CLASSES TAKEN', a 'Standard View' button, a 'Trainer' role indicator, and a 'MY ACCOUNT' section with a 'Sign out' link and a user profile icon. The main content area features a 'Rate Lab:' section with five stars, the lab title 'Deep Learning Lab', and a green 'Start Lab' button highlighted by a red dashed box. To the right of the button is a 'TIME REMAINING:' section showing '04:00:00'. Below this is a green banner stating 'Lab completed on Tue, 24 May 2016 03:41:21 PM PDT. Elapsed time: 128 minutes' with 'CONNECTION' and 'ADDL. INFO' buttons. The 'LAB DETAILS' section contains a table with lab specifications and a list of tags.

LAB DETAILS	
Setup Time (min.)	3
Duration (min.)	240
Access (min.)	240

Tags: [Deep Learning](#), [Machine Learning](#)

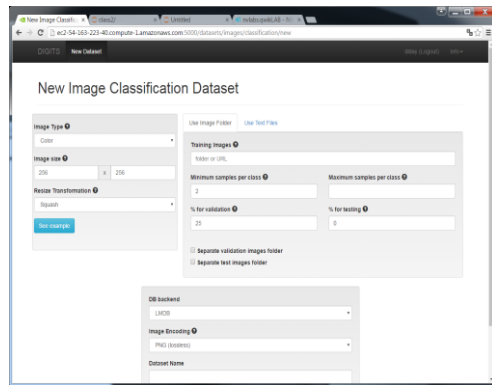
Lab Description:
Need a description!

Lab Creator: Mark Ebersole
Date Created: May 23, 2016 01:03 PM
AWS Region: [us-east-1] US East (N. Virginia)

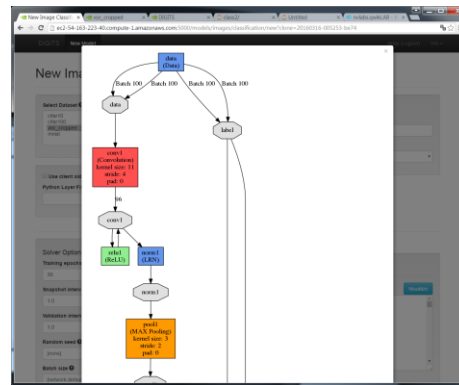
Start Lab

DIGITS workflow

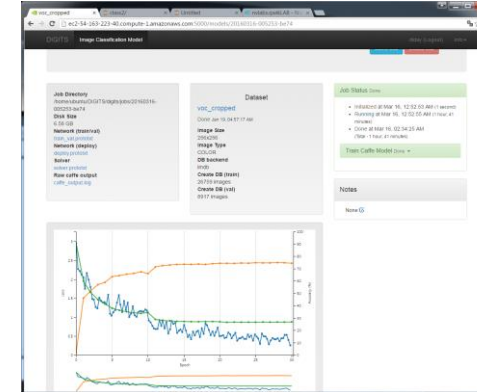
STEP1 Prepare Dataset



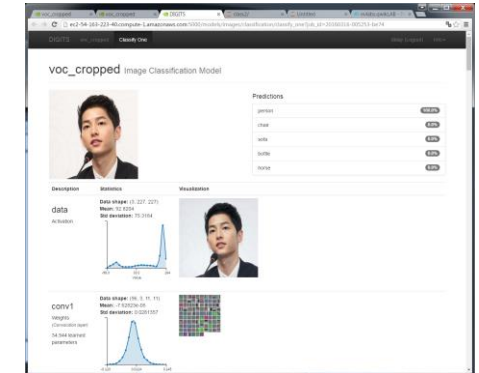
STEP2 Prepare DL Model



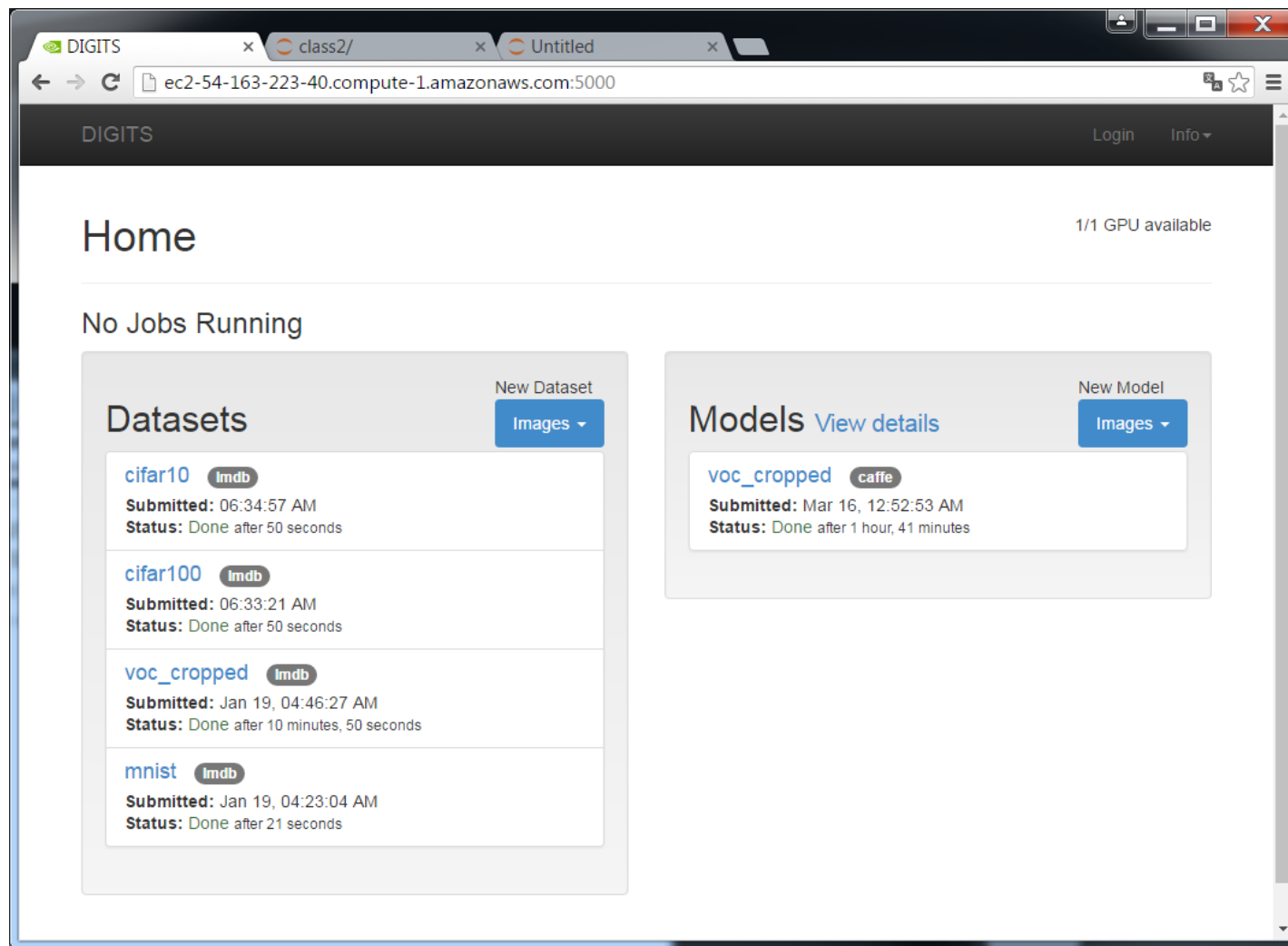
STEP3 DL training



STEP4 inference



DIGITS UI (home)



The screenshot shows the DIGITS (Data Import and Generic Training Interface) web application. The browser window has tabs for 'DIGITS', 'class2/', and 'Untitled'. The address bar shows 'ec2-54-163-223-40.compute-1.amazonaws.com:5000'. The page has a dark header with 'DIGITS', 'Login', and 'Info' links. The main content area is titled 'Home' and shows '1/1 GPU available'. Below this, it says 'No Jobs Running'. There are two main sections: 'Datasets' and 'Models'. The 'Datasets' section has a 'New Dataset' button and a list of datasets: 'cifar10' (Submitted: 06:34:57 AM, Status: Done after 50 seconds), 'cifar100' (Submitted: 06:33:21 AM, Status: Done after 50 seconds), 'voc_cropped' (Submitted: Jan 19, 04:46:27 AM, Status: Done after 10 minutes, 50 seconds), and 'mnist' (Submitted: Jan 19, 04:23:04 AM, Status: Done after 21 seconds). The 'Models' section has a 'New Model' button and a list of models: 'voc_cropped' (Submitted: Mar 16, 12:52:53 AM, Status: Done after 1 hour, 41 minutes). Both sections have 'Images' buttons with dropdown arrows.

