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Faculty of Computer Science

Spring Semester 2020

CS364

**Cloud Computing**

# Project Documentation

Project Video link: [**https://youtu.be/0XZYOV0STZU**](https://youtu.be/0XZYOV0STZU)

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Submitted to:

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In this project, I am going to train an image classifier to recognize different species of flowers (over 100 category). You can imagine using something like this in a phone app that tells you the name of the flower your camera is looking at. In practice you would train this classifier, then export it for use in your application. We'll be using [this dataset](http://www.robots.ox.ac.uk/~vgg/data/flowers/102/index.html) of 102 flower categories.

Image classification is the process of labeling images according to predefined categories. The process of image classification is based on supervised learning. The image classification model is given a batch of images within a specific category. Based on this set, the algorithm learns which class the test images belong to and can later then predict the correct class of future image inputs and can even measure how accurate the predictions are.

This process introduces multiple challenges, including scale variation, viewpoint variation, intra-class variation, image deformation, image occlusion, illumination conditions and background clutter

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**Services used:**

**Amazon S3**

Amazon Simple Storage Service is storage for the Internet. It is designed to make web-scale computing easier for developers.

Used for storing the data that can be accessed to be either fetched or edited from sage maker

Dataset is stored in the s3 bucket for the scalability and security, where in future work the dataset can be in matter of gb’s

**Amazon SageMaker**

It also provides common machine learning algorithms that are optimized to run efficiently against extremely large data in a distributed environment.

Offer instances ranging from medium to x-large according to the provided resources

**Amazon S3 Bucket**

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A close up of a sign

Description automatically generated **Sagemaker**

All the dataset are stored in S3 bucket(training, testing and validating)

The dataset is then download to the sagemaker instance using console commands to be accessed later by the model for training

The model saved checkpoint which hold the latest model status, hyperparameters and label indexing is then stored in the S3 bucket so the model can later be either improved or deployed for working

Training model with different hyperparameter to get the best accuracy while testing the runtime of the instance

1. Using Alexnet with 20 epochs and 1024 hidden units

Runtime 5m 26s

A screenshot of a computer

Description automatically generated

1. Using alexnet with 8 epochs and 200485 hidden unit

Runtime 13m 15s

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1. Using vgg16 with 20 epochs and 1024 hidden unit

Runtime 2m 14s

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Comparing between both Cpu and Gpu computing time per batch

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Unfortunately, I have failed to deploy the model to be accessed with remote access or ui due to certain permissions required with IAM user that I couldn’t obtain or find a way to override them

A screenshot of a computer screen

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