

Assignment 3: Image Classification

KERROUMI Mohamed

Master MVA

ENS Paris-Saclay

Kerroumimohamed1997@gmail.com

Abstract

*In this assignment, I tried to build a model for image classification on the **Caltech-UCSD Birds-200-2011** bird dataset, I used Transfer Learning and I built my model based on a pretrained model (Resnet18), I managed to get a 97% training accuracy and 77.4% test accuracy on the Kaggle competition, which is good considering the simple architecture of the model and the short time of training.*

1. Dataset

The dataset used in the assignment is the Caltech-UCSD Birds-200-2011 bird dataset, this dataset contains images of 20 classes of birds. The images are of different sizes and they are 1100 in the training sets and 103 in the validation sets. This 1100 images are not enough to train the model and get good performance in the classification, so we added some data augmentation (Random Cropping, Horizontal Flipping) to augment the training sets.

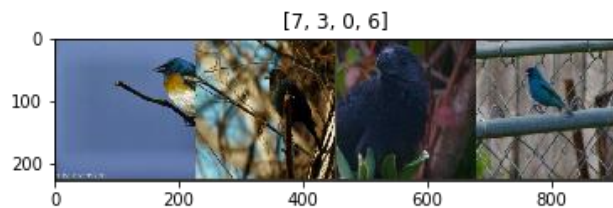


Fig1: Examples of images from the Dataset

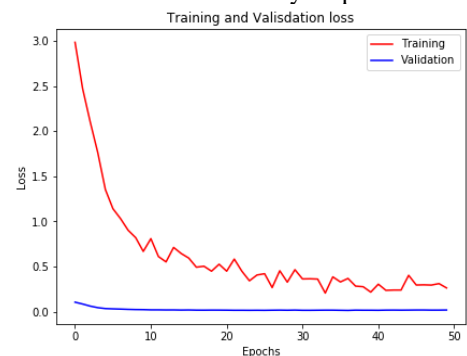
2. Model

In our case, the size of the dataset is not sufficient to train an entire ConvNet from scratch with random initialization. Instead, it is preferable to use a pretrained ConvNet on a very large dataset (e.g. ImageNet) as an initialization and finetune the parameters of the model using the training sets, this technique is called Transfer Learning. The pretrained model I used is Resnet18, and I added in the bottom of this network two dense layer of size 512, 20 respectively. For the optimizer, I used a Stochastic Gradient Descent with Momentum, I took $lr = 0.001$ and the momentum=0.9, and

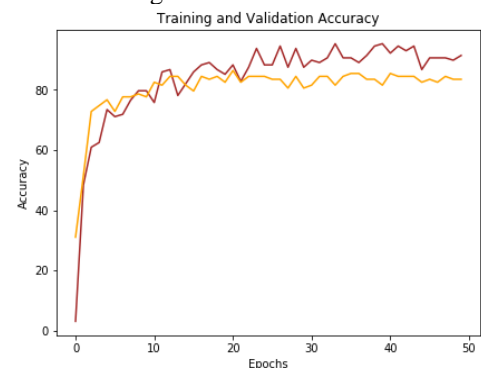
for the Loss function I'm trying to minimize, I chose the Categorical Cross-Entropy. I trained the model for 50 epochs with a batch_size =32 and the results of the training are presented in the next section.

3. Results

The graph below represents the variation of the training and validation Loss during the training of the model. We can see that the training loss is constantly decreasing and the model is learning very quickly because the validation loss reached its minimum after only 5 epochs.



I plotted as well the variation of the accuracy during training, we can see that the gap between the training and validation accuracy is very small, which indicates that the model is not overfitting.



4. References

How transferable are features in deep neural networks ?
Jason Yosinski et al. 2014