DIGITS Login Info

Home

1/1 GPU available

No Jobs Running

Datasets

New Dataset Images

- cifar10** Imdb
Submitted: 06:34:57 AM
Status: Done after 50 seconds
- cifar100** Imdb
Submitted: 06:33:21 AM
Status: Done after 50 seconds
- voc_cropped** Imdb
Submitted: Jan 19, 04:46:27 AM
Status: Done after 10 minutes, 50 seconds
- mnist** Imdb
Submitted: Jan 19, 04:23:04 AM
Status: Done after 21 seconds

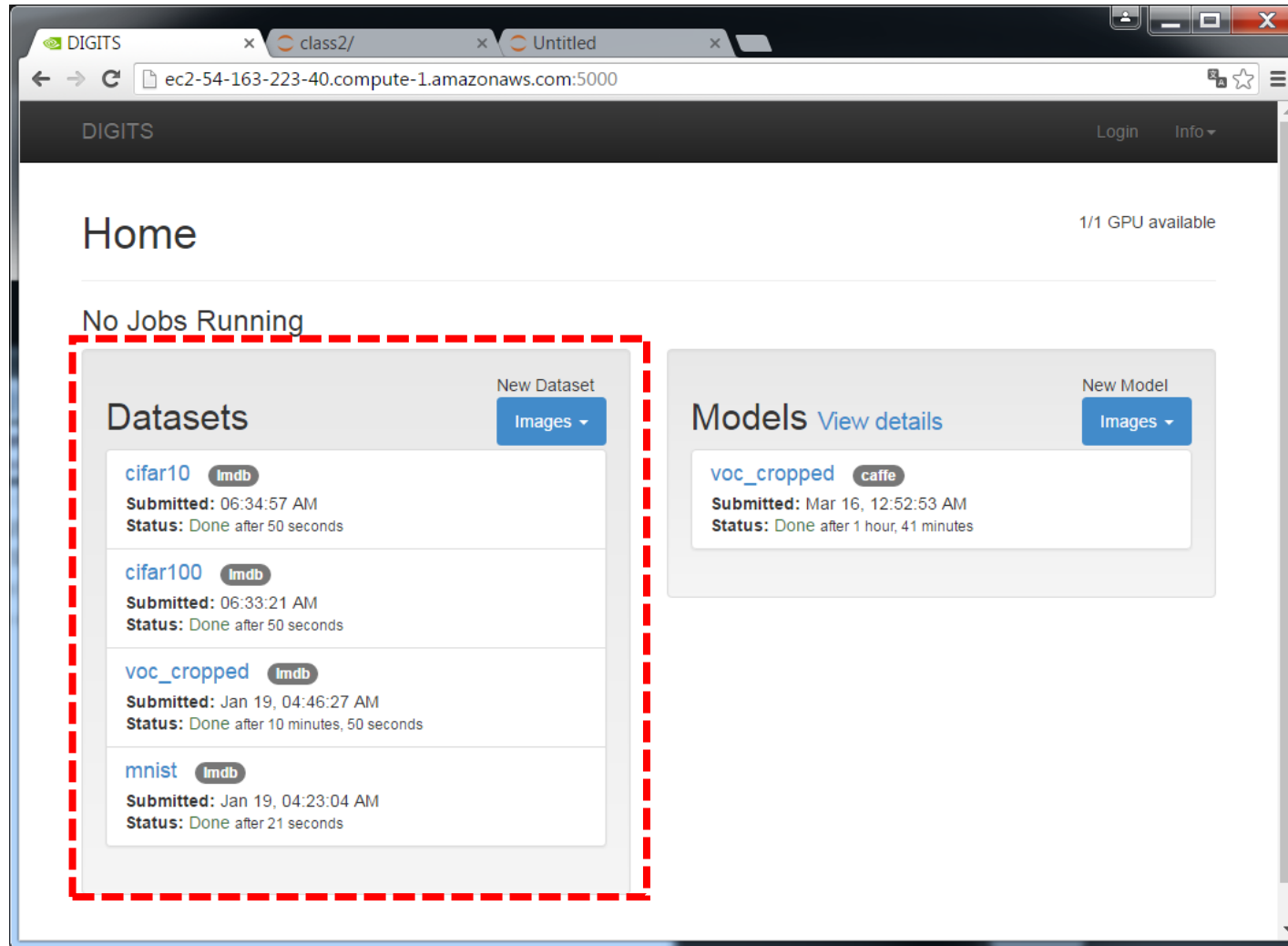
Models

New Model View details Images

- voc_cropped** caffe
Submitted: Mar 16, 12:52:53 AM
Status: Done after 1 hour, 41 minutes

DIGITS UI (Datasets)

Prepare Data



The screenshot shows the DIGITS web interface in a browser window. The browser has three tabs: 'DIGITS', 'class2/', and 'Untitled'. The address bar shows 'ec2-54-163-223-40.compute-1.amazonaws.com:5000'. The page has a dark header with 'DIGITS' on the left, 'Login' and 'Info' on the right. The main content area has a 'Home' heading and '1/1 GPU available' status. Below this, it says 'No Jobs Running'. There are two main sections: 'Datasets' and 'Models'. The 'Datasets' section is highlighted with a red dashed box and contains a list of four datasets: 'cifar10', 'cifar100', 'voc_cropped', and 'mnist'. Each dataset entry shows its name, a source tag (e.g., 'lmdb'), submission time, and status. The 'Models' section shows one model, 'voc_cropped', with a 'caffe' tag, submission time, and status. Both sections have a 'New Dataset' or 'New Model' button and an 'Images' dropdown menu.

