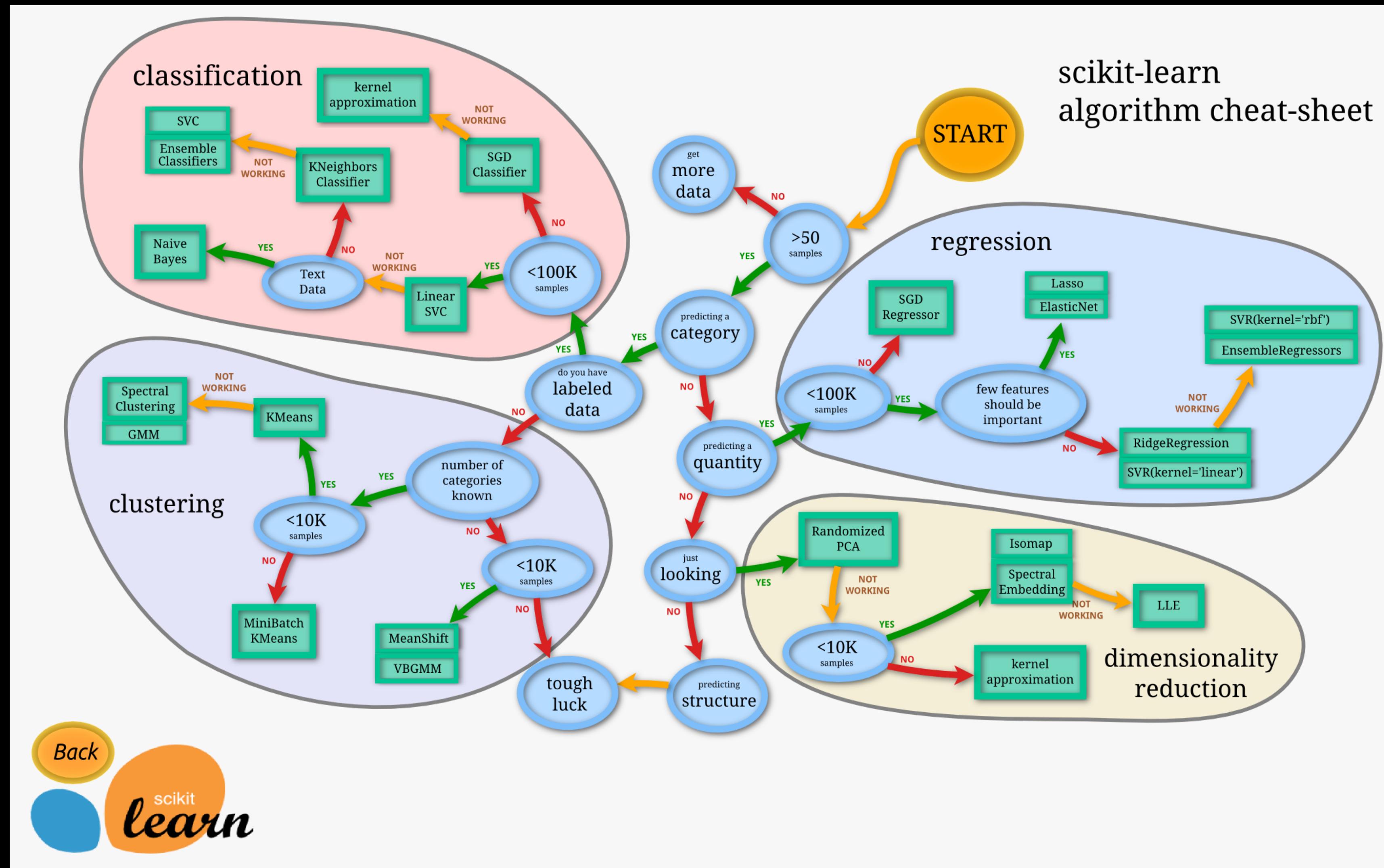


Unsupervised Learning Dimensionality Reduction – Feature Selection

