Curse of Dimsensionality

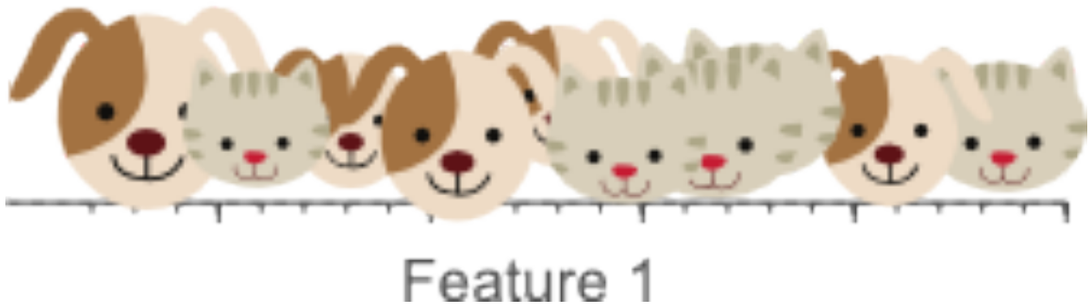
Or the mysteries of highly-dimensional spaces

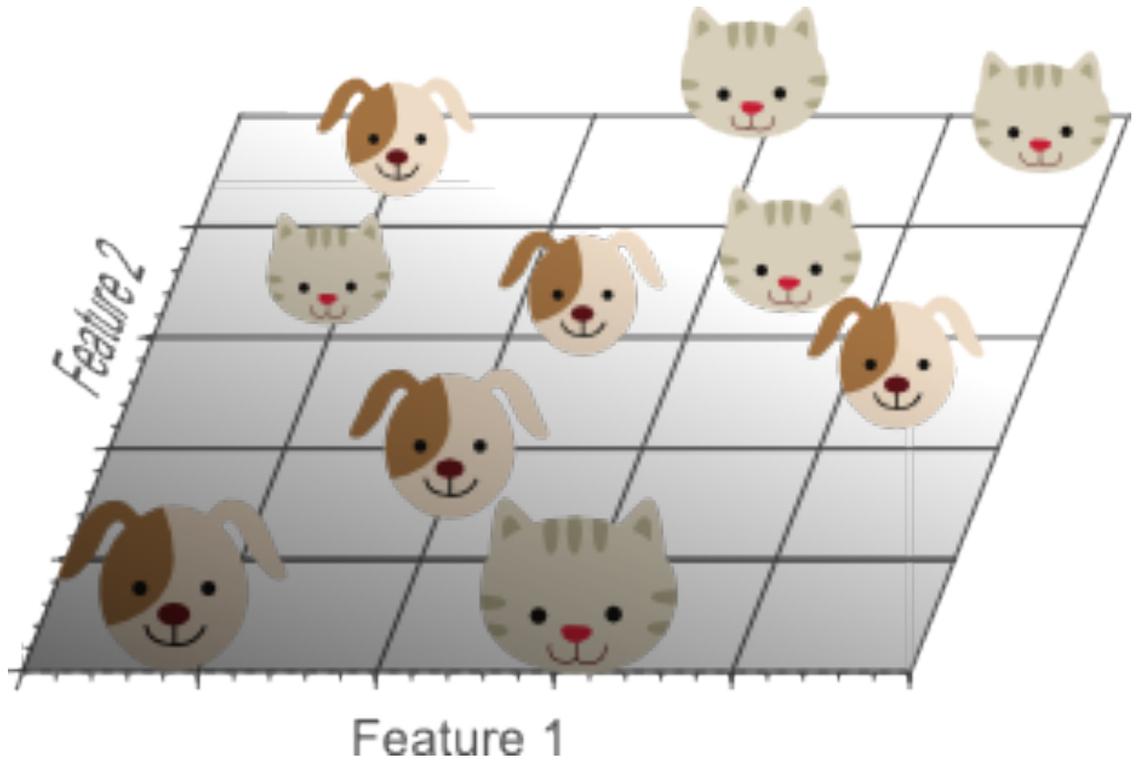
Mauricio Araya

https://www.visiondummy.com/2014/04/curse-dimensionality-affect-classification/

Cats and Dogs

The good thing





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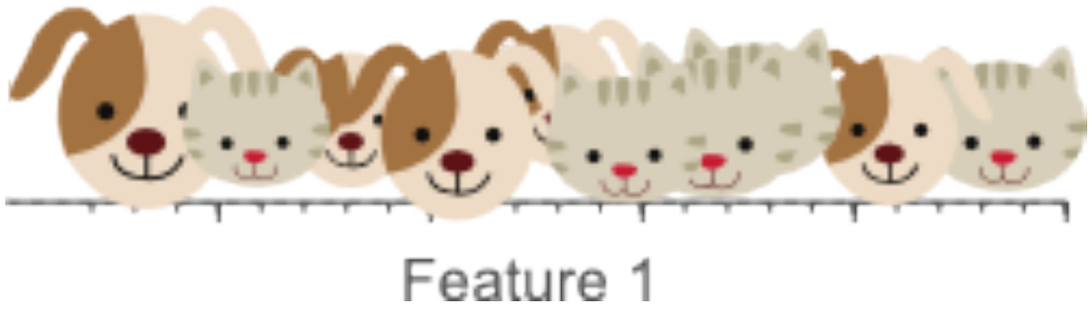