DIGITS Login Info

Home 1/1 GPU available

No Jobs Running

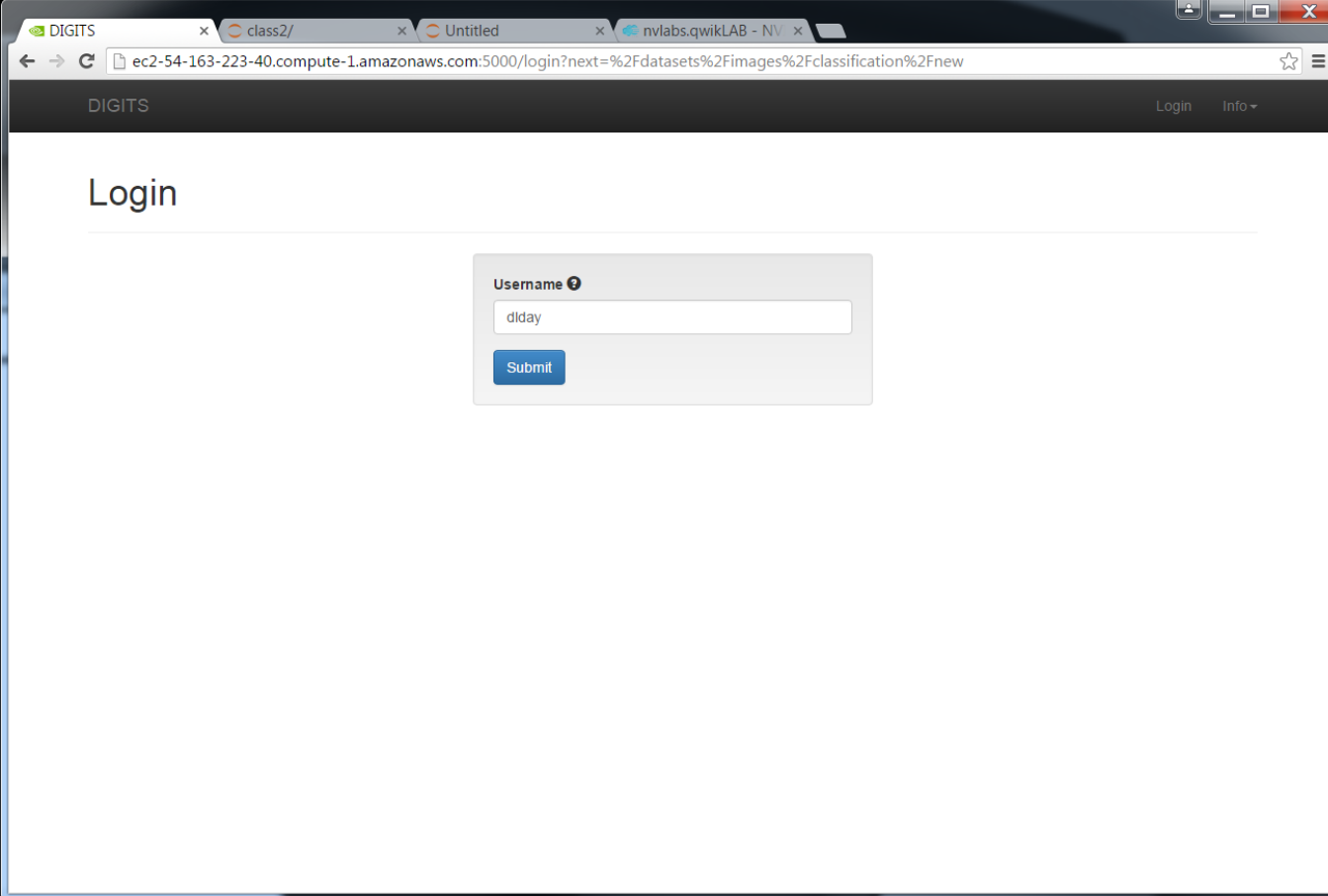
Datasets New Dataset Images

- cifar10** lmdb
Submitted: 06:34:57 AM
Status: Done after 50 seconds
- cifar100** lmdb
Submitted: 06:33:21 AM
Status: Done after 50 seconds
- voc_cropped** lmdb
Submitted: Jan 19, 04:46:27 AM
Status: Done after 10 minutes, 50 seconds
- mnist** lmdb
Submitted: Jan 19, 04:23:04 AM
Status: Done after 21 seconds

Models View details New Model Images

- voc_cropped** caffe
Submitted: Mar 16, 12:52:53 AM
Status: Done after 1 hour, 41 minutes

DIGITS UI (login)



The image shows a web browser window displaying the DIGITS (Deep Image Generator Tool) login interface. The browser's address bar shows the URL: `ec2-54-163-223-40.compute-1.amazonaws.com:5000/login?next=%2Fdatasets%2Fimages%2Fclassification%2Fnew`. The page has a dark header with the "DIGITS" logo on the left and "Login" and "Info" links on the right. The main content area is white and features the word "Login" in a large font. Below this, there is a light gray box containing a "Username" label with a help icon, a text input field with the value "dlday", and a blue "Submit" button.

DIGITS

Login Info

Login

Username ⓘ

Submit

DIGITS UI (Datasets)

The screenshot shows the DIGITS web interface for creating a new image classification dataset. The browser tabs include 'New Image Classification', 'class2/', 'Untitled', and 'nvlabs.qwikLAB - NV'. The address bar shows the URL 'ec2-54-163-223-40.compute-1.amazonaws.com:5000/datasets/images/classification/new'. The page has a dark header with 'DIGITS' and 'New Dataset' tabs, and a user profile 'dlday (Logout)'.

New Image Classification Dataset

Image Type ?
Color

Image size ?
256 x 256

Resize Transformation ?
Squash

[See example](#)

Use Image Folder [Use Text Files](#)

Training Images ?
folder or URL

Minimum samples per class ?
2

Maximum samples per class ?

% for validation ?
25

% for testing ?
0

☐ Separate validation images folder

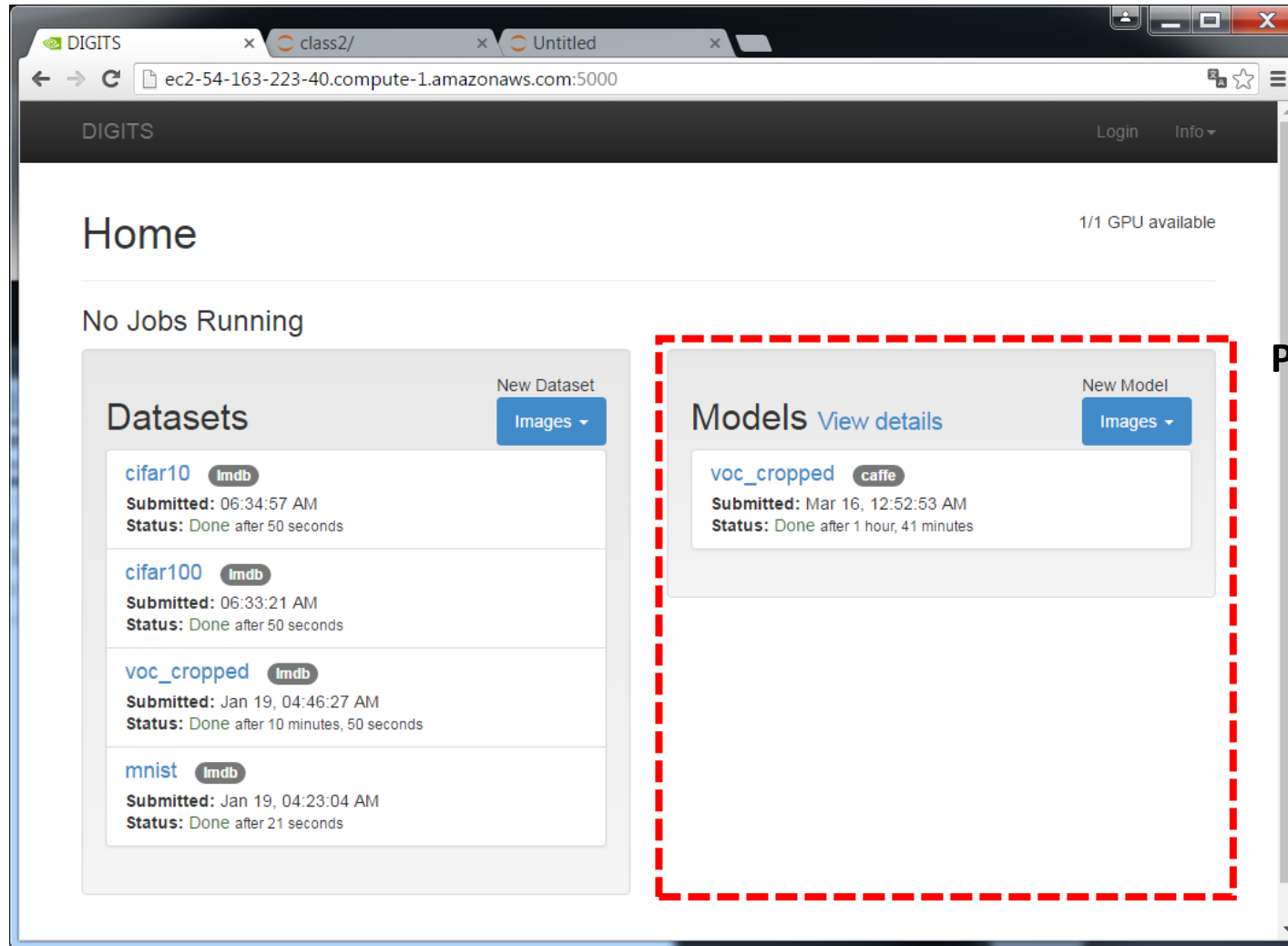
☐ Separate test images folder

DB backend
LMDB

Image Encoding ?
PNG (lossless)

Dataset Name

DIGITS UI (Models)



The screenshot shows the DIGITS web interface in a browser window. The browser has three tabs: 'DIGITS', 'class2/', and 'Untitled'. The address bar shows 'ec2-54-163-223-40.compute-1.amazonaws.com:5000'. The interface has a dark header with 'DIGITS' and 'Login' / 'Info' links. Below the header, the main content area is titled 'Home' and shows '1/1 GPU available'. A message 'No Jobs Running' is displayed. There are two main panels: 'Datasets' on the left and 'Models' on the right. The 'Models' panel is highlighted with a red dashed box. It shows a table with one model entry: 'voc_cropped' using 'caffe' framework, submitted on Mar 16, 12:52:53 AM, and completed after 1 hour, 41 minutes. The 'Datasets' panel shows a table with four dataset entries: 'cifar10', 'cifar100', 'voc_cropped', and 'mnist', all using 'lmdb' and completed successfully.

