Start Lab 03:00:00

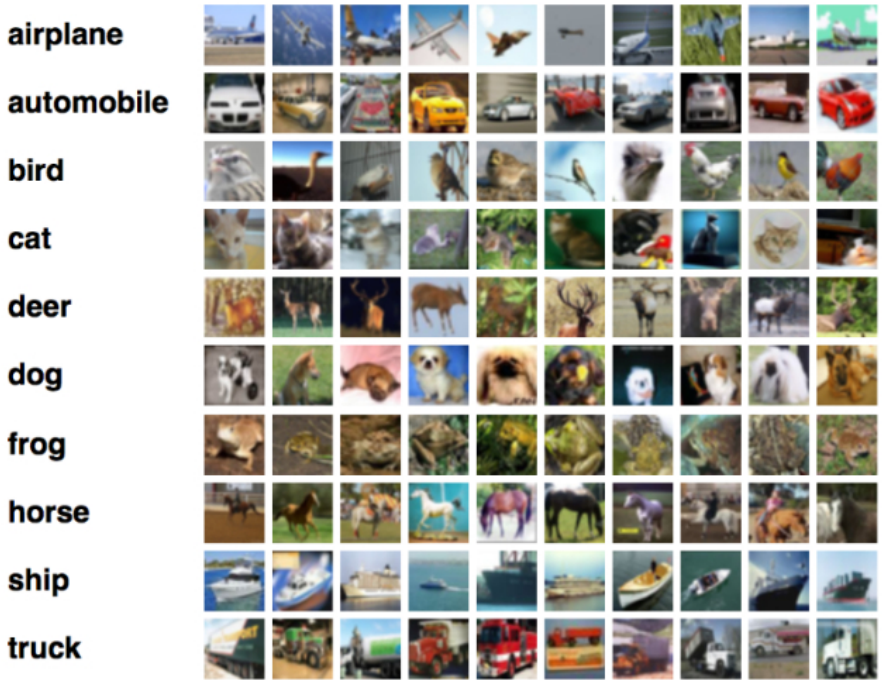
Deep Learning on AWS Lab 2 - Training a Convolutional Neural Network to Predict Images on CIFAR10 dataset

3 hours 10 Credits Rate Lab

In this lab, you train a ResNet neural network with CIFAR-10 training data to classify an image into 10 known categories. The code is written in MXNet.

CIFAR-10 and CIFAR-100 are labeled subsets of the 80 million tiny images dataset. Alex Krizhevsky, Vinod Nair, and Geoffrey Hinton collected the datasets.

The CIFAR-10 dataset consists of 60,000 32x32 pixel color images in 10 classes, with 6,000 images per class. There are 50,000 training images and 10,000 test images:



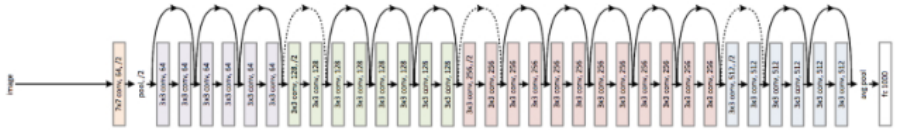
The dataset is divided into 5 training batches and 1 test batch, each with 10,000 images. The test batch contains exactly 1,000 randomly selected images from each class. The training batches contain the remaining images in random order, but some training batches may contain more images from one class than another. Between them, the training batches contain exactly 5,000 images from each class.

You can work with image datasets for:

- **Classification** to identify which of set of categories the image belongs.
- **Localization** to determine the position of the image with respect to the attributes.
- **Segmentation** to create data mask for each objects in the image.
- **Scene classification** to determine the context of the image.
- **Scene parsing** to segment and parse an image into different image regions associated with semantic categories, such as sky, road, person, and bed.

For additional information about deep learning on images, see CS231n: Convolutional Neural Networks for Visual Recognition.

This lab uses a residual neural network (ResNet). Deep Residual Learning for Image Recognition:



- Residual nets with a depth of up to 152 layers, which is 8x deeper than VGG nets but still having lower complexity
- Achieves 3.57% error on the ImageNet test set
- 1st place on the ILSVRC (Large Scale Visual Recognition Challenge) 2015 classification task

Objectives

After completing this lab, you will be able to:

- Create a convolutional neural network model
- Train a convolutional neural network using GluonCV
- Evaluate your predictions using Amazon SageMaker endpoints

Prerequisites

This lab requires:

- Access to a notebook computer with Wi-Fi running Microsoft Windows, Mac OS X, or Linux (Ubuntu, SuSE, or Red Hat). The Qwiklabs lab environment is not accessible using an iPad or tablet device, but you can use these devices to access the student guide.
- For Microsoft Windows users: administrator access to the computer
- An internet browser such as Chrome, Firefox, or Internet Explorer 9 (previous versions of Internet Explorer are not supported)

Duration

This lab takes approximately **60 minutes**.

Access the AWS Management Console

1. At the top of the lab page, launch the lab by clicking **Start Lab**

   A status bar shows the progress of the lab environment creation process. The AWS Management Console is accessible during lab resource creation, but your AWS resources may not be fully available until the process is complete.

   Note This process can take up to 12 minutes. Do not exit or refresh your browser during this time.

   When the provisioning process is complete, click **Open Console**.

2. Log in to the console:

   - For **IAM user name**, type `awsstudent`
   - For **Password**, copy and paste the **Password** value from the left side of the lab page
   - Click **Sign In**

3. At the top-right corner of the console, make sure the AWS Region is same as the **Region** displayed on the left side of the lab page.

   ⚠ Only use the Region indicated on the lab page. Do not change to a different Region during this lab.

Task 1: Connect to the Amazon SageMaker notebook instance

An Amazon SageMaker notebook instance has already been launched for you as part of this lab. In this task, you will connect to the instance via SSH.

4. In the AWS Management Console, on the **Services** menu, click **Amazon SageMaker**.

5. In the left navigation menu, click **Notebook instances**.

6. Under **Actions**, open the notebook instance by clicking **Open Jupyter**.

7. In Jupyter, open the **Lab2.ipynb** notebook file, which was automatically uploaded to the Jupyter console.

Task 2: Review and complete the provided notebook

To complete this lab, carefully move through the notebook, from top to bottom. Run each code cell and view its output. To run a cell, click within the cell and press **SHIFT + ENTER** OR click **Run** at the top of the page.

Lab complete

Congratulations! You have completed this lab. To clean up your lab environment, do the following:

8. Close the **Lab2.ipynb** notebook file.

9. Log out of Jupyter Notebook by clicking **Quit**. Then, close the tab.

10. Log out of the AWS Management Console by clicking **awsstudent** at the top of the console, and then clicking **Sign Out**.

11. End the lab session in Qwiklabs by clicking **End Lab**.

Chat