

Report

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Q1-1. Please report the validation accuracy of a pretrained Alexnet used as a feature extractor in the two-class classification problem. (5 pts)

Ans: Best valid accuracy : 0.8000

Q1-2 Please report the validation accuracy of a pretrained Alexnet after it is finetuned in the two-class classification problem. (5 pts)

Ans: Best valid accuracy : 0.8850

Q1-3 Please report the validation accuracy of a non-pretrained Alexnet after it is trained in the two-class classification problem. (5 pts)

Ans: Best valid accuracy : 0.6950

Q1-4 Please discuss the results of Q1-1, Q1-2, & Q1-3. (5 pts)

Ans: Best valid accuracy : Q1-2 > Q1-1 > Q1-3

Q1-2 因為有 finetune 所有的 layer 再加上 pretrain 過，所以 accuracy 最高，而 Q1-1 也有 pretrain 但只有 finetune 最後一層 layer，Q1-3 沒有經過 pretrain 而使用 random 的 initial weight，所以 Q1-2 accuracy 會比 Q1-3 高。

Q1-5. Please try to correct the data augmentation strategy in order to let the entire face of each image be seen and report the validation accuracy of a pre-trained Alexnet as a feature extractor in the two-class classification problem. (5 pts)

Ans: Best valid accuracy : 0.8075

Q1-6. Please try to correct the data augmentation strategy in order to let the entire face of each image be seen and report the validation accuracy of a pretrained Alexnet after it is fine-tuned in the two-class classification problem. (5 pts)

Ans: Best valid accuracy : 0.8950

Q1-7. Please discuss the results of Q1-5 & Q1-6. (5pts)

Ans: Best valid accuracy : Q1-6 > Q1-5 (finetune 差異)

且 Q1-6 > Q1-2、Q1-5 > Q1-1 (Q1-6、Q1-5 由於使用正確的 data augmentation，所以會比原本使用錯誤的好)

Q1-8. Please try to achieve validation accuracy higher than 89.5% using a CNN other than Alexnet & ResNet-18 in the fine-tuning case. (20pts)

Ans: Best valid accuracy :

Q1-9. Please discuss the results of Q1-9 (5pts if your meet the requirement of Q1-8)

Ans: 使用 vgg16_bn 取代 alexnet (用更深層的網路)，加上正確的 data augmentation，就能提升 accuracy 達到超過 89.5%

Q2-1. Please try to “eliminate” the skip-connection so the output of convolution layers of FCN8s will be directly upsampled for 32x. Please report pixel accuracy and mIOU before and after. (10 pts)

Ans:

Before: best pixel accuracy: 0.853

best mIOU: 0.459

After: best pixel accuracy: 0.830

best mIOU: 0.394

Q2-2. Please discuss the results of Q2-1. (10 pts)

Ans:

Performance: Before > after

拿掉 skip connection 的 accuracy 會比較差，因為沒有取得前幾層的特征

Q2-3. Please try to further reduce the number of classes from 11 to 3 and report the pixel accuracy & mIOU of FCN8s. (10 pts)

Ans:

The highest mIOU is 0.860

The highest pixel accuracy is 0.970

Q2-4. Please discuss the results of Q2-3. Was mIOU increased when the number of classes reduce? Please explain why! (10 pts)

Ans:

mIOU 變大，因為公式裡分母的 N 從 11 變成 3，且 summation 裡面的分母中的 t 也變大