Dataset	Framework	Submitted	Status
cifar10	lmdb	06:34:57 AM	Done after 50 seconds
cifar100	lmdb	06:33:21 AM	Done after 50 seconds
voc_cropped	lmdb	Jan 19, 04:46:27 AM	Done after 10 minutes, 50 seconds
mnist	lmdb	Jan 19, 04:23:04 AM	Done after 21 seconds

Model	Framework	Submitted	Status
voc_cropped	caffe	Mar 16, 12:52:53 AM	Done after 1 hour, 41 minutes

Prepare Model

DIGITS UI (Models)

The screenshot shows the DIGITS UI interface for creating a new image classification model. The browser address bar indicates the URL is `ec2-54-163-223-40.compute-1.amazonaws.com:5000/models/images/classification/new`. The page title is "New Image Classification Model".

Select Dataset

- cifar10
- cifar100
- voc_cropped
- mnist

☐ Use client side file

Python Layer File (server side)

Data Transformations

Crop Size

none

Subtract Mean

Image

Solver Options

Training epochs

30

Snapshot interval (in epochs)

1

Validation interval (in epochs)

1

Random seed

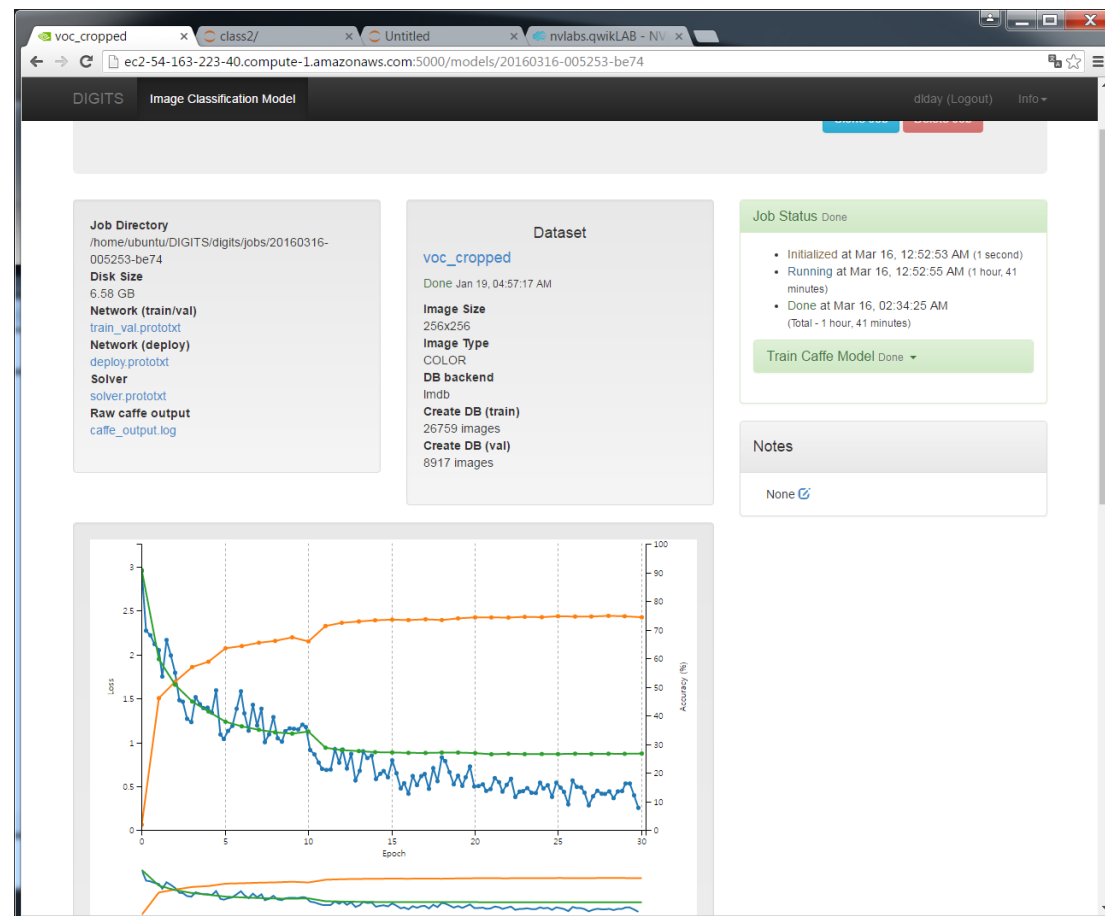
Standard Networks

Previous Networks Custom Network

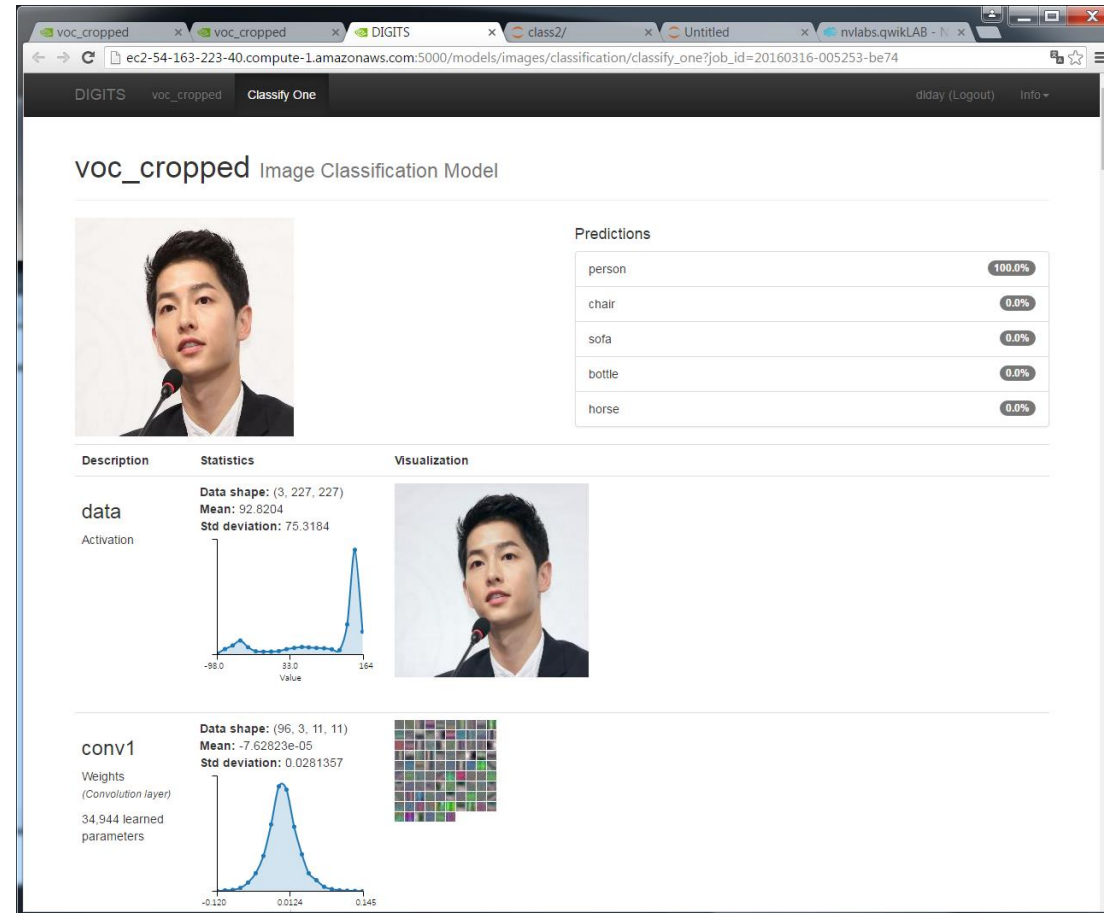
Caffe Torch (experimental)