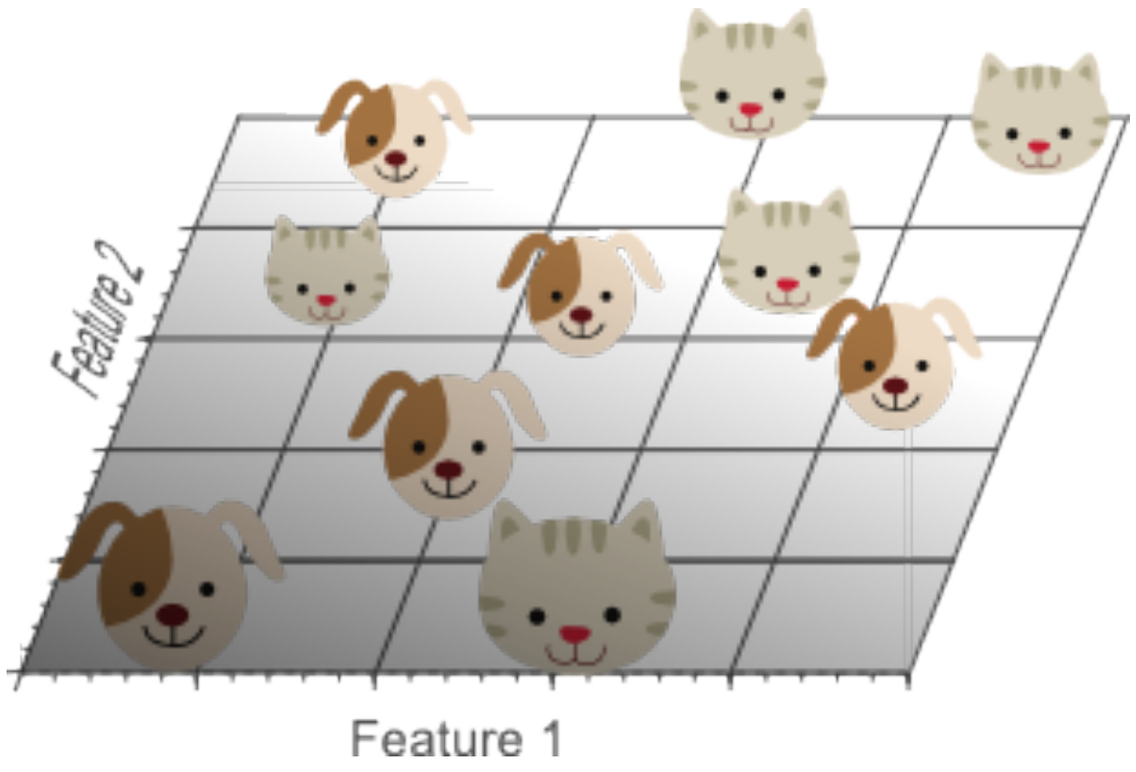

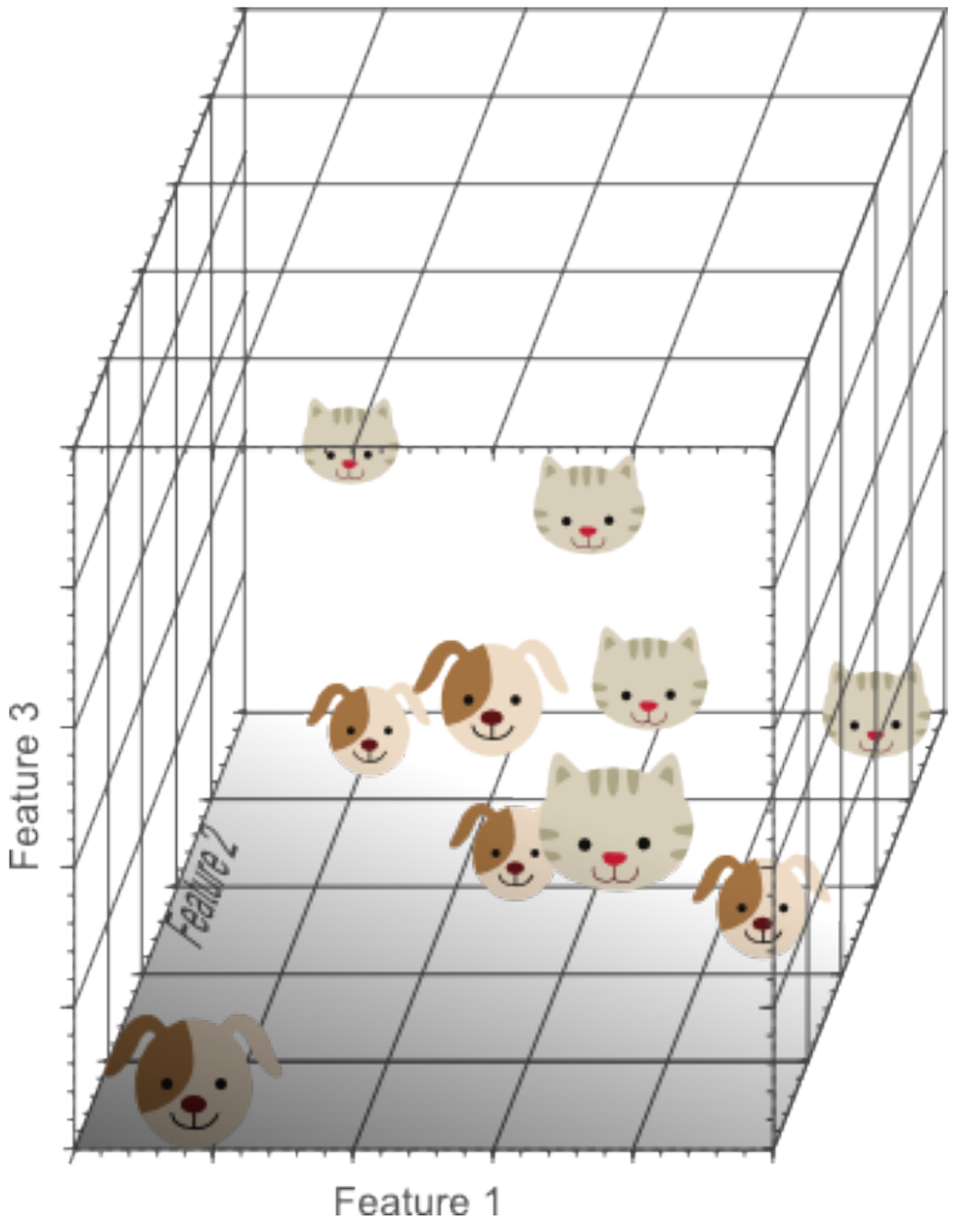

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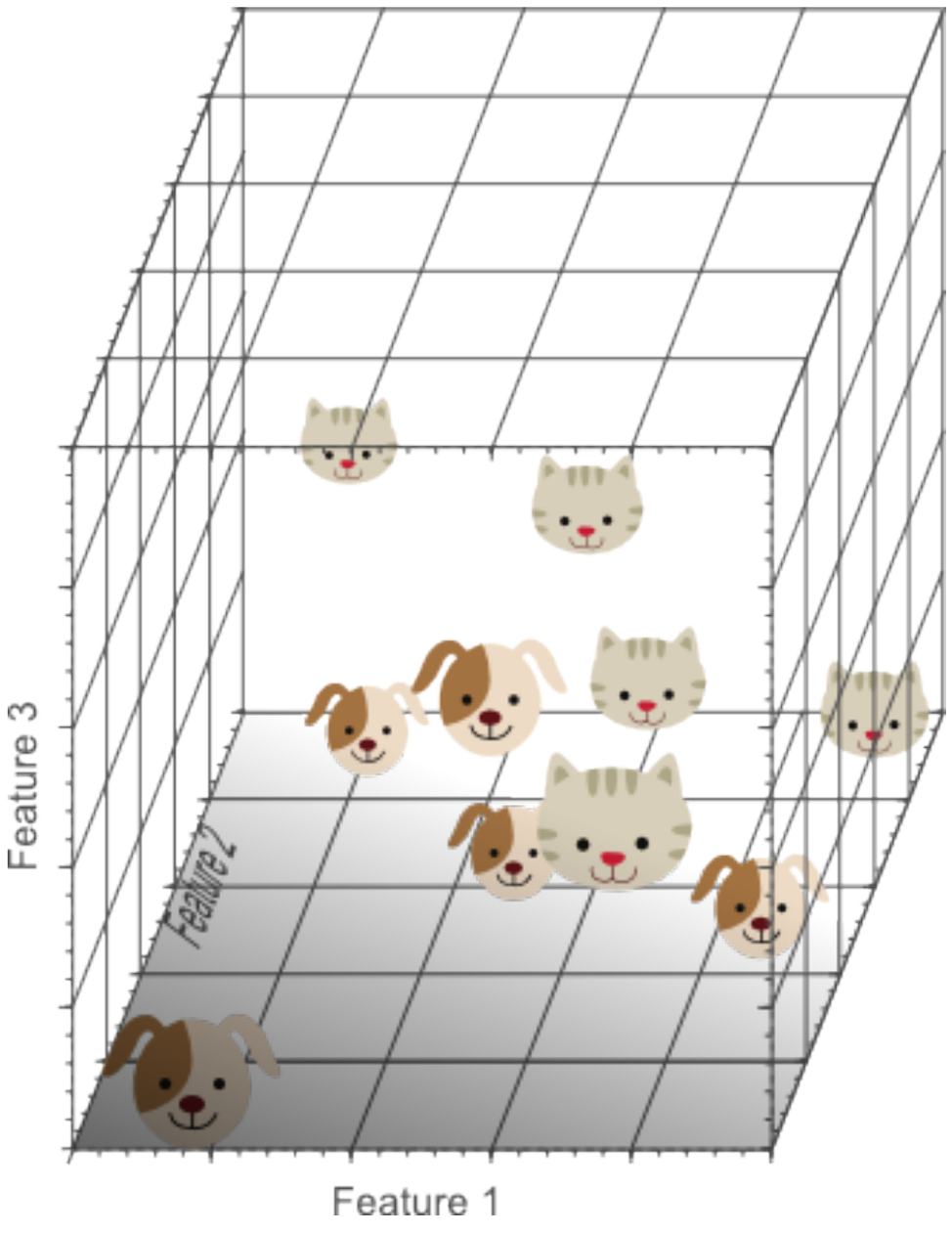

