

Write up for HW2P2

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1 Face Classification

1.1 Model Architecture

ResNet50 is the architecture that I used. However, the architecture in the paper requires input size to be $3 \times 224 \times 224$ (ImageNet), so I had to modify the architecture a little bit to fit our input size ($3 \times 32 \times 32$). In detail, because of the small input size, I got rid of the MaxPooling layer after the very first Convolution layer in order to maintain as much information as possible. Design for the ResBlocks is exactly the same as in paper. Then, going through all the ResBlocks gave a output shape of $2048 \times 4 \times 4$ which is connected to an AvgPool layer with kernel size 4 and stride 1 (this is different from the paper). After pooling, the 1×2048 vector is fully-connected to 2300-class outputs.

1.2 Loss Function

Only cross entropy loss with default settings.

1.3 Hyperparameters & Tricks

Training batch size: 256; Num_epochs: 12; Learning rate: $1e-3$ and decay by 0.1 at epoch #7; Optimizer: Adam with default settings (NO WEIGHT DECAY). Xavier initialization for weights in convolutional layer and linear layer. Biases were set to false.

1.4 Performance

The training loss was under 0.1 at the end of training and the minimum validation loss is around 0.7-0.8. The maximum validation accuracy that I got was over 82%.

2 Face Verification

2.1 Model Architecture

Same architecture was used for both classification and verification tasks. However, for verification task, the final fully-connected layer had to be changed from 2300-class outputs to 4300. Moreover, in order to do face embeddings, I also returned the vector with size 1×2048 right before the final fully connected layer.

2.2 Loss Function

Cross entropy loss.

2.3 Hyperparameters & Tricks

Similar to classification. The only difference is that the epoch was set to 9 with 0.1 lr decay rate for every 3 epochs.

2.4 Performance

I got over 85% validation accuracy here and over 0.91 AUC score on Kaggle.