Network	Details	Intended image size
<input type="radio"/> LeNet	Original paper [1998]	28x28 (gray)
<input type="radio"/> AlexNet	Original paper [2012]	256x256
<input type="radio"/> GoogLeNet	Original paper [2014]	256x256

DIGITS UI (training)



DIGITS UI(inference)



실습 DIGITS Dataset

Dataset is in below directory
`/home/ubuntu/data/`

MNIST dataset

`/home/ubuntu/data/mnist`



Python Class2

PASCAL VOC dataset

`/home/ubuntu/data/voc_cropped`



horse



person



chair



person



person



motorbike



sheep



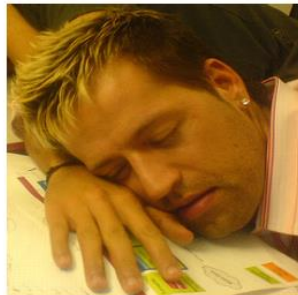
chair



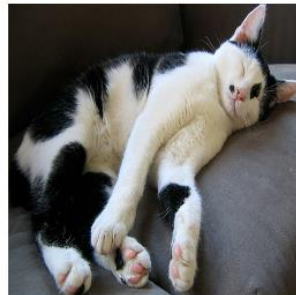
person



bicycle



person



cat

CIFAR-10

`/home/ubuntu/data/cifar10`

airplane



automobile



bird



cat



deer



dog



frog



horse



ship

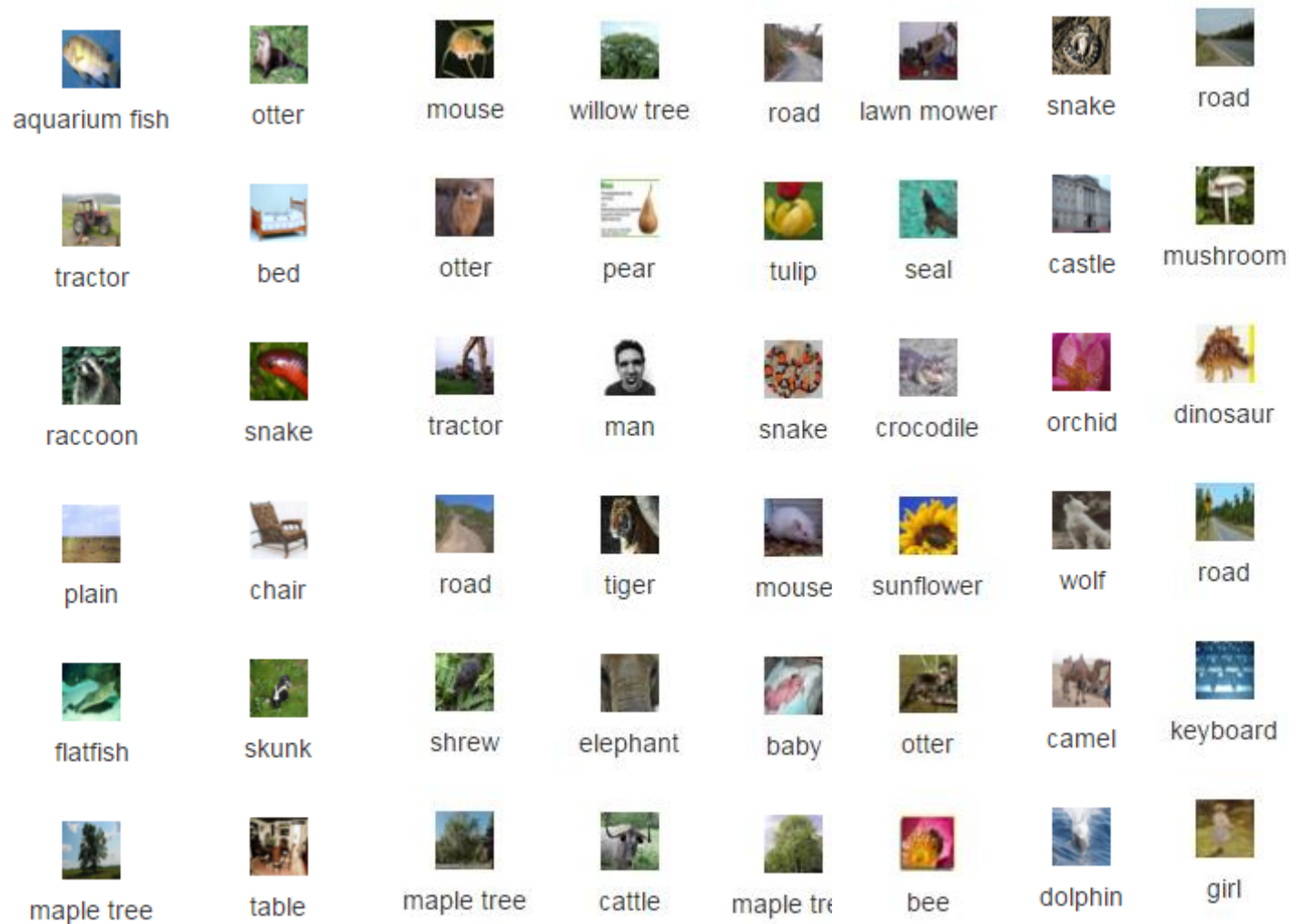


truck



CIFAR-100

`/home/ubuntu/data/cifar100/fine`



실습 DIGITS DL Model & train

<https://github.com/yhgon/KRDLDAY2016>

실습 python Class1

CIFAR-10/100

실습 Python Class2 whale Dataset

Subset (500 images)