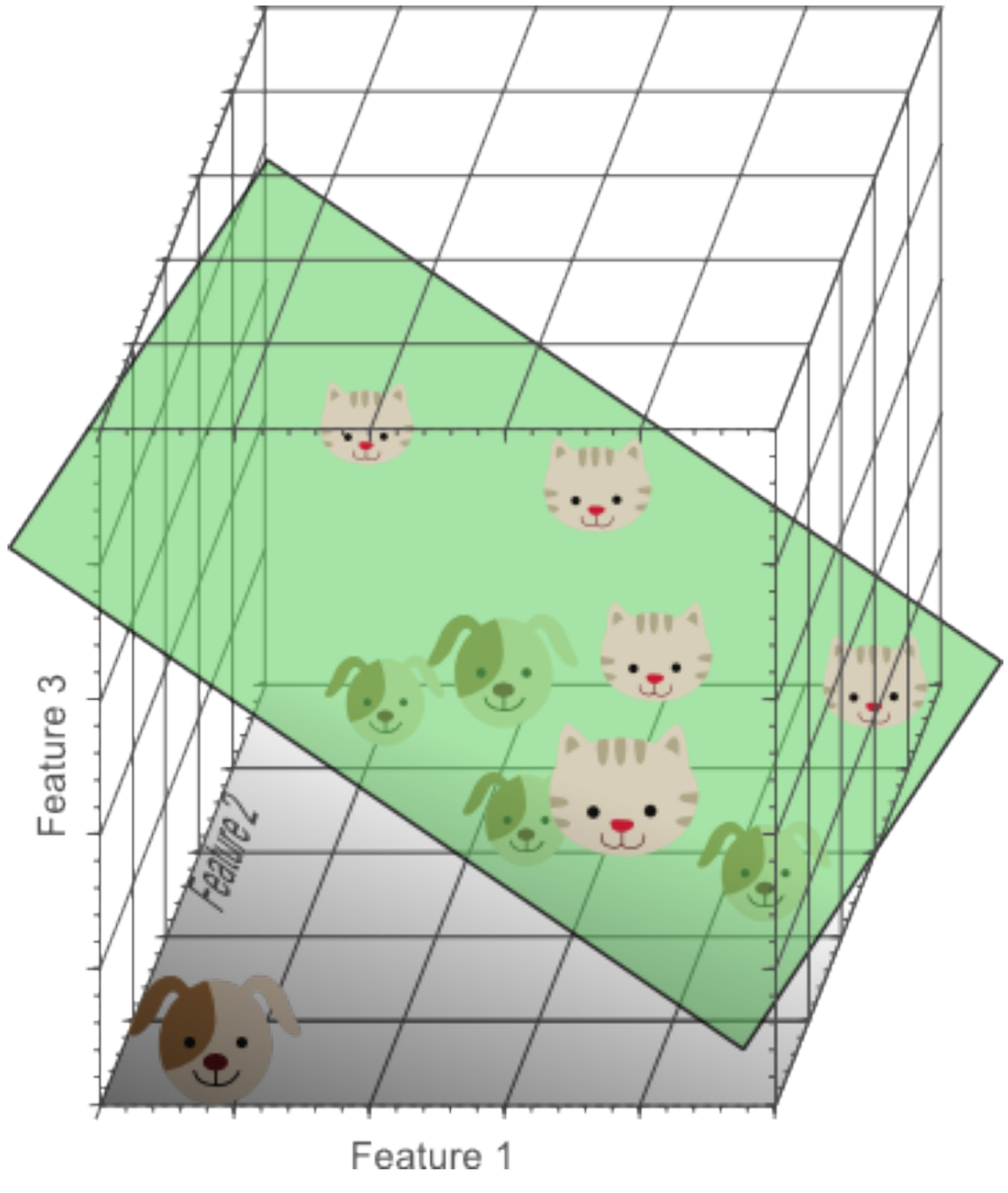

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