Machine Learning Refined	Spring 2025
Topic: Introduction — 2/28 2025	
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1 Overview

There are four main categories of concepts in the book.

- Predictive learning: The goal is to predict a continuous and valued phenomenon (this can also be a form of distinguishing of different objects)
- Feature Design: Using tools and techniques to make more successful predictive models
- Function approximation: The goal is to approximate a function that is not known (implying there is little to learn from the proper features themselves)
- Numerical Optimization - powering the first three and makes machine learning run

1.1 Toy Example: Cats and Dogs

Problem 0. What is the goal and solution of the Cats and Dogs problem?

Answer to Problem 0. The goal is to be able to correctly distinguish between cats and dogs given new pictures and new samples of data.

Solution to Problem 0. Find features that differentiate between cats and dogs (numerical) and divide them with a line

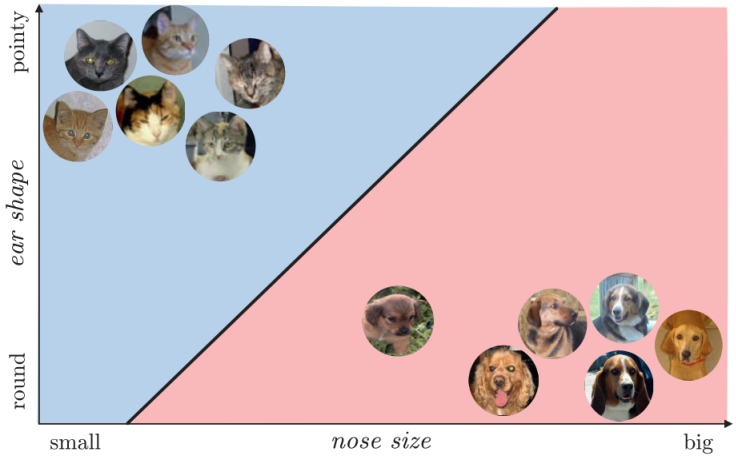

Figure 1: An example of cats and dogs

1.2 Classication:

Similar to regression, the key difference between the two is instead of prediction of a continuous valued output classification aims to predict values to take on discrete values or classes.

References

[1] Jeremy Wattós, Reza Borhanié Aggelos K. Katsaggelos, *Machine Learning Refined: Foundations, Algorithms, and Applications*, Northwestern University.