North Atlantic right whale



Kaggle Right Whale Recognition



<https://www.kaggle.com/c/noaa-right-whale-recognition>

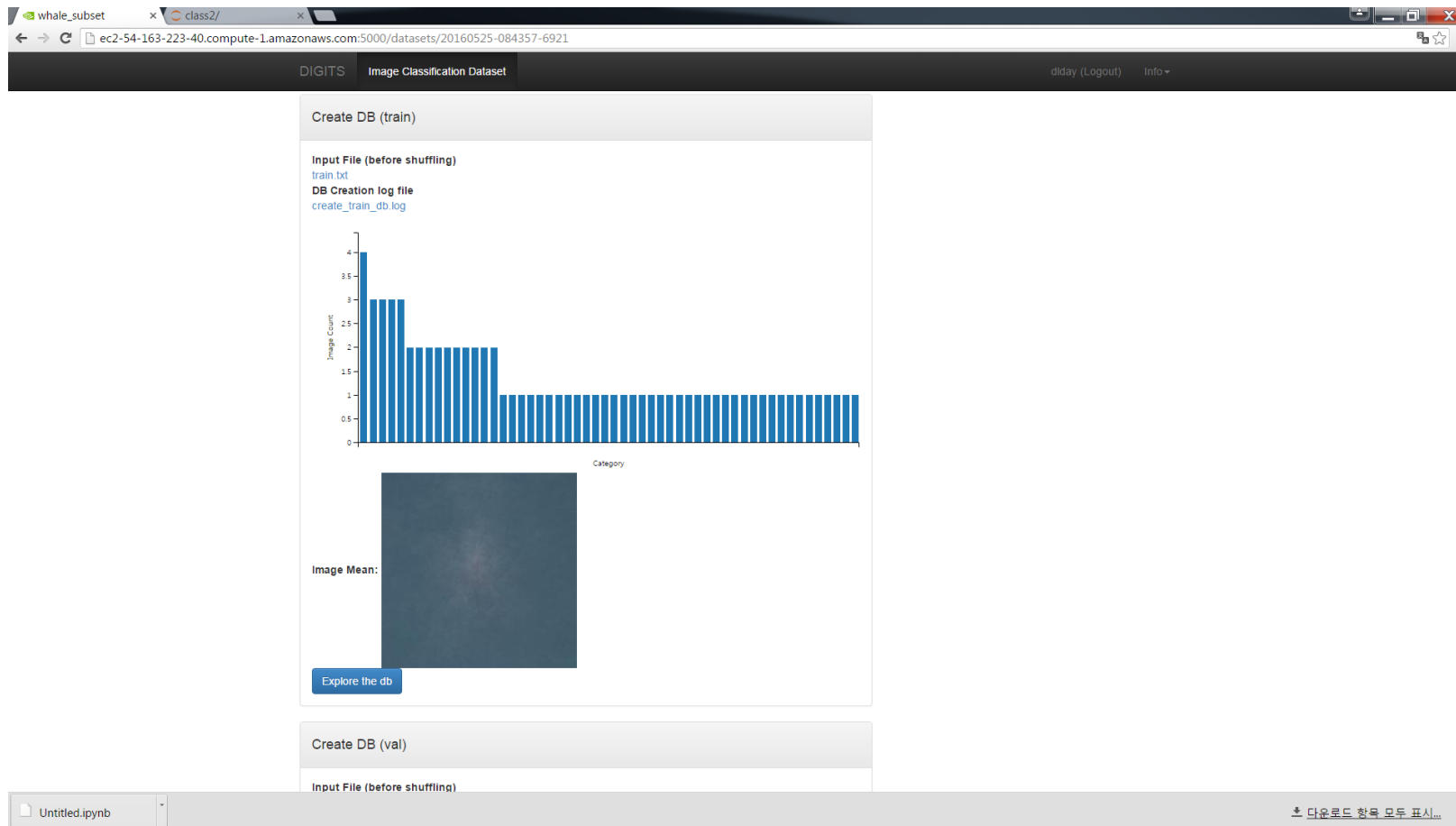
Identify endangered right whales in aerial photographs

With fewer than **500** North Atlantic right whales left in the world's oceans, knowing the health and status of each whale is integral to the efforts of researchers working to protect the species from extinction. Currently, only a handful of very experienced researchers can identify individual whales on sight while out on the water. For the majority of researchers, identifying individual whales takes time, making it difficult to effectively target whales for biological samples, acoustic recordings, and necessary health assessments. To track and monitor the population, right whales are photographed during aerial surveys and then manually matched to an online photo-identification catalog.

DIGITS Data

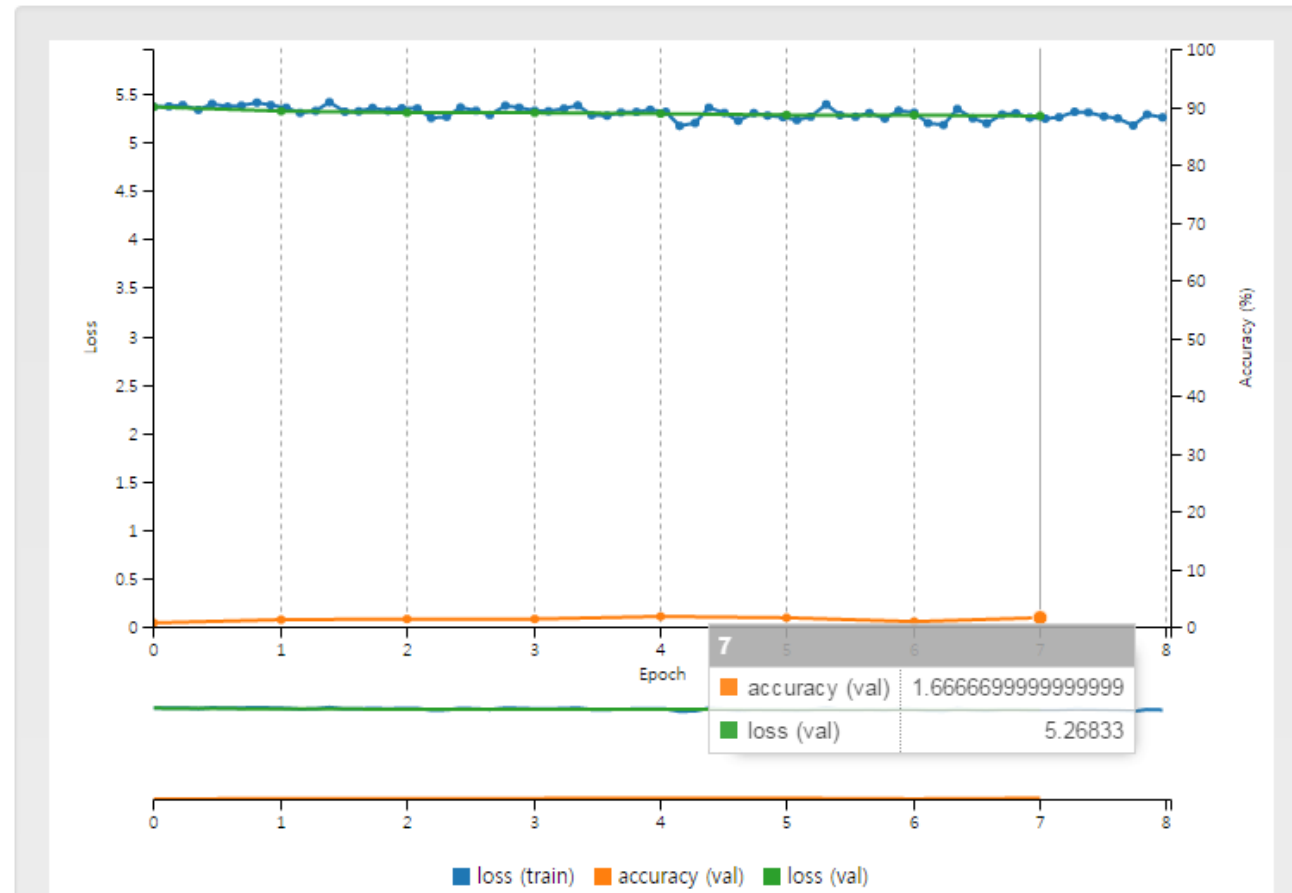
- files on subfolders
- files with train/validate/test list & label info
- Imdb files with generated train/validate/test list & label info

Whale subset DB



실습 Python Class3
Whale Dataset (7GB)

Problem : Accurate for Whale Dataset



Main Problems

Histogram

Input File (before shuffling)

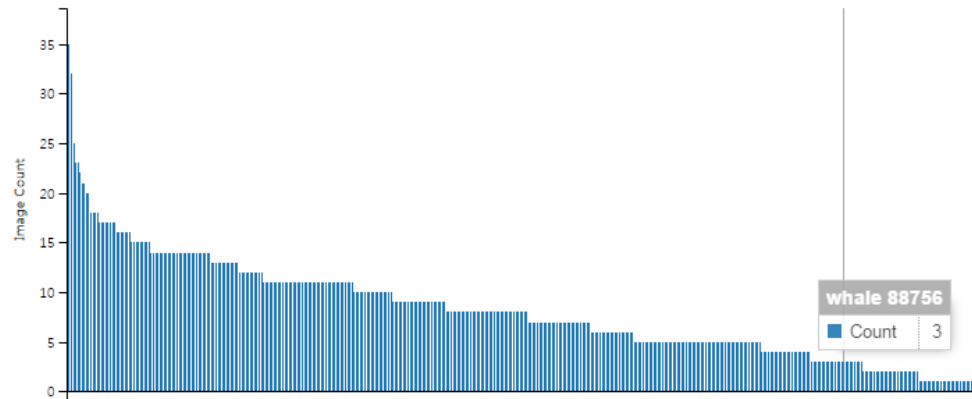
[train.txt](#)

DB Creation log file

[create_train_db.log](#)

