

Assignment 2.: Image classification with Tiny imageNet using Convolutional Neural Network (CNN)

Practical Machine Learning: Dr. Suyong Eum

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1 Description

The aim of this assignment is to get a firm understanding of Convolutional Neural Networks (CNN) through hand-on experience of its implementation. CNN regained its popularity after AlexNet using CNN won the ImageNet challenge in 2012 with far better results compared to its runner up. Since then, it has been widely used as a fundamental building block of various neural network architectures, e.g., Deep Convolutional Generative Adversarial Networks (DCGAN) or Deep Q-Networks (DQN).

In this assignment, you are expected to implement a CNN to classify image files. Here we use data set provided for Tiny ImageNet Visual Recognition Challenge (<https://tiny-imagenet.herokuapp.com/>). The data set has 200 classes and includes 100,000 image files for training and 10,000 for validating. The basic implementation is covered during the lecture: CNN implementation. Thus, you need to put them into a code and change the architecture: the number of convolutional/fully-connected layers and hyper-parameters, e.g., size/number of filters, and stride, etc.

Similar to the previous assignment, Cross Validation (CV) will prevent your model from getting overfit to training data. For the convenience of marking the assignment, 1000 image files will be used to test the accuracy of your CNN model. The image files will be available from the subject website. Thus, you download the image files and identify the label of each image file. Then, submit the text file which includes the labels. Your mark will be determined how many test image files are correctly classified. Please, make sure that the file has two columns: 1) name of image file, 2) its label as shown below.

41863d66c8695102bd533a209c6ad4dd.jpeg	n03444034
0c60643ca29f17bed1d5f6d9a31995bd.jpeg	n04179913

2 Required Tasks

The assignment can be completed individually or as a group of 3 or less. There will be no advantage or disadvantage in terms of the number of people for the completion of the assignment.

1. You are encouraged to use tensorflow for this implementation. However, it is not mandatory.
2. You need to submit
 - (a) A report which explains the model you developed including its performance evaluation.
 - (b) A code: python or Jupyter notebook file.
 - (c) A file which estimates label of the test image files.
 - i. Make sure that it follows the format above: two columns 1) name of image file, 2) its label

3 Administrative

- Due: 6pm, July 13, 2018
- Testing image files can be downloaded from (www.suyongeum/ML/assignments.php)
- Submission to (suyong@ist.osaka-u.ac.jp)
 - Zip all submission as one file and name it with your student number
- Late submission will be penalized at the rate of 10% reduction per day