50.021 Artificial Intelligence Project

Group Name: Dog
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Chosen Resolution: 200X
Chosen split: split1 (other splits have been trained too)

Training Settings

We explored two models for our project: Alexnet and Inception. Alexnet was a natural choice because we were already acquainted with the model from our earlier classes. Inception was an interesting model that can accept various input sizes of images. We selected the model out of curiosity and to get our hands dirty on it.

Alexnet
Data preparation:

- Images are chosen at random and flipped horizontally.
- A crop of 96*96 is done over each image, with each crop having 50% overlap is carried out. To fit the dataset into memory, the number of crops per image are limited to 1000, and chosen at random.

Learning Rate	Batch Size	# Patches	# epoch	**Average Validation Accuracy**
0.01	180	18	30	**75.5**
0.01	128	8	30	**75.6**

Accuracy on test split: Given the slightly lower performance of alexnet compared to the inception net, which we implemented in parallel, we gave up the model and did not attempt to find test accuracy.

Inception
Data preparation:
Interestingly, any form of image preprocessing was observed to deprove the test set accuracy.

Training Results

Inception (Training steps: 100)

Learning Rate	Flip	Crop Percentage	Scale Percentage	Brightness Percentage	**Accuracy Percentage**
0.01	False	0	0	0	**86.6**
0.02	False	0	0	0	**84.8**
0.005	False	0	0	0	**86**
0.001	False	0	0	0	**82.2**
0.003	False	0	0	0	**84**
0.008	False	0	0	0	**85**
0.0065	False	0	0	0	**85.2**
0.006	False	0	0	0	**85.4**
0.0055	False	0	0	0	**84**
0.001	True	0	0	0	**83.0**
0.005	True	0	0	0	**84.4**
0.01	True	0	0	0	**86.6**
0.02	True	0	0	0	**85.8**
0.001	False	50	0	0	**81.5**
0.005	False	50	0	0	**83.6**
0.01	False	50	0	0	**67.5**
0.02	False	50	0	0	**82.6**
0.001	False	10	0	0	**82.4**
0.005	False	10	0	0	**85.2**
0.01	False	10	0	0	**69.0**
0.02	False	10	0	0	**86.8**

0.001	False	10	0	0	**83**
0.005	False	10	0	0	**85.4**
0.01	False	0	50	0	**86.4**
0.02	False	0	50	0	**81.5**
0.001	False	0	50	0	**82.8**
0.005	False	0	50	0	**85.0**
0.01	False	0	10	0	**85.2**
0.01	False	0	0	50	**85.4**
0.01	False	0	0	10	**84.9**

Results on splits

Result 1 is done with:
- Learning rate = 0.02
- Crop = 0.1

Result 2 is done with:
- Learning rate = 0.01

	Results 1	**Results 2**
Split 1	**86.6**	**86.2**
Split 2	**82.6**	**86.2**
Split 3	**85.8**	**85.4**
Split 4	**85.4**	**86.0**
Split 5	**78.9**	**87**
Average	**83.86 ± 3.16**	**86.16 ± 0.57 (Best result)**