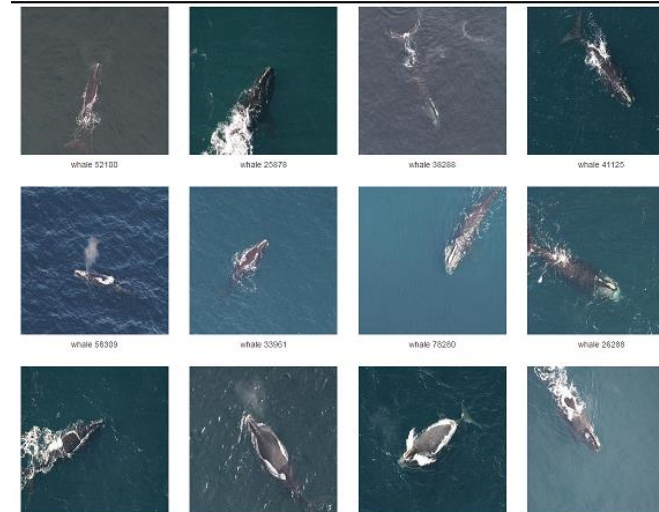
DB Entries

3424



few images per whales

Feature for Images



Location of whale
Direction of whale
spray of sea water
Shap of body

Meaningless metadata

truncate

DIGITS

New Dataset

dlday (Logout) Info

New Image Classification Dataset

Image Type ?
Color

Image size ?
256 x 256

Resize Transformation ?
Squash

See example

Use Image Folder

Use Text Files

Training Images ?
folder or URL

Minimum samples per class ?
10

Maximum samples per class ?

% for validation ?
25

% for testing ?
0

☐ Separate validation images folder

☐ Separate test images folder

Object Classifier vs recognition



VS



VS

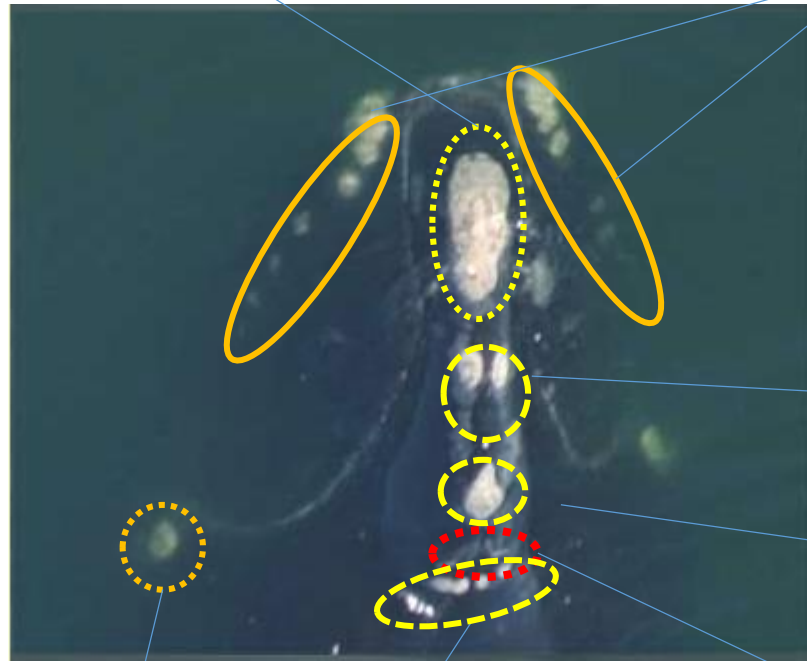


Whale Face recognition

Chracteristic of Right Whale

보닛 티눈(Bonnet Callosity)

입술티눈(Lip Callosity)
턱티눈 (Mendibular Collosity)



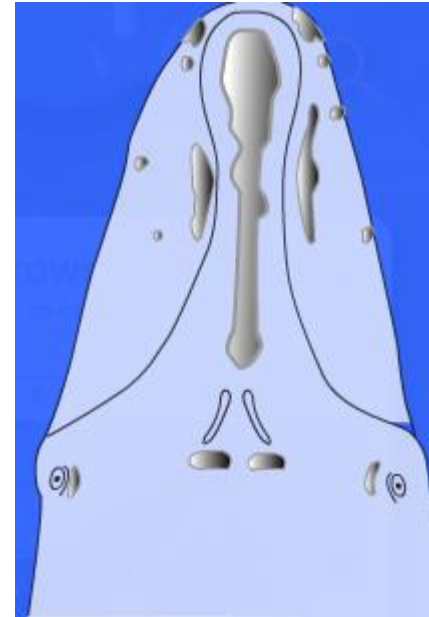
티눈(Callosity)
island

숨구멍 앞티눈
(coaming)

