

Lab 10: Deep Learning: Transfer Learning

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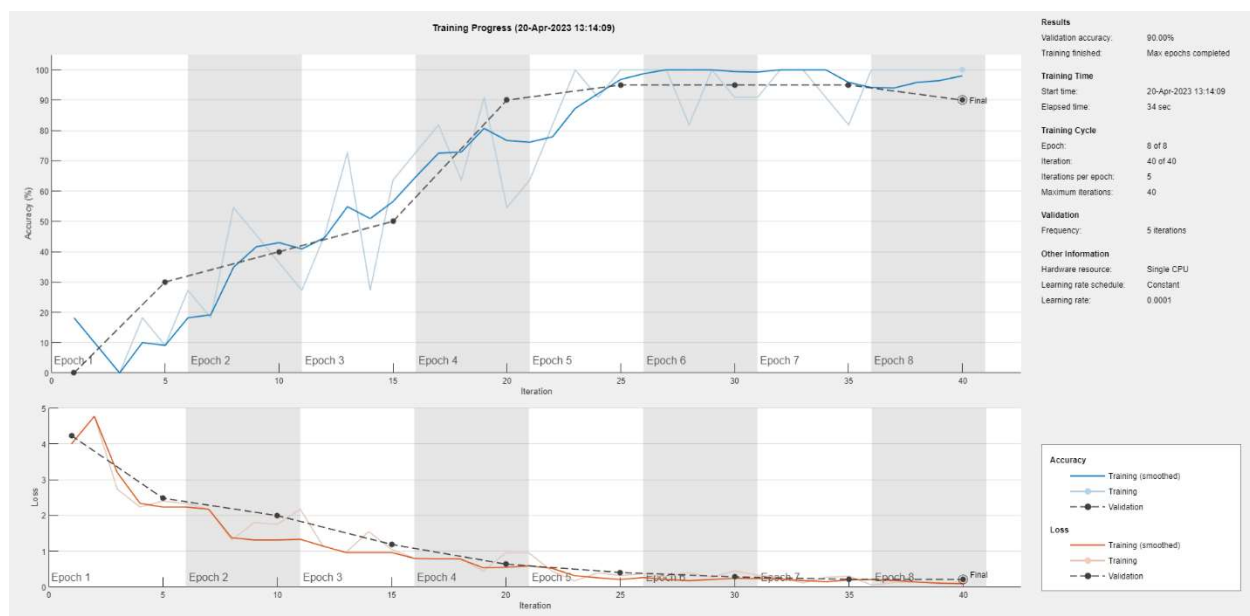
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OBJECTIVE: The objective of this lab was to get a better understanding of deep learning on MATLAB using Deep Network Designer.

METHODS: In part 1 “Classify Image Using Pretrained Network”, I utilized GoogLeNet to classify three images: peppers.png, test.jpg, and hat.jpg.

In part 2 “Get Started with Transfer Learning”, I utilized Deep Network Designer to edit and run SqueezeNet network. I classified two images: test.jpg and hat.jpg.

RESULTS: The training plot is as follows:



The classification label on test.jpg was “MathWorks Cap” with accuracy of 98.2%. The classification label on hat.jpg was “MathWorks Cap” with accuracy of 82.6%. The reason that the cowboy hat turned out to be labeled as MathWorks Cap is because the MerchData dataset does not include a generalized category “hat” or “cowboy hat”, but instead had “MathWorks Cap” category. Because the cowboy hat is not a cap nor is it a MathWorks item, the classification accuracy is 82.6%, which is lower than 98.2% of the partial image of an actual MathWorks Cap.

CONCLUSION: Through the lab I was able to further understand how neural networks work, as well as how to edit and utilize them using MATLAB and Deep Network Designer.

APPENDIX:

Contents

- [part 1](#)
- [part 2](#)

part 1

```
net = googlenet;

I = imread("peppers.png");
inputSize = net.Layers(1).InputSize;
I = imresize(I,inputSize(1:2));

label = classify(net,I);
figure,subplot(131)
imshow(I)
title(string(label))

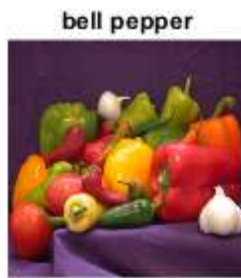
I = imread("test.jpg");
inputSize = net.Layers(1).InputSize;
I = imresize(I,inputSize(1:2));

label = classify(net,I);
subplot(132)
imshow(I)
title(string(label))

I = imread("hat.jpg");
inputSize = net.Layers(1).InputSize;
I = imresize(I,inputSize(1:2));

label = classify(net,I);
subplot(133)
imshow(I)
title(string(label))

lastLayer = net.Layers(end);
```



part 2

```
I = imread("test.jpg");    %test image
I = imresize(I, [227,227]);

[YPred,probs] = classify(trainedNetwork_1,I);
figure
imshow(I)
label = YPred;
title(string(label) + ", " + num2str(100*max(probs),3) + "%");

I = imread("hat.jpg");    %hat image
I = imresize(I, [227,227]);

[YPred,probs] = classify(trainedNetwork_1,I);
figure
imshow(I)
label = YPred;
title(string(label) + ", " + num2str(100*max(probs),3) + "%");
```

MathWorks Cap, 98.2%



MathWorks Cap, 82.6%

