Practicing with the DIGITS Workflow

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Abstract—Practicing with the DIGITS Workflow using the conveyor belt dataset from Udacity.

Index Terms—Robot, IEEEtran, Udacity, LaTeX, deep learning.

✦

1 INTRODUCTION

P ART of the inference project is practicing simple deep learning networks using the nVidia DIGITS application.

2 BACKGROUND / FORMULATION

The GoogleLeNet model was chosen. It is a standard model available in the DIGITS application. The model was chosen because the inference time is less than 10 ms and the accuracy is higher than AlexNet. To avoid overfitting, the training was terminated after 5 epochs.

3 RESULTS

The requirements for the project were less than 10 milliseconds inference time and greater than 75 percent accuracy. The output of the "evaluate" command is shown below. The accuracy is 75.4 percent and the inference time is less than 6 milliseconds.

```
Calculating average inference time over 10 samples...
deploy: /opt/DIGITS/digits/jobs/20181009-042607-7c21/deploy.prototxt
model: /opt/DIGITS/digits/jobs/20181009-042607-7c21/snapshot_iter_595.caffemodel
output: softmax
iterations: 5
avgRuns: 10
Input "data": 3x224x224
Output "softmax": 3x1x1
name=data, bindingIndex=0, buffers.size()=2
name=softmax, bindingIndex=1, buffers.size()=2
Average over 10 runs is 5.46516 ms.
Average over 10 runs is 5.46006 ms.
Average over 10 runs is 5.24432 ms.
Average over 10 runs is 4.97834 ms,
Average over 10 run   Jeremy Hale Oct 8, 2018

Calculating model accuacy...

  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left  Speed
100 14667  100 12351  100  2316   1779    333  0:00:06  0:00:06 --:--:--  2548

Your model accuacy is 75.4098360656 %
```

Fig. 1. GoogleLeNet.

The training plot is shown below.

4 DISCUSSION

The performance is sufficient for the project requirements. The first attempt using 30 epochs of training; however, this resulted in overfitting and the accuracy of the test data dropped to 70 percent.

5 CONCLUSION / FUTURE WORK

The GoogleLeNet model has a reasonable balance of inference time and performance. The saved model is stored in the folder "model_epoch5". Future work could use a GoogleLeNet model pretrained on ImageNet for higher accuracy.
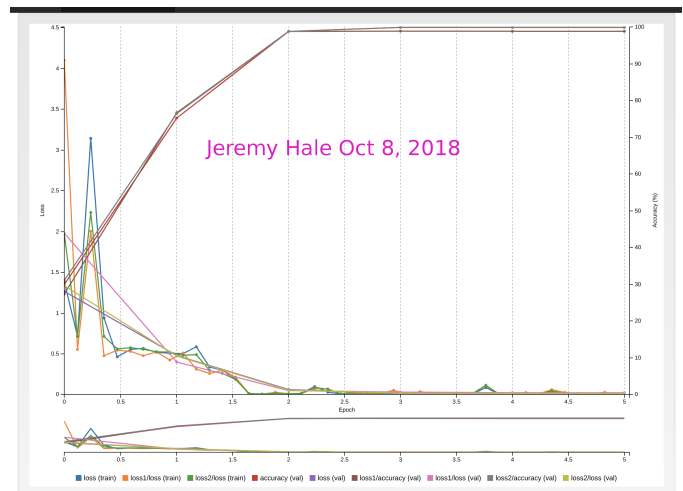

Fig. 2. Training.