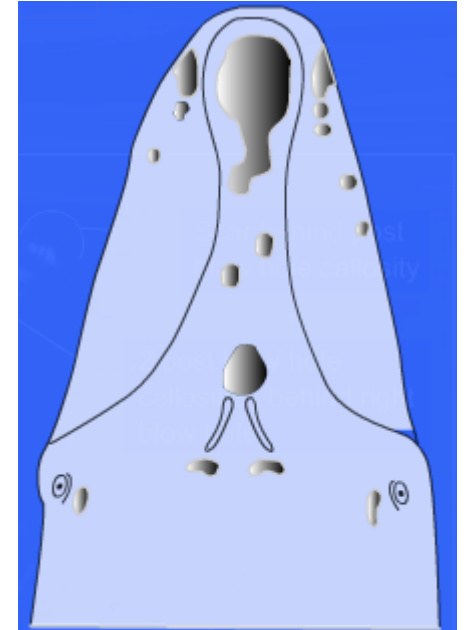
숨구멍

눈쪽 티눈

숨구멍 뒤티눈



Continuous Callosity
with one Peninsula



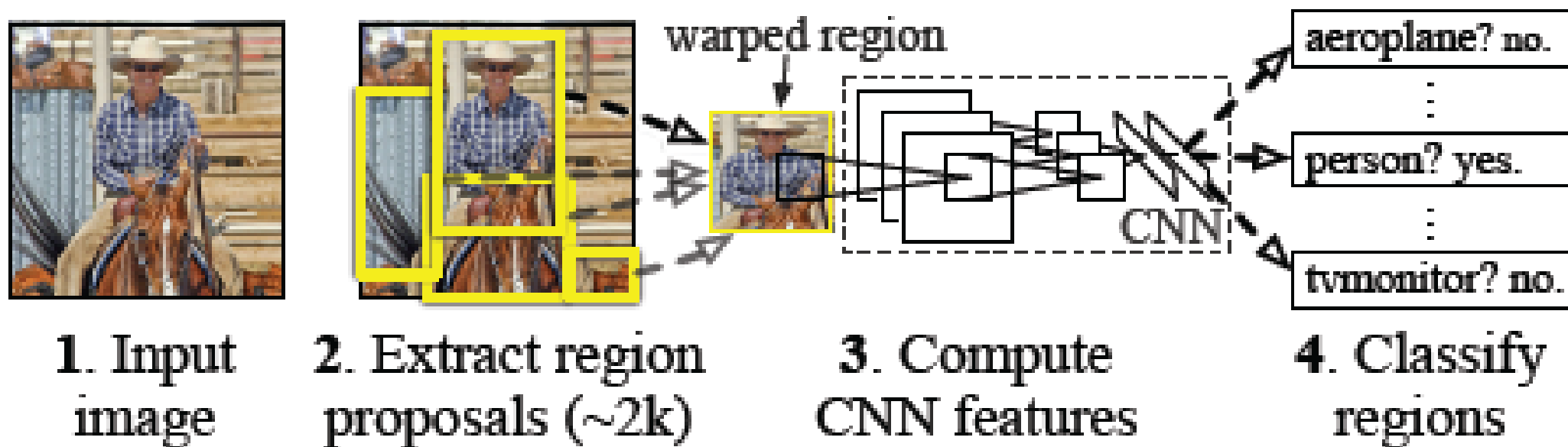
Broken Bonnet
with one Island

실습 Python Class4

object detection & crop

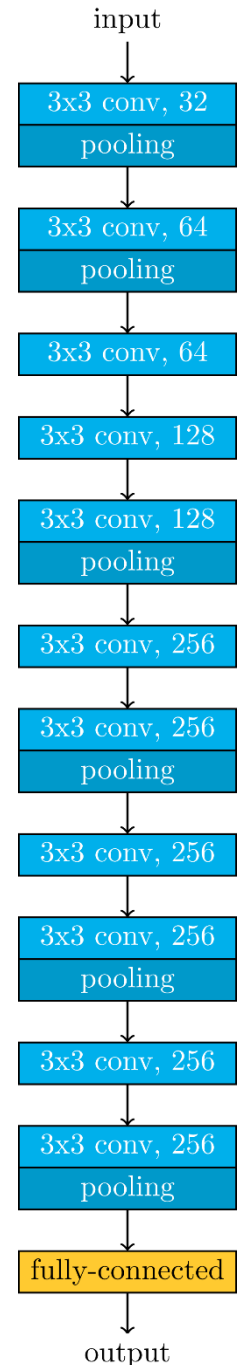
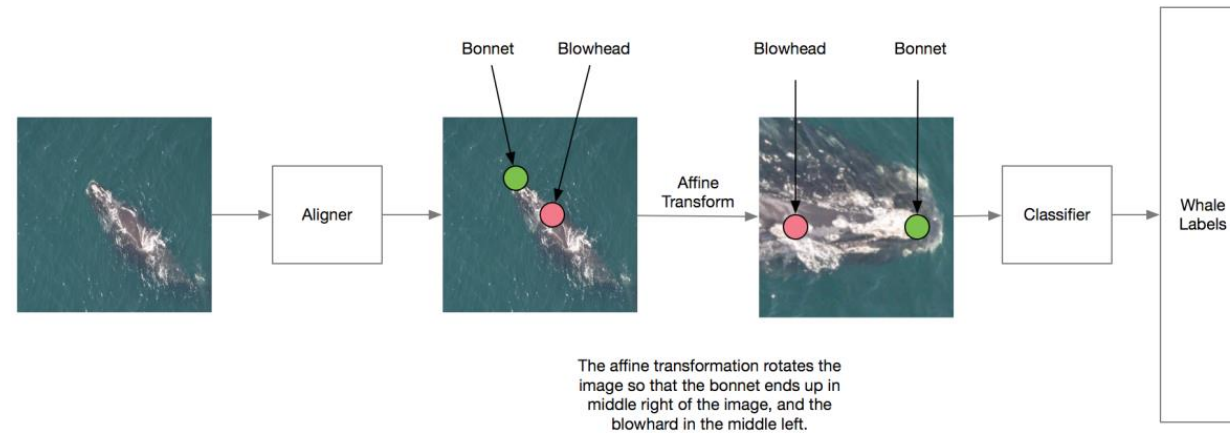
R-CNN (localization)

R-CNN: *Regions with CNN features*

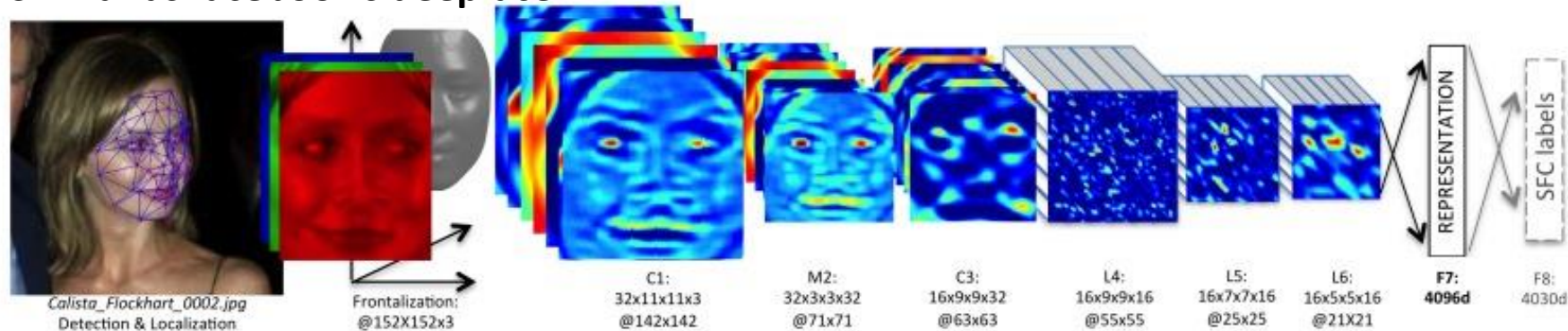


deepsense.io : Kaggle Winner

<http://blog.kaggle.com/2016/01/29/noaa-right-whale-recognition-winners-interview-1st-place-deepsense-io/>



Similar as facebook's deepface

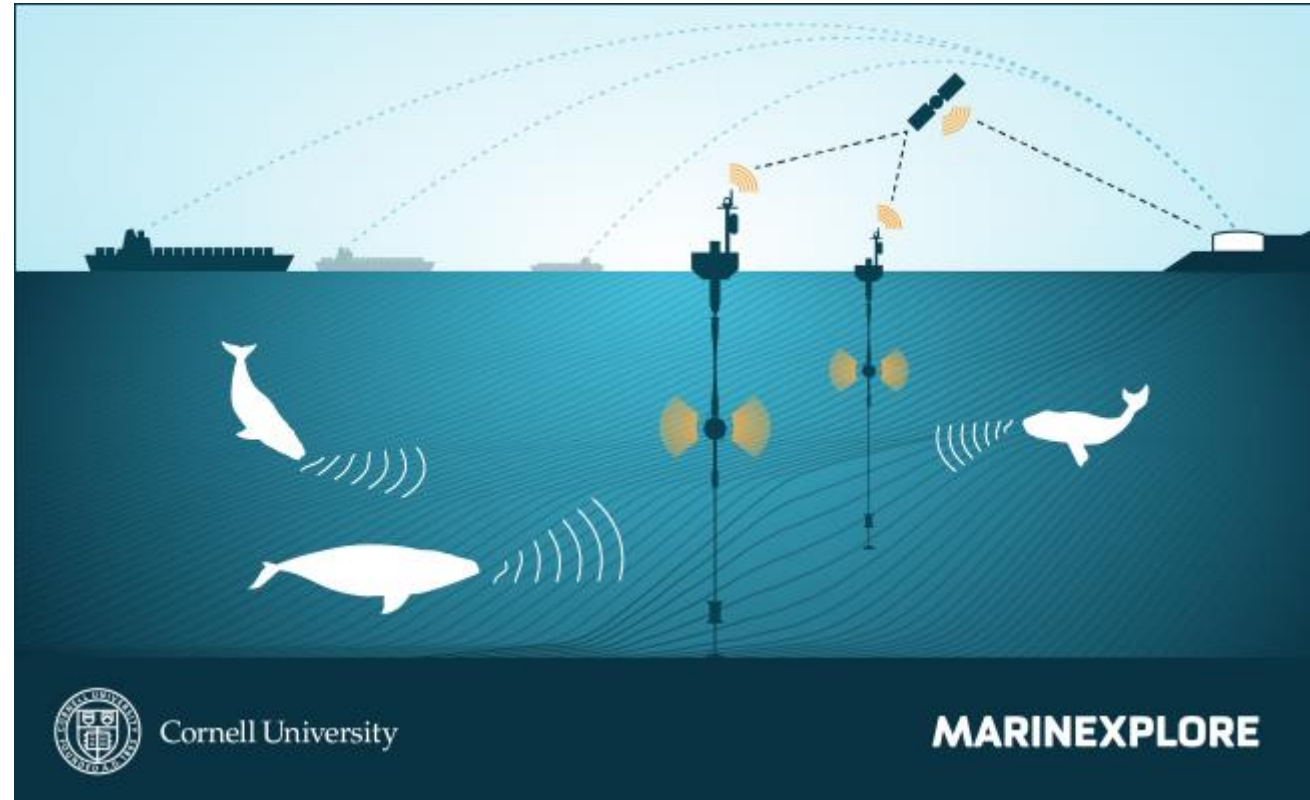


실습 DIGITS
custom python layer

실습

Audio(FFT) → Image(spectrogram)

Whale Sound or not



Thanks