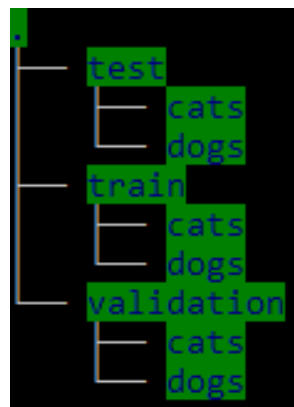


Project 1 - Cat & Dog Classification



We want to distinguish between images of cats and dogs. You must train a deep neural network to perform the classification task. To execute this task, you must work in groups of 2 people plus/minus 1. The dataset consists of 3600 images of cats and dogs, 1800 images of each class. The image format is jpeg, with 3 color channels. The data is organized into directories as shown on the figure below.



Task 1 - Create the dataloader

Due to the high amount of data, you need to write a dataloader to load the images. You must apply at least one on-the-fly data augmentation. Which type of data augmentation is up to you, but you need to justify your choice in your report.

Task 2 - Constructing the network

After successfully crafting the data generators, you need to craft a neural network, and use the dataloader to feed the network. The architecture, complexity and regularizers are all up to you, but you need to justify your choices in the report. You are more than welcome to replicate already known architectures or architectures we made during the course, but you are not allowed to use any pretrained networks. You are also not allowed to use any training data that isn't included on ItsLearning.

Carefully consider which hyperparameters to test and strategically try to find the optimal architecture for the task. In the comments, please describe your method for the optimization and your choice of hyperparameters.

Task 3 - Visualizing your results

Finally, you must visualize some aspects of your model. It can be a graph of the training/validation performance, visualization of the filters or feature maps, misclassified samples, or anything you can think of. A fun addition could be to take a picture of your favorite cat or dog, and test if your classifier can classify it correctly.

Bonus task (optional)

Download a pretrained model, for instance, using timm (<https://huggingface.co/docs/timm/quickstart>), and fine-tune it on the cats & dogs dataset. How is the performance compared to your own network?

When to submit

You need to submit before Tuesday 2024-11-19 at 12.00.

What to submit

You must hand-in: A report, your code, and your visualizations. The report should be about 3-4 pages, not including code and visualizations. You can supply your code as an appendix, or do a notebook style report with text and code intermixed.

Your report must reflect who wrote and worked on each part.

How to submit

Upload everything in a single pdf on itslearning.

Notes

You must do this assignment in groups, and only one submission is needed per group. The data is available on ItsLearning zipped as catdog_data.zip.

Training the networks can be a slow process, keep this in mind. You're NOT allowed to use pretrained networks, or data not found in the catdog_data.zip file! You are allowed to use any networks made during the exercises.

Please read through the entire project description, as there will be Q&A sessions in the exercise sessions in Week 46 and in the lectures.

If your local computer does not have enough computational power, you can perform the calculations in a notebook on Google Colab.