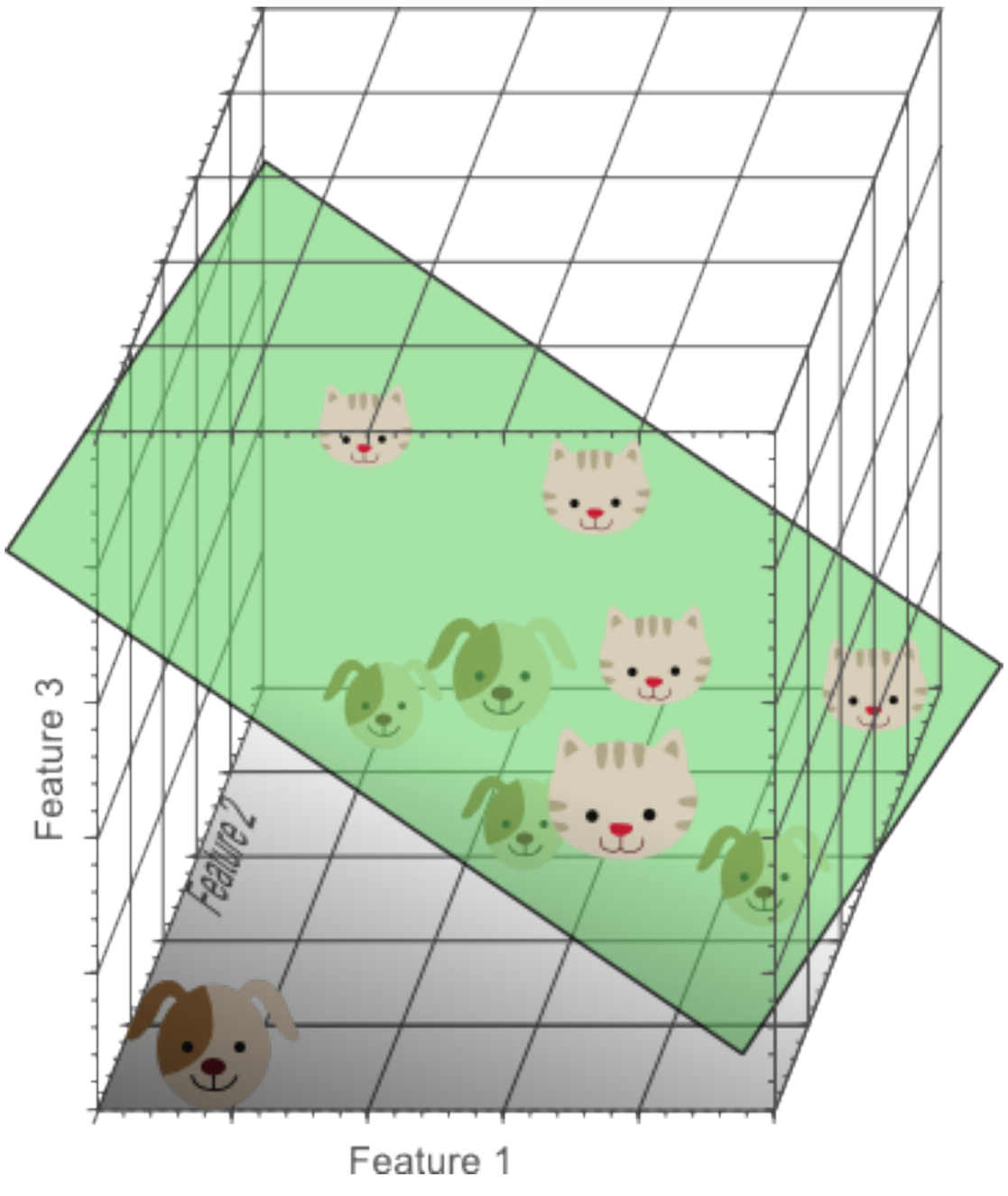
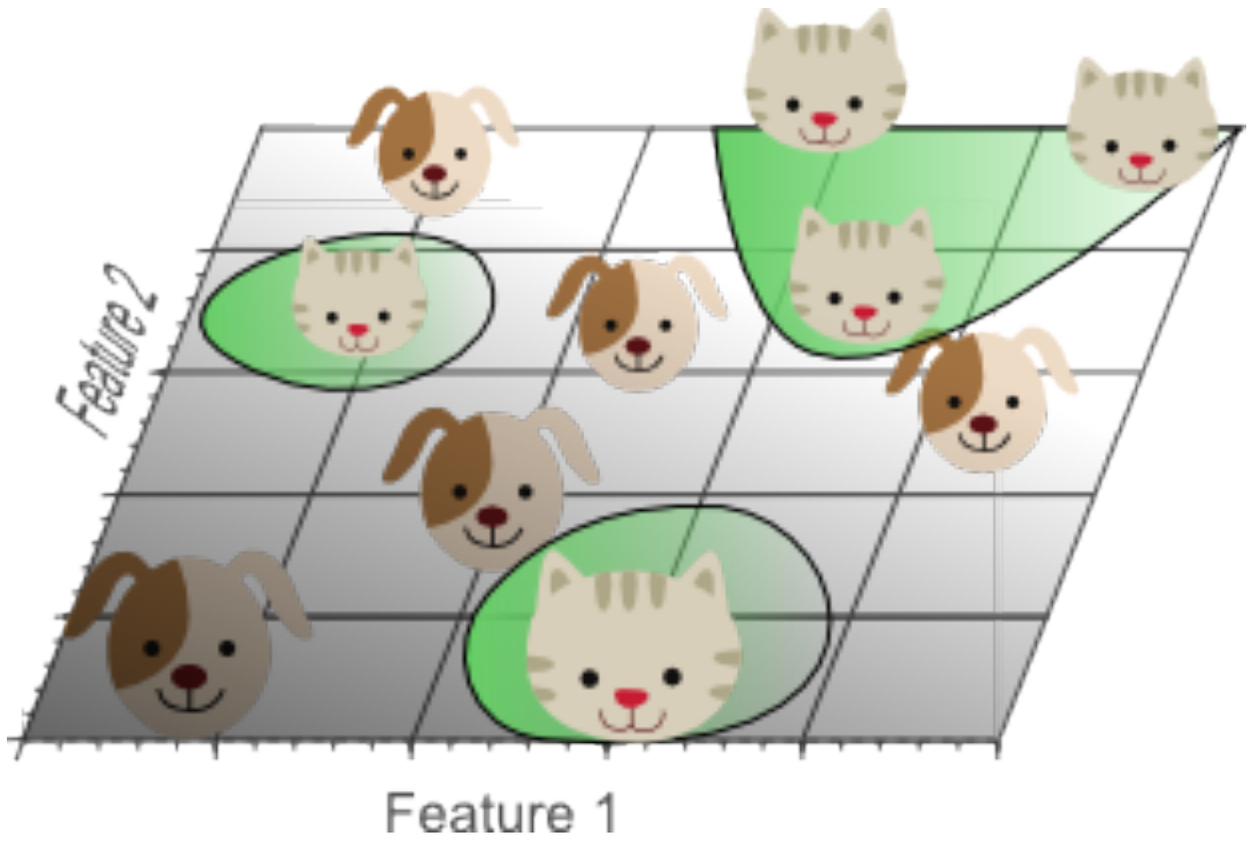
