ATNN - Homework 2 - Experiments report

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1 Summary of Experiments

Experiment	Link	Training Time	Accuracy (%)
1 – CutMix and MixUp	link	19m 55s	65.92
2 – Image Preprocessing	link	20m 45s	68.20
3 – TTA 1	link	41m 3s	65.52
4 – TTA 2	link	40m 50s	69.90

2 Experiment Descriptions

Each experiment is built upon the previous so only the changes will be mentioned.

2.1 CutMix and MixUp

This experiment used the Adam optimizer with weight decay, the StepLR scheduler and CutMix and MixUp techniques for data augmentation during training. The learning rate, weight decay and the scheduler have been fine tuned manually.

Without the CutMix and MixUp methods, the accuracy would hover around 50%, but by utilizing them, the accuracy was able to easily surpass the 60% threshold.

2.2 Image Preprocessing

During training the images were augmented by applying a random rotation, erasure and horizontal flip.

By adding these augmentations, the training time stayed about the same, but the accuracy increased a few percentage points.

2.3 TTA 1

During inference, the images are augmented using 8 translations and a horizontal flip. This results in $18 = (8 + 1) \cdot 2$ different outputs of the neural network that are combined to give a single prediction.

The validation time for each iteration increased significantly, and the total training time doubled. However, the accuracy did not increase, but decreased because the model didn't train on translated images.

2.4 Experiment 4 – Optimizer Tuning

During the image processing phase the random rotation has been replaced by a random translation.

Now that the model trained on both translated and horizontally flipped images, the TTA method was able to further increase the accuracy by a few percentage points from the second experiment.