

## Questions to Answer regarding Uploaded Image Classification:

Once the program stops running and the results files appear in the workspace, open and review each of the three to answer the following questions on the `check_images.txt` file:

1. Did the three model architectures classify the breed of dog in `Dog_01.jpg` to be the same breed? If not, report the differences in the classifications.



Model Architecture	Classification of Dog_01.jpg
AlexNet	dingo, warrigal, warragal, canis dingo
RESNET	dingo, warrigal, warragal, canis dingo
VGG16	dingo, warrigal, warragal, canis dingo

All model architectures labeled the image as a dingo. Although not correct, it isn't too far off since the dog does look like a dingo.

2. Did each of the three model architectures classify the breed of dog in `Dog_01.jpg` to be the same breed of dog as that model architecture classified `Dog_02.jpg`? If not, report the differences in the classifications.



Model Architecture	Classification of Dog_02.jpg
AlexNet	Pomeranian
RESNET	eskimo dog, husky
VGG16	golden retriever

All model architectures labeled the image as a dog this time, but they all differed on breed (see table above).

3. Did the three model architectures correctly classify Animal\_Name\_01.jpg and Object\_Name\_01.jpg to not be dogs? If not, report the misclassifications.



Model Architecture	Classification of Cat_01.jpg
AlexNet	cardigan, cardigan welsh corgi, corgi
RESNET	egyptian cat, cat
VGG16	plastic bag



Model Architecture	Classification of Sailboat_01.jpg
AlexNet	suspension bridge
RESNET	catamaran
VGG16	catamaran

The only false positive “dog” classification was by AlexNet, which thought Cat\_01.jpg was a corgi.

4. Based upon your answers for questions 1. - 3. above, select the model architecture that you feel did the best at classifying the four uploaded images. Describe why you selected that model architecture as the best on uploaded image classification.

The model architecture that performed the best on the uploaded photos was RESNET. Based on classifying an image as “dog” vs “not dog”, either VGG16 or RESNET would be

acceptable choices since only AlexNet classified a non-dog (Cat\_01) as a dog. I have selected RESNET as the best performing since

- It did equally well as the other models on Dog\_01 (all misclassified as a dingo)
- It is the closest model to the correct breed in Dog\_02 (the dog is a husky mix)
- It was the only model that correctly classified Cat\_01
- It did equally well with VGG16 on the Sailboat\_01 classification (it's not a catamaran, but it's in the right ballpark)

To make a call on the best model for this application, it would be best to run for at least several hundred labeled images and evaluate against whichever metric (e.g. accuracy, precision, recall, F score) makes the most sense for the dog show's needs. Based on how the three model architectures performed in this exercise on the 40 provided images (see table below), I would select VGG16 for this task since it hasn't made any mistakes classifying as "dog" / "not dog" and does the best at correctly identifying the dog breed (when it is a dog).

	AlexNet	RESNET	VGG16
Num images	40	40	40
Num dog images	30	30	30
Num not dog images	10	10	10
Num correctly labeled dog / not dog	40	39	40
Num correctly labeled not dog	10 (100%)	9 (90%)	10 (100%)
Num correctly labeled dog	30 (100%)	30 (100%)	30 (100%)
Num correctly labeled dogs with the correct breed	24 (80%)	27 (90%)	28 (93.3%)
Num exactly matching labels	30 (75.0%)	33 (82.5%)	35 (87.5%)