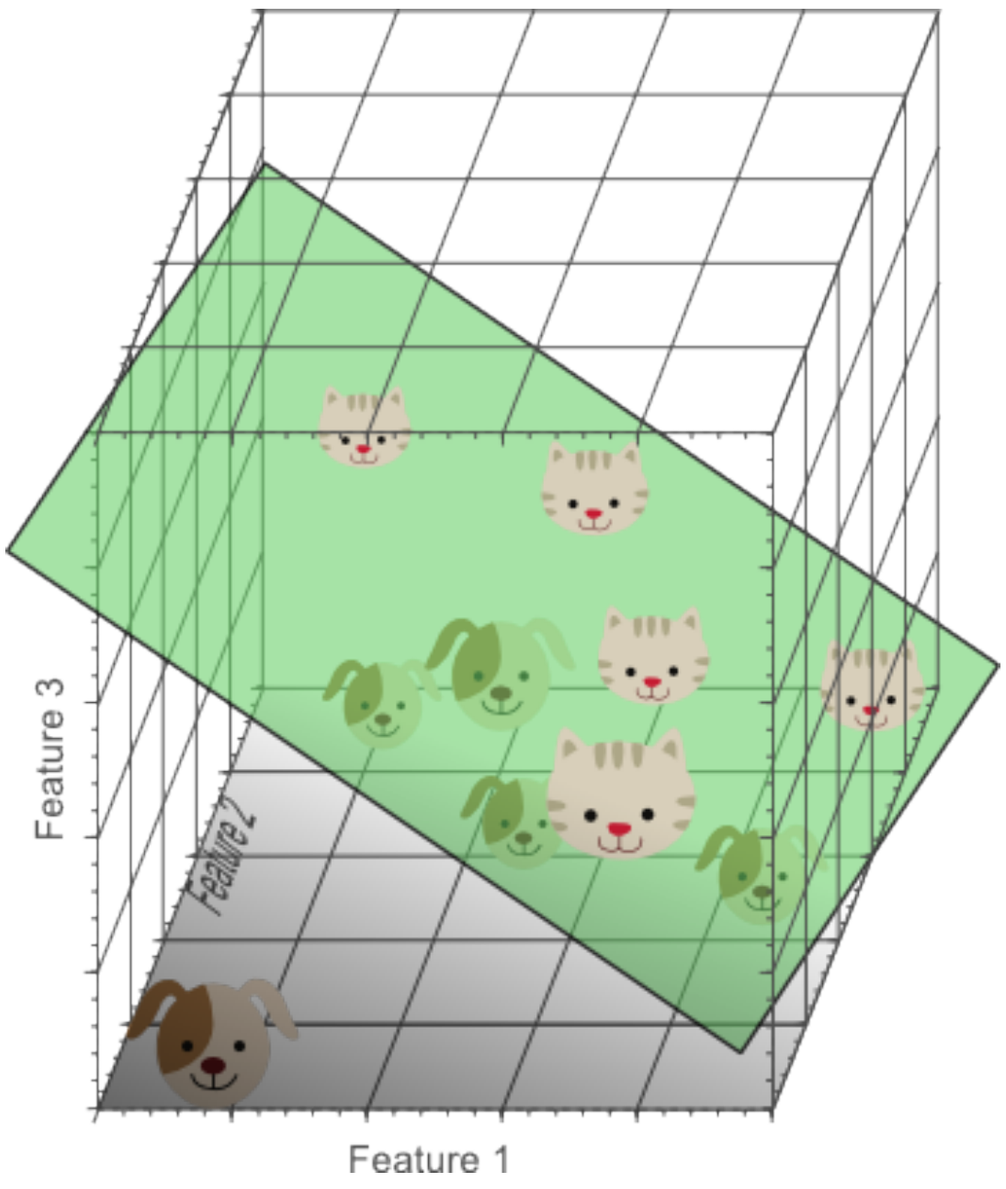
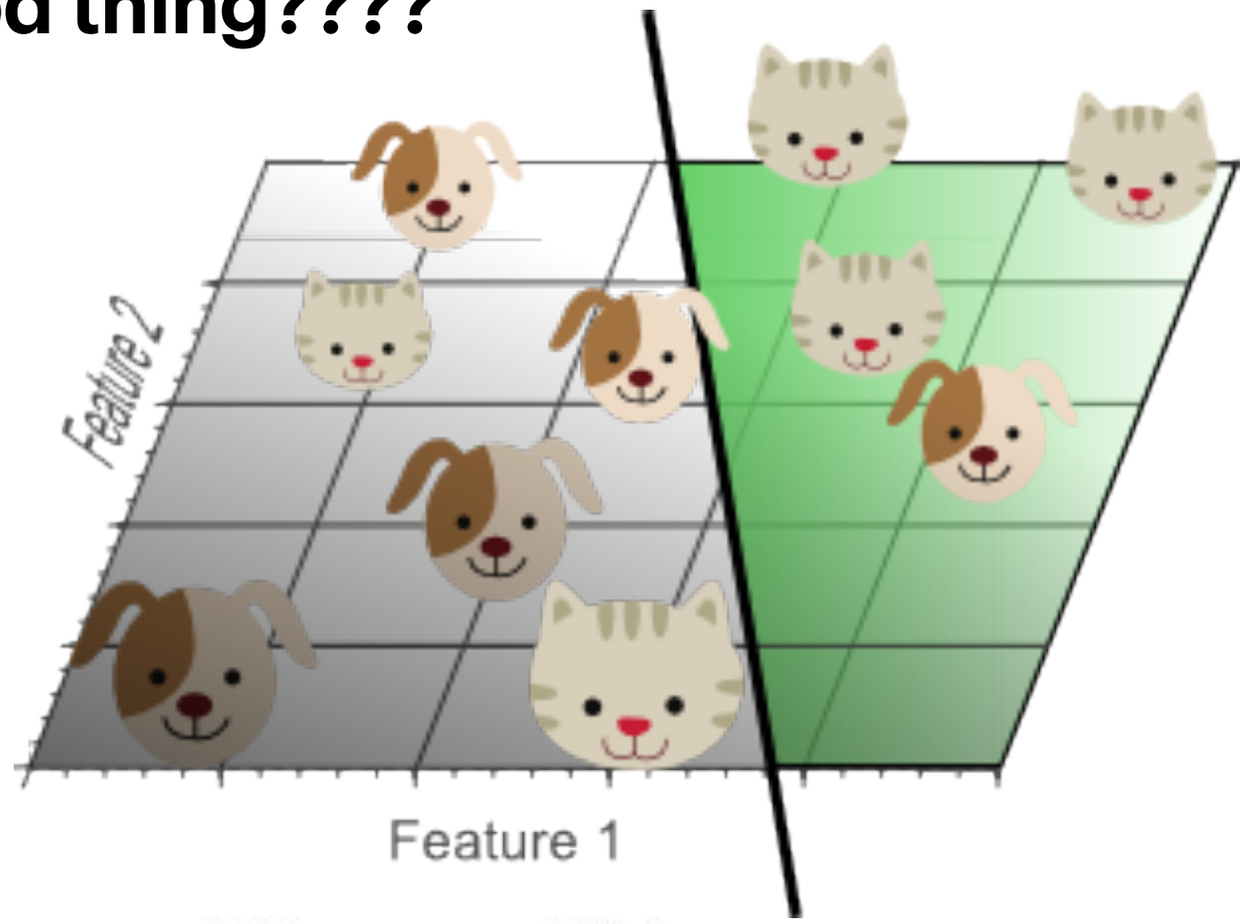