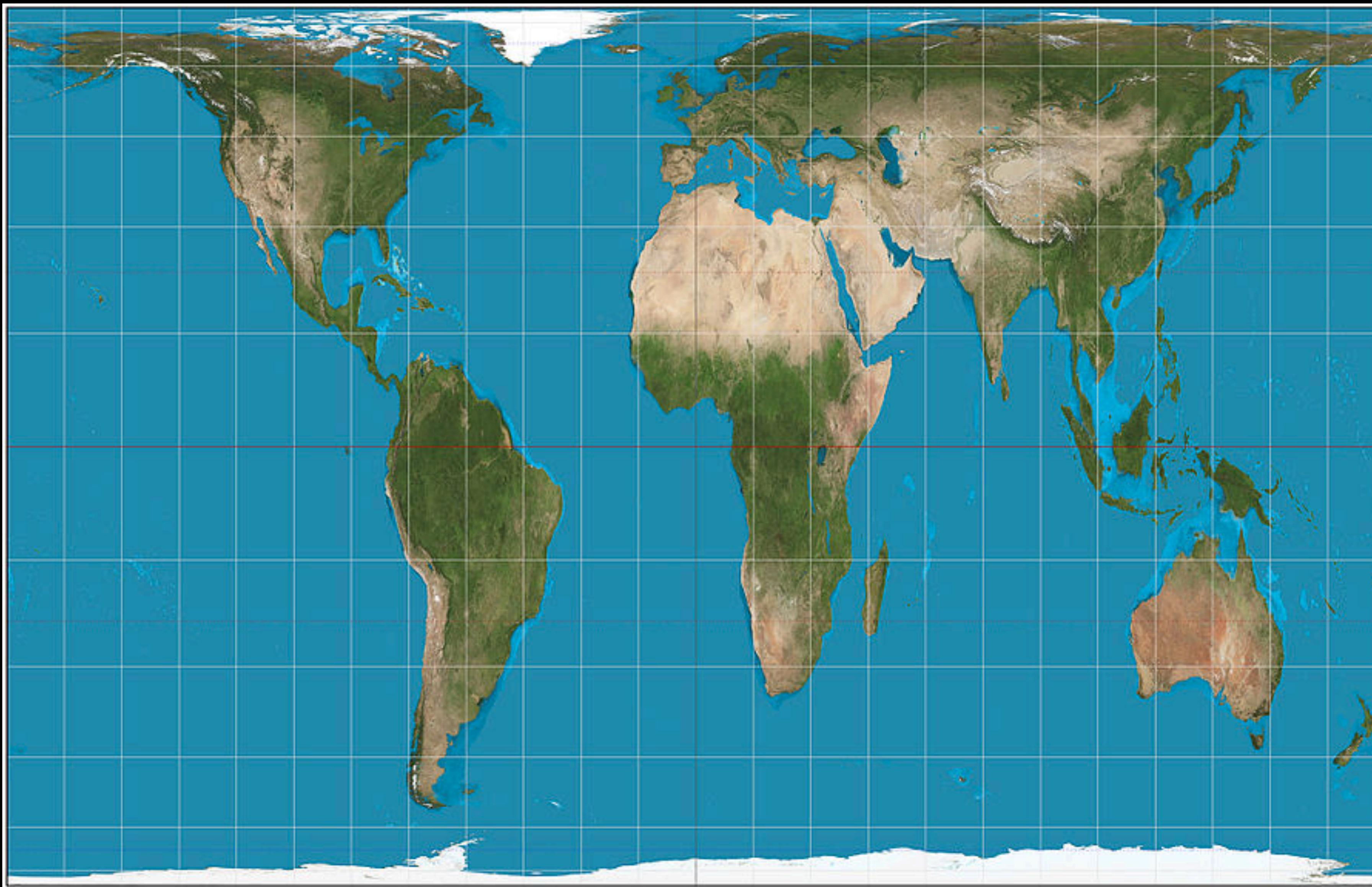


X-Ed
Demian Wassermann
Inria, France

Where are we in the Data Science Landscape?



