Project 1 - Cat & Dog Classification

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Deep Learning
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1 Introduction

The objective of this project is to develop a deep learning model capable of distinguishing between images of cats and dogs. The task involves training a neural network using a dataset containing 2,600 images, equally divided between the two categories.

The report is structured as follows: Section 2 explores the dataset and the possible features that can be extracted from it. Section 3 describes which data augmentation techniques were used for the model training. Section 4 presents the architecture of the neural network. Section 5 describes the training process used to optimize the model. Section 6 presents the results obtained by the model. Section 7 presents the results of using a pre-trained model. Section 8 discusses the results and the limitations of the model. Finally, Section 9 concludes the report. In the Appendix, the code and a notebook with the results and visualizations are provided.

2 Explorative Analysis

(a) Cats **(b)** Dogs

Fig. 1. Illustration of the effect of adaptive grids.

Dataset contains many diverse images and differ in terms of color, size, and orientation. The images are of varying quality, with some being clear and well-lit, while others are blurry or poorly framed. The dataset contains a mix of close-up shots and full-body shots of both cats and dogs. The dataset contains a mix of different breeds of cats and dogs, with varying fur lengths, colors, and patterns.

Cats vs. Dogs features - Face: - Cats generally have shorter, more rounded faces, often with triangular ears and pointed noses. - Dogs generally have longer snouts and a greater diversity in ear shapes. - Ears: - Cats ears are typically upright and pointed. - Dogs ears vary widely in shape and position, from erect to floppy, and they often have a different positioning on the head compared to cats. - Eyes: - Cats have generally more sharper-shaped eyes. - Dogs have rounder eyes. - Tail: - Cats have long, flexible tails, often held upright or curled. - Dogs' tails vary greatly in length and shape, often held in different positions. - Body Structure: - Cats are generally lean, with flexible, agile bodies. - Dogs come in a range of body types, from muscular to slender. - Fur and Markings: - Cats fur are often softer, finer, and smoother. - Dogs often are coarser.

3 Data Augmentation

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4 Model

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5 Training and Tuning

6 Results

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7 Pretrained model

8 Discussion

9 Conclusion

9.1 Individual Contributions

A Code

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B Notebook

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References