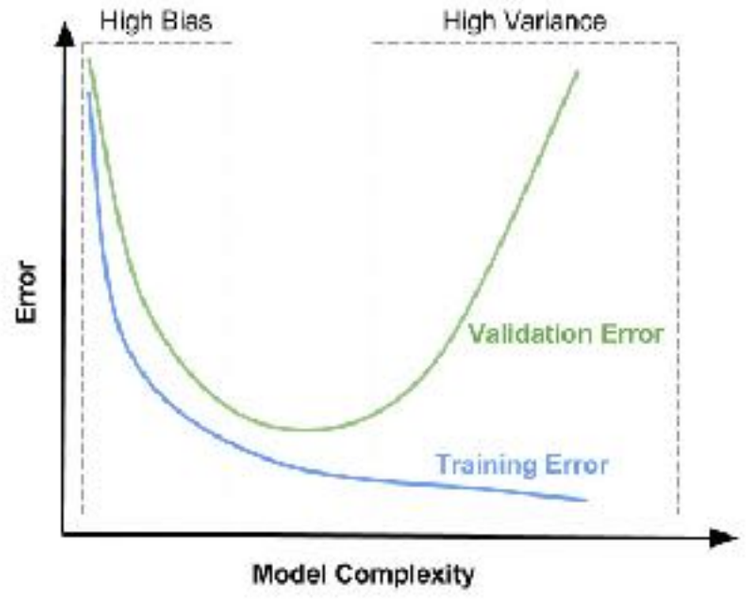


Cats and Dogs

The good thing????