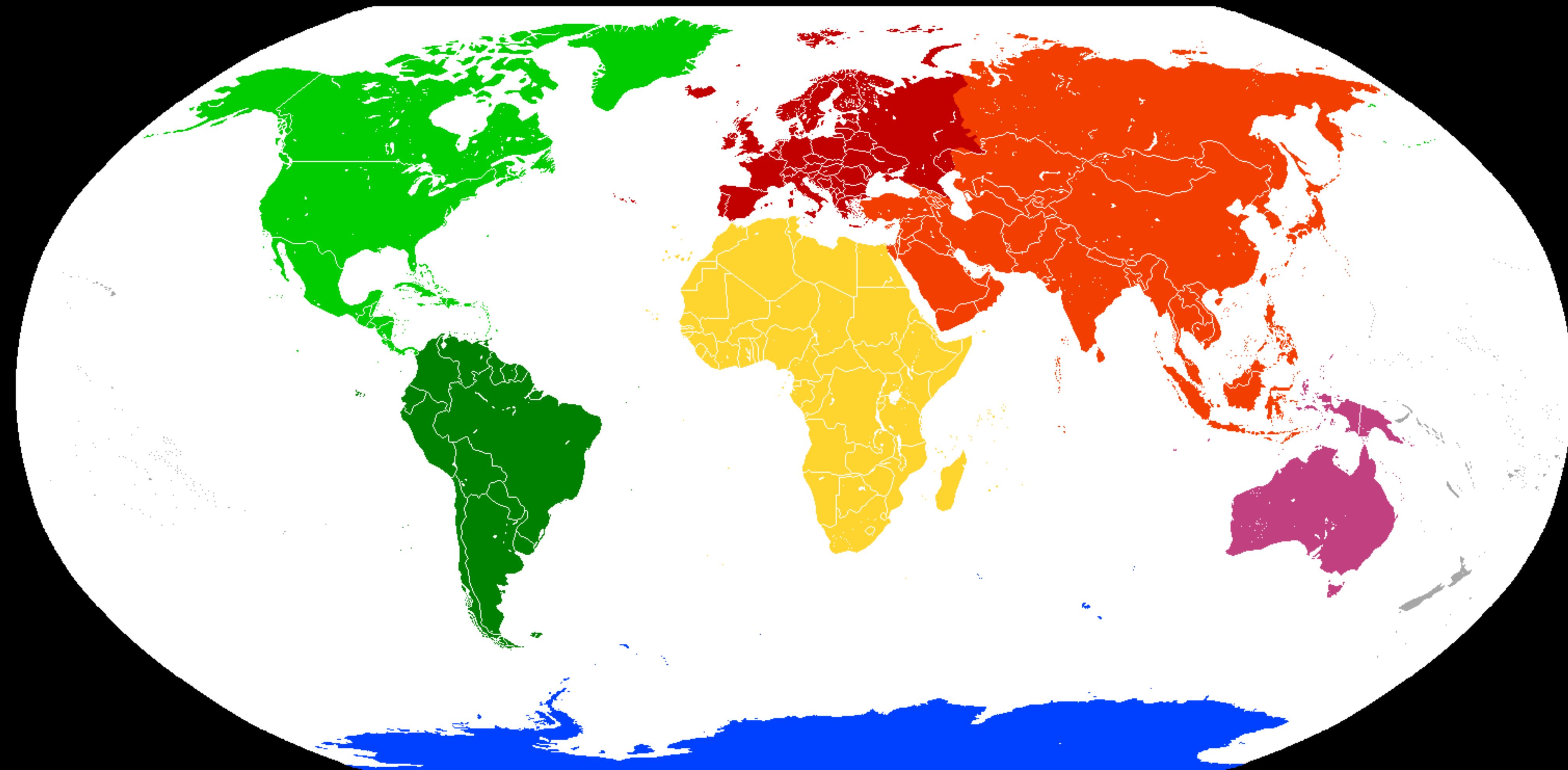
Motivating Example



