

PROJECT PROGRESS

- When only the fc layer was unfrozen, the validation accuracy was about 62.50% after few epochs
- The Running train loss was decreasing

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hgafar@yao-Unbuntu2: ~/TermProject
Layer layer2.1.conv1.weight is frozen
Layer layer2.1.bn1.weight is frozen
Layer layer2.1.bn1.bias is frozen
Layer layer2.1.conv2.weight is frozen
Layer layer2.1.bn2.weight is frozen
Layer layer2.1.bn2.bias is frozen
Layer layer3.0.conv1.weight is frozen
Layer layer3.0.bn1.weight is frozen
Layer layer3.0.bn1.bias is frozen
Layer layer3.0.conv2.weight is frozen
Layer layer3.0.bn2.weight is frozen
Layer layer3.0.bn2.bias is frozen
Layer layer3.0.downsample.0.weight is frozen
Layer layer3.0.downsample.1.weight is frozen
Layer layer3.0.downsample.1.bias is frozen
Layer layer3.1.conv1.weight is frozen
Layer layer3.1.bn1.weight is frozen
Layer layer3.1.bn1.bias is frozen
Layer layer3.1.conv2.weight is frozen
Layer layer3.1.bn2.weight is frozen
Layer layer3.1.bn2.bias is frozen
Layer layer4.0.conv1.weight is frozen
Layer layer4.0.bn1.weight is frozen
Layer layer4.0.bn1.bias is frozen
Layer layer4.0.conv2.weight is frozen
Layer layer4.0.bn2.weight is frozen
Layer layer4.0.bn2.bias is frozen
Layer layer4.0.downsample.0.weight is frozen
Layer layer4.0.downsample.1.weight is frozen
Layer layer4.0.downsample.1.bias is frozen
Layer layer4.1.conv1.weight is frozen
Layer layer4.1.bn1.weight is frozen
Layer layer4.1.bn1.bias is frozen
Layer layer4.1.conv2.weight is frozen
Layer layer4.1.bn2.weight is frozen
Layer layer4.1.bn2.bias is frozen
Layer fc.weight is unfrozen
Layer fc.bias is unfrozen
Epoch 1/5, Train Loss: 45.6008, Val Loss: 0.7309, Val Acc: 56.25%
Epoch 2/5, Train Loss: 28.4237, Val Loss: 0.7261, Val Acc: 62.50%
Epoch 3/5, Train Loss: 24.3367, Val Loss: 0.8207, Val Acc: 50.00%
Epoch 4/5, Train Loss: 22.8996, Val Loss: 0.6357, Val Acc: 68.75%
Epoch 5/5, Train Loss: 21.6725, Val Loss: 0.7494, Val Acc: 62.50%
hgafar@yao-Unbuntu2:~/TermProject$ python3 ProjectTest.py
cpu
Layer conv1.weight is frozen
Layer bn1.weight is frozen
Layer bn1.bias is frozen
Layer layer1.0.conv1.weight is frozen
Layer layer1.0.bn1.weight is frozen
Layer layer1.0.bn1.bias is frozen
Layer layer1.0.conv2.weight is frozen
Layer layer1.0.bn2.weight is frozen
Layer layer1.0.bn2.bias is frozen
Layer layer1.1.conv1.weight is frozen
Layer layer1.1.bn1.weight is frozen
Layer layer1.1.bn1.bias is frozen
Layer layer1.1.conv2.weight is frozen
Layer layer1.1.bn2.weight is frozen
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PROJECT PROGRESS

- When layer 3, 4 and the fc layer were unfrozen, the test accuracy was about 83%
- The running train loss was decreasing

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hgafar@yao-Ubuntu2: ~/TermProject
Layer layer1.1.bn1.weight is frozen
Layer layer1.1.bn1.bias is frozen
Layer layer1.1.conv2.weight is frozen
Layer layer1.1.bn2.weight is frozen
Layer layer1.1.bn2.bias is frozen
Layer layer2.0.conv1.weight is frozen
Layer layer2.0.bn1.weight is frozen
Layer layer2.0.bn1.bias is frozen
Layer layer2.0.conv2.weight is frozen
Layer layer2.0.bn2.weight is frozen
Layer layer2.0.bn2.bias is frozen
Layer layer2.0.downsample.0.weight is frozen
Layer layer2.0.downsample.1.weight is frozen
Layer layer2.0.downsample.1.bias is frozen
Layer layer2.1.conv1.weight is frozen
Layer layer2.1.bn1.weight is frozen
Layer layer2.1.bn1.bias is frozen
Layer layer2.1.conv2.weight is frozen
Layer layer2.1.bn2.weight is frozen
Layer layer2.1.bn2.bias is frozen
Layer layer3.0.conv1.weight is unfrozen
Layer layer3.0.bn1.weight is unfrozen
Layer layer3.0.bn1.bias is unfrozen
Layer layer3.0.conv2.weight is unfrozen
Layer layer3.0.bn2.weight is unfrozen
Layer layer3.0.bn2.bias is unfrozen
Layer layer3.0.downsample.0.weight is unfrozen
Layer layer3.0.downsample.1.weight is unfrozen
Layer layer3.0.downsample.1.bias is unfrozen
Layer layer3.1.conv1.weight is unfrozen
Layer layer3.1.bn1.weight is unfrozen
Layer layer3.1.bn1.bias is unfrozen
Layer layer3.1.conv2.weight is unfrozen
Layer layer3.1.bn2.weight is unfrozen
Layer layer3.1.bn2.bias is unfrozen
Layer layer4.0.conv1.weight is unfrozen
Layer layer4.0.bn1.weight is unfrozen
Layer layer4.0.bn1.bias is unfrozen
Layer layer4.0.conv2.weight is unfrozen
Layer layer4.0.bn2.weight is unfrozen
Layer layer4.0.bn2.bias is unfrozen
Layer layer4.0.downsample.0.weight is unfrozen
Layer layer4.0.downsample.1.weight is unfrozen
Layer layer4.0.downsample.1.bias is unfrozen
Layer layer4.1.conv1.weight is unfrozen
Layer layer4.1.bn1.weight is unfrozen
Layer layer4.1.bn1.bias is unfrozen
Layer layer4.1.conv2.weight is unfrozen
Layer layer4.1.bn2.weight is unfrozen
Layer layer4.1.bn2.bias is unfrozen
Layer fc.weight is unfrozen
Layer fc.bias is unfrozen
Epoch 1/20, Train Loss: 29.3389, Test Loss: 9.6982, Test Acc: 80.29%
Epoch 2/20, Train Loss: 13.9861, Test Loss: 10.4855, Test Acc: 80.93%
Epoch 3/20, Train Loss: 9.4090, Test Loss: 10.3697, Test Acc: 82.69%
Epoch 4/20, Train Loss: 7.7763, Test Loss: 10.0149, Test Acc: 83.17%
Epoch 5/20, Train Loss: 5.1133, Test Loss: 11.1523, Test Acc: 83.01%
Epoch 6/20, Train Loss: 4.9405, Test Loss: 11.4841, Test Acc: 83.17%
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PROJECT PROGRESS