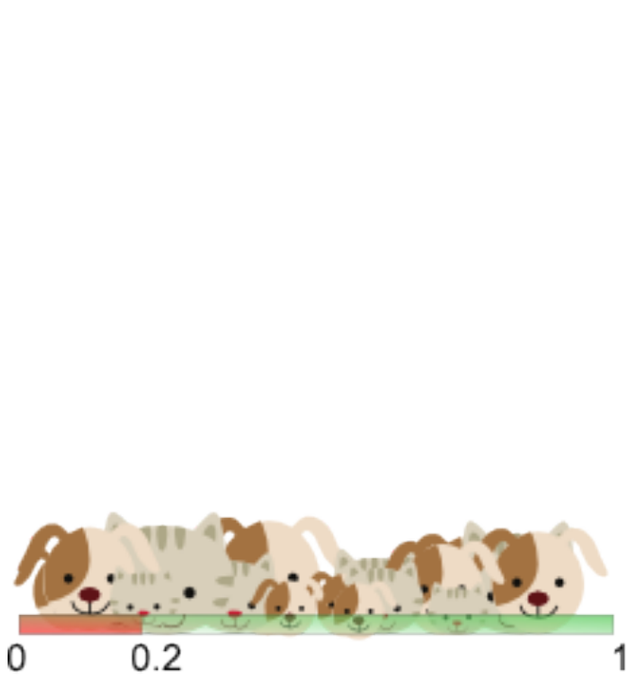


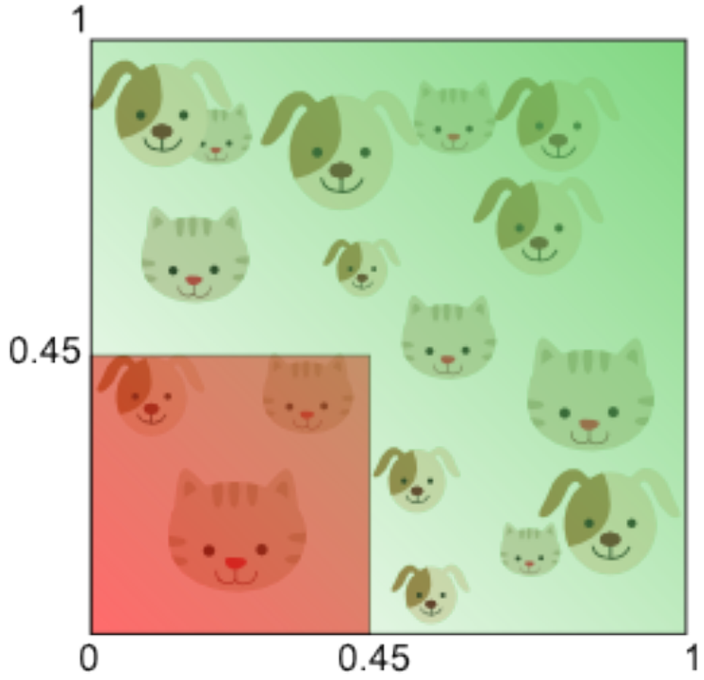


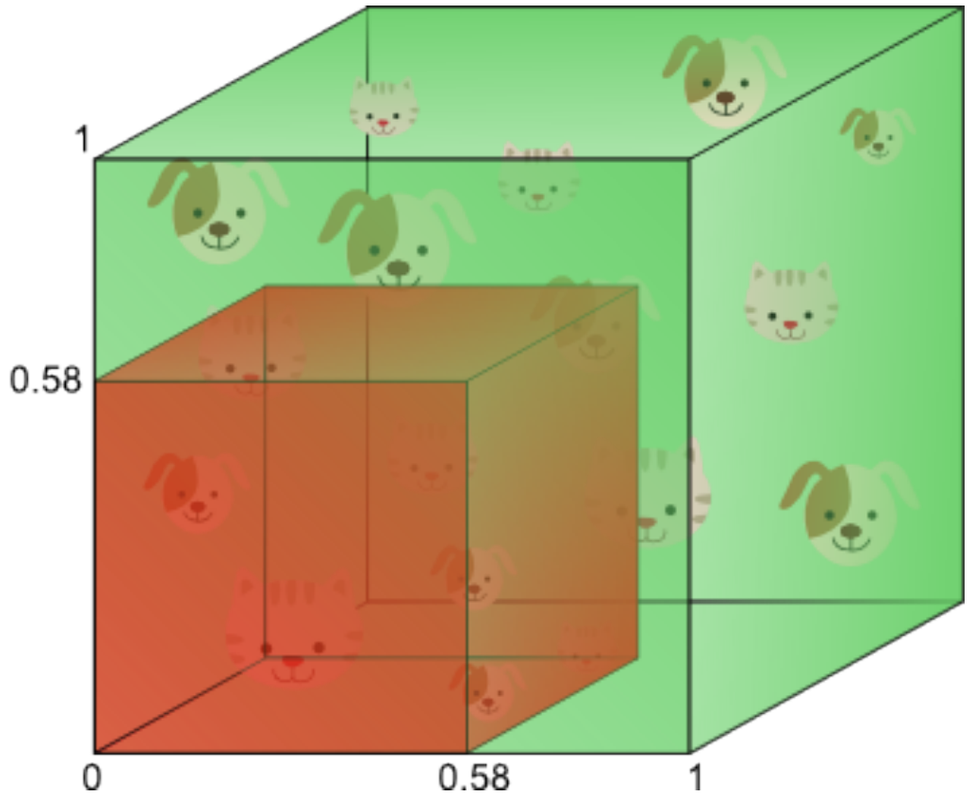


Cats and Dogs

The 20% is the 60% of features in 3D

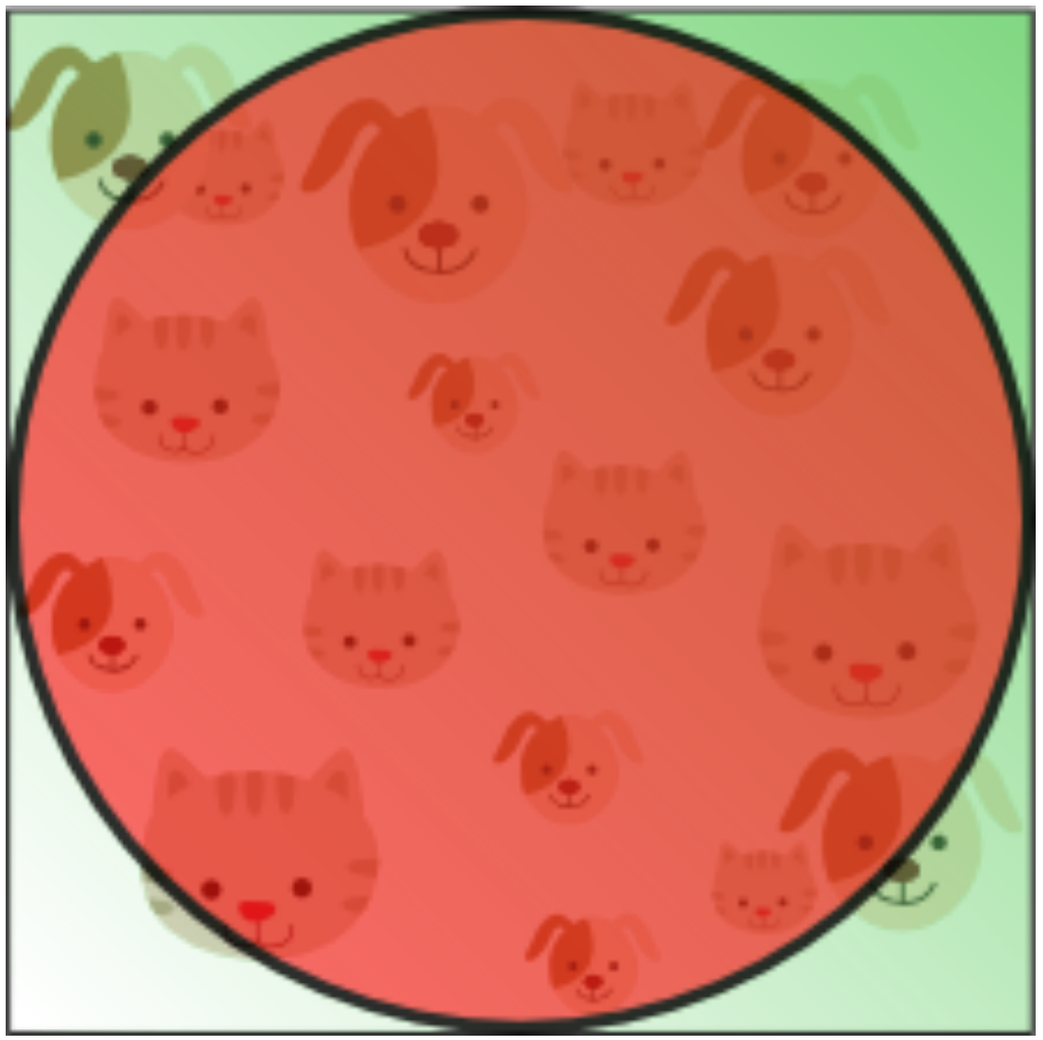






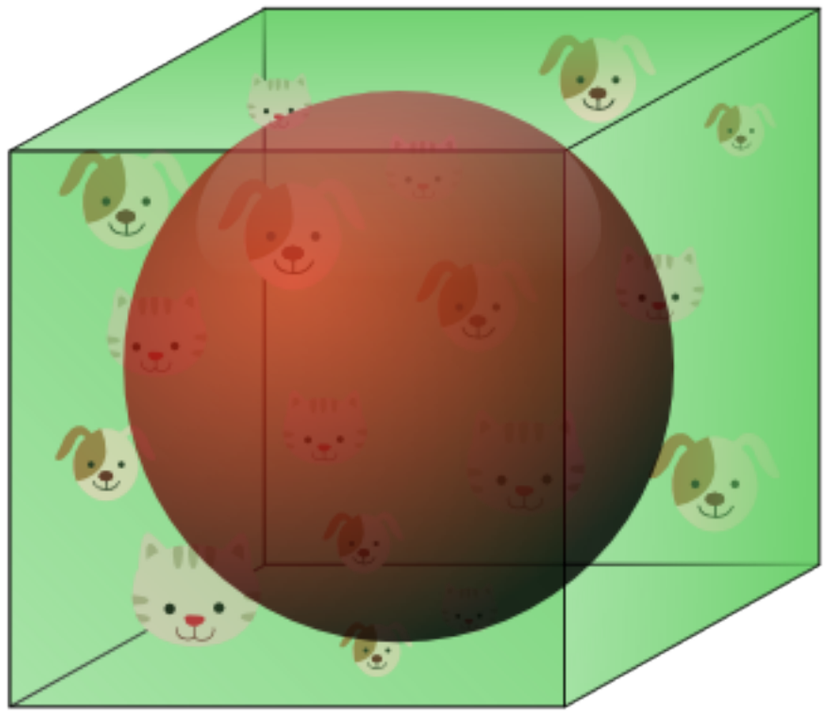
Cats and Dogs

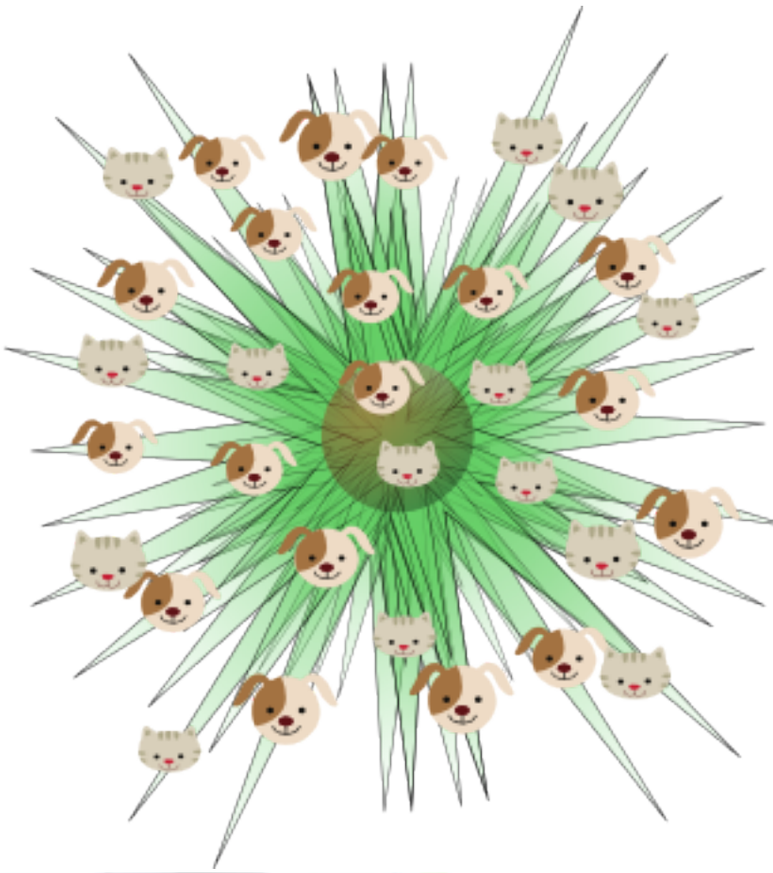
