

First Principles of ML

A Peek Inside the 'Black Box' of Machine Learning

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The Wellcome Sanger Institute, Hinxton, UK
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- ▶ (Explainability!)

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As we progress you will slowly build up your own ML toolkit, built entirely from scratch!

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You will need to know what they mean!

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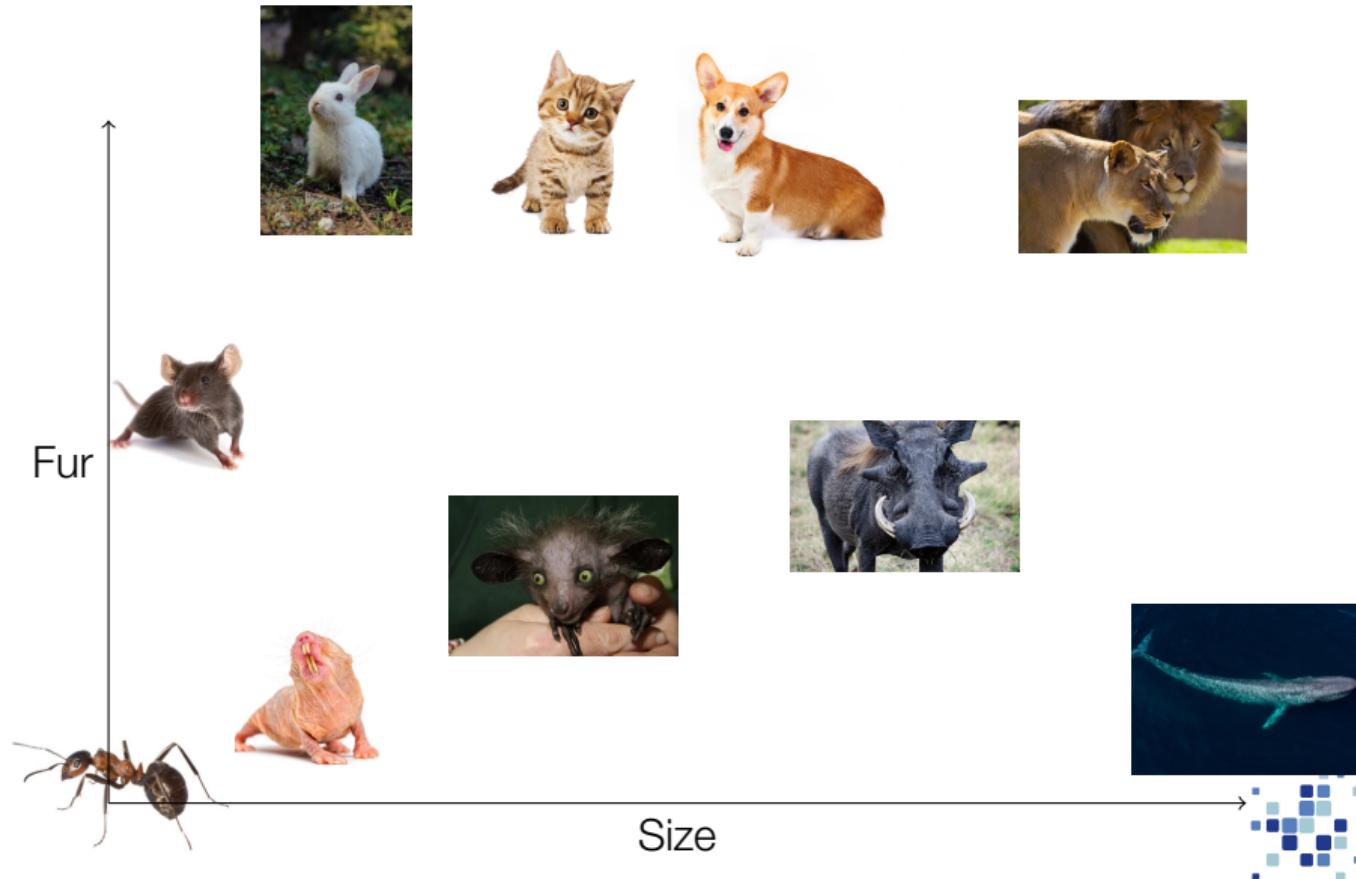
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*Please, please, please, ask if you want clarification on the underlying mathematics
and theory! That's why you're here today!*