- When layer 3, 4 and the fc layer were unfrozen, the validation accuracy was about 68.70% which might be due to overfitting because only the training running error showed decreasing trend
- Different learning rates yield similar result

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hgafar@yao-Unbuntu2: ~/TermProject
Layer layer1.1.bn1.bias is frozen
Layer layer1.1.conv2.weight is frozen
Layer layer1.1.bn2.weight is frozen
Layer layer1.1.bn2.bias is frozen
Layer layer2.0.conv1.weight is frozen
Layer layer2.0.bn1.weight is frozen
Layer layer2.0.bn1.bias is frozen
Layer layer2.0.conv2.weight is frozen
Layer layer2.0.bn2.weight is frozen
Layer layer2.0.bn2.bias is frozen
Layer layer2.0.downsample.0.weight is frozen
Layer layer2.0.downsample.1.weight is frozen
Layer layer2.0.downsample.1.bias is frozen
Layer layer2.1.conv1.weight is frozen
Layer layer2.1.bn1.weight is frozen
Layer layer2.1.bn1.bias is frozen
Layer layer2.1.conv2.weight is frozen
Layer layer2.1.bn2.weight is frozen
Layer layer2.1.bn2.bias is frozen
Layer layer3.0.conv1.weight is unfrozen
Layer layer3.0.bn1.weight is unfrozen
Layer layer3.0.bn1.bias is unfrozen
Layer layer3.0.conv2.weight is unfrozen
Layer layer3.0.bn2.weight is unfrozen
Layer layer3.0.bn2.bias is unfrozen
Layer layer3.0.downsample.0.weight is unfrozen
Layer layer3.0.downsample.1.weight is unfrozen
Layer layer3.0.downsample.1.bias is unfrozen
Layer layer3.1.conv1.weight is unfrozen
Layer layer3.1.bn1.weight is unfrozen
Layer layer3.1.bn1.bias is unfrozen
Layer layer3.1.conv2.weight is unfrozen
Layer layer3.1.bn2.weight is unfrozen
Layer layer3.1.bn2.bias is unfrozen
Layer layer4.0.conv1.weight is unfrozen
Layer layer4.0.bn1.weight is unfrozen
Layer layer4.0.bn1.bias is unfrozen
Layer layer4.0.conv2.weight is unfrozen
Layer layer4.0.bn2.weight is unfrozen
Layer layer4.0.bn2.bias is unfrozen
Layer layer4.0.downsample.0.weight is unfrozen
Layer layer4.0.downsample.1.weight is unfrozen
Layer layer4.0.downsample.1.bias is unfrozen
Layer layer4.1.conv1.weight is unfrozen
Layer layer4.1.bn1.weight is unfrozen
Layer layer4.1.bn1.bias is unfrozen
Layer layer4.1.conv2.weight is unfrozen
Layer layer4.1.bn2.weight is unfrozen
Layer layer4.1.bn2.bias is unfrozen
Layer fc.weight is unfrozen
Layer fc.bias is unfrozen
Epoch 1/20, Train Loss: 53.2544, Val Loss: 0.5053, Val Acc: 62.50%
Epoch 2/20, Train Loss: 27.0980, Val Loss: 0.6107, Val Acc: 62.50%
Epoch 3/20, Train Loss: 21.0780, Val Loss: 0.5299, Val Acc: 68.75%
Epoch 4/20, Train Loss: 18.1406, Val Loss: 0.5637, Val Acc: 62.50%
Epoch 5/20, Train Loss: 16.6006, Val Loss: 0.5656, Val Acc: 62.50%
Epoch 6/20, Train Loss: 15.8816, Val Loss: 0.4731, Val Acc: 68.75%
Epoch 7/20, Train Loss: 13.5917, Val Loss: 0.4819, Val Acc: 62.50%
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Future Directions

- Try more architectures
- Select one with highest validation accuracy