Circle in a Square

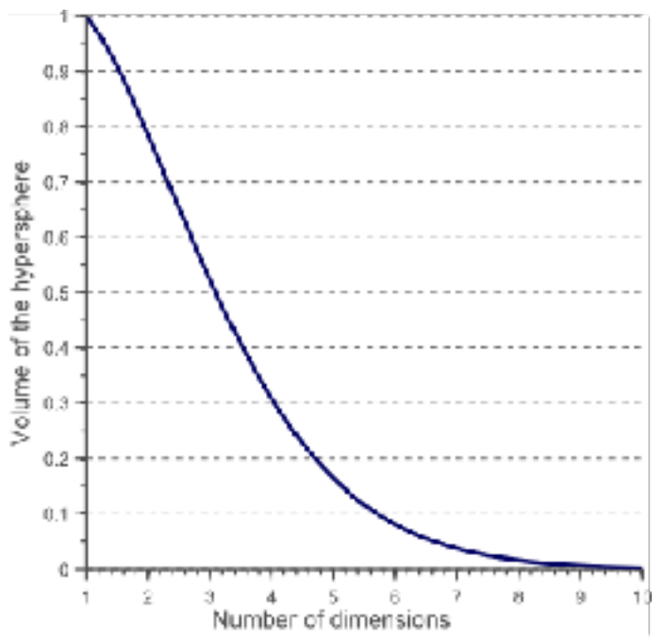


Cats and Dogs

Hypersphere in a Hypercube







« Gaussian egg »

$X = (X_1,....,X_M) \quad X_i \sim N(0,1)$

estimation for $P(X \approx (r,....,r)^T)$

$$E(r^2) = \frac{1}{M} M = 1 \qquad V(r^2) = \frac{2M}{M^2} = \frac{2}{M}$$