Assignment 2: Convolution

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Results:

Training size	Model	Test Accuracy
1000	Base model	0.626
1000	Data augmentation	0.668
1000	Dropout	0.658
1000	Data augmentation and dropout	0.68
2000	Base model, no optimization	0.716
2000	Data augmentation	0.734
2000	Data augmentation and dropout	0.728
2000	Pretrained model, no optimization	0.424
2000	Pretrained model, feature extraction	0.982

Summary:

When starting with 1000 train, 500 test, and 500 validation, the best test accuracy score I achieved was 0.68. This was an 8.6% increase in accuracy from the base convolution model. I achieved this increase by incorporating data augmentation and dropout into the model. When increasing the training set to 2000, the initial test accuracy was 0.716. Increasing the training size from 1000 to 2000 samples resulted in a 14.4% increase in accuracy. Increasing the training size was far more beneficial than incorporating data augmentation and dropout. After incorporating data augmentation and dropout into the model using the 2000 training size, a test accuracy of 0.728 was achieved. After trying different thresholds, this model struggled to optimize much more. There was a clear benefit from increasing the training size compared to data augmentation or regularization techniques. Using a pretrained model without any optimization resulted in a test accuracy of 0.424. Since the training, test, and validation sets contain the same amount of cats and dogs, there is a 50% chance, or 0.5 accuracy, which would serve as a baseline for performance. Since the pretrained model got a 0.424 accuracy, the model would be worse than having no model at all. After applying feature extraction and using the 2000 training sample size, the model achieved a 0.982 test accuracy which is the best performance I was able to achieve.