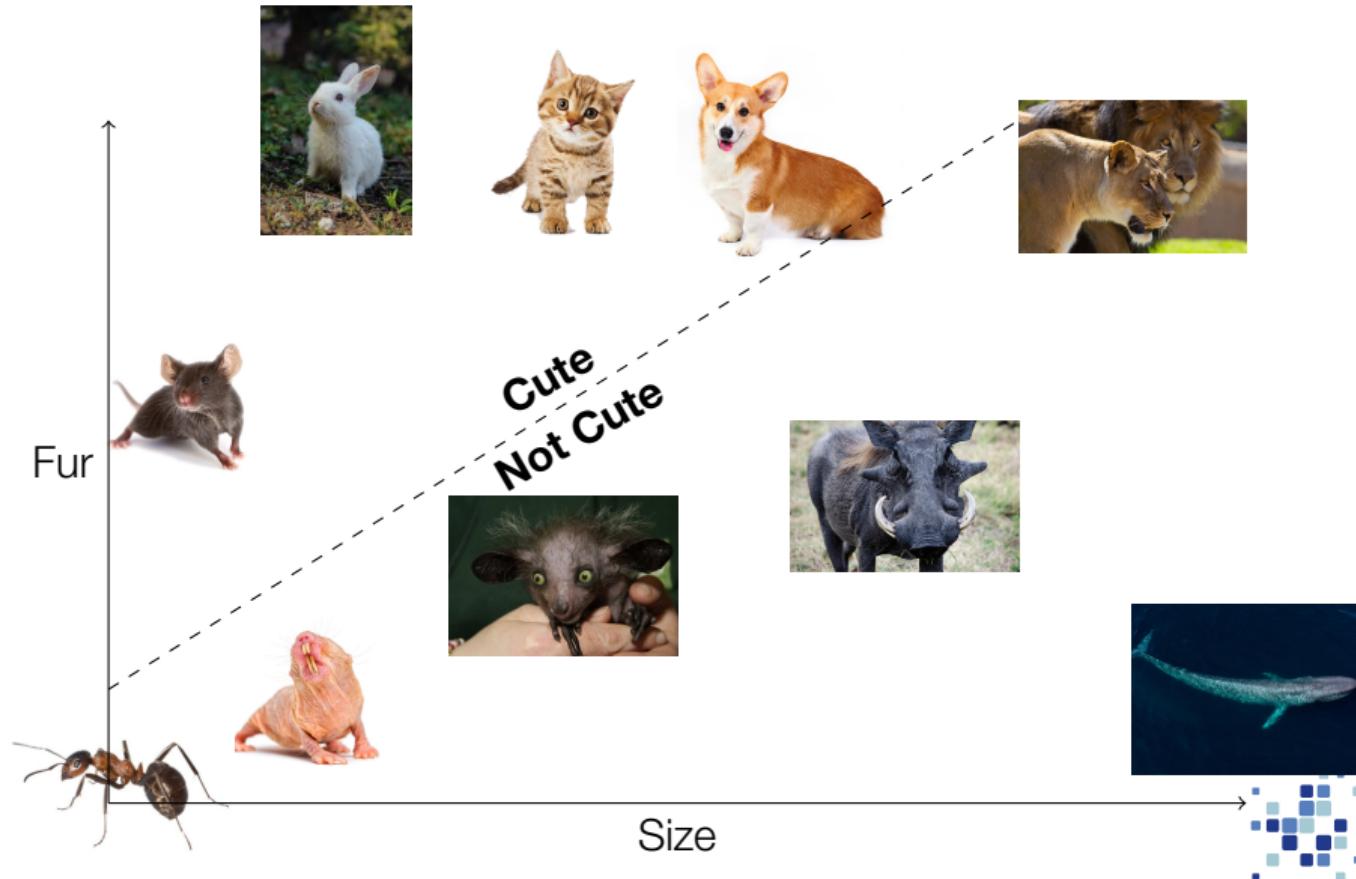
Part 1

The Perceptron

Basic Decision Making: Defining Cuteness



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Question: Why then do we need $N + 1$ dimensions?

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We need 3 parameters to define a **directional line**. The Perceptron classifier algorithm is:

$$P(\mathbf{x}) = \begin{cases} 1 & \text{if } \tilde{\mathbf{x}} \cdot \mathbf{w}^1 > 0 \\ 0 & \text{else} \end{cases} \quad (1)$$

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\mathbf{w} our the **weights**.

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Exercise 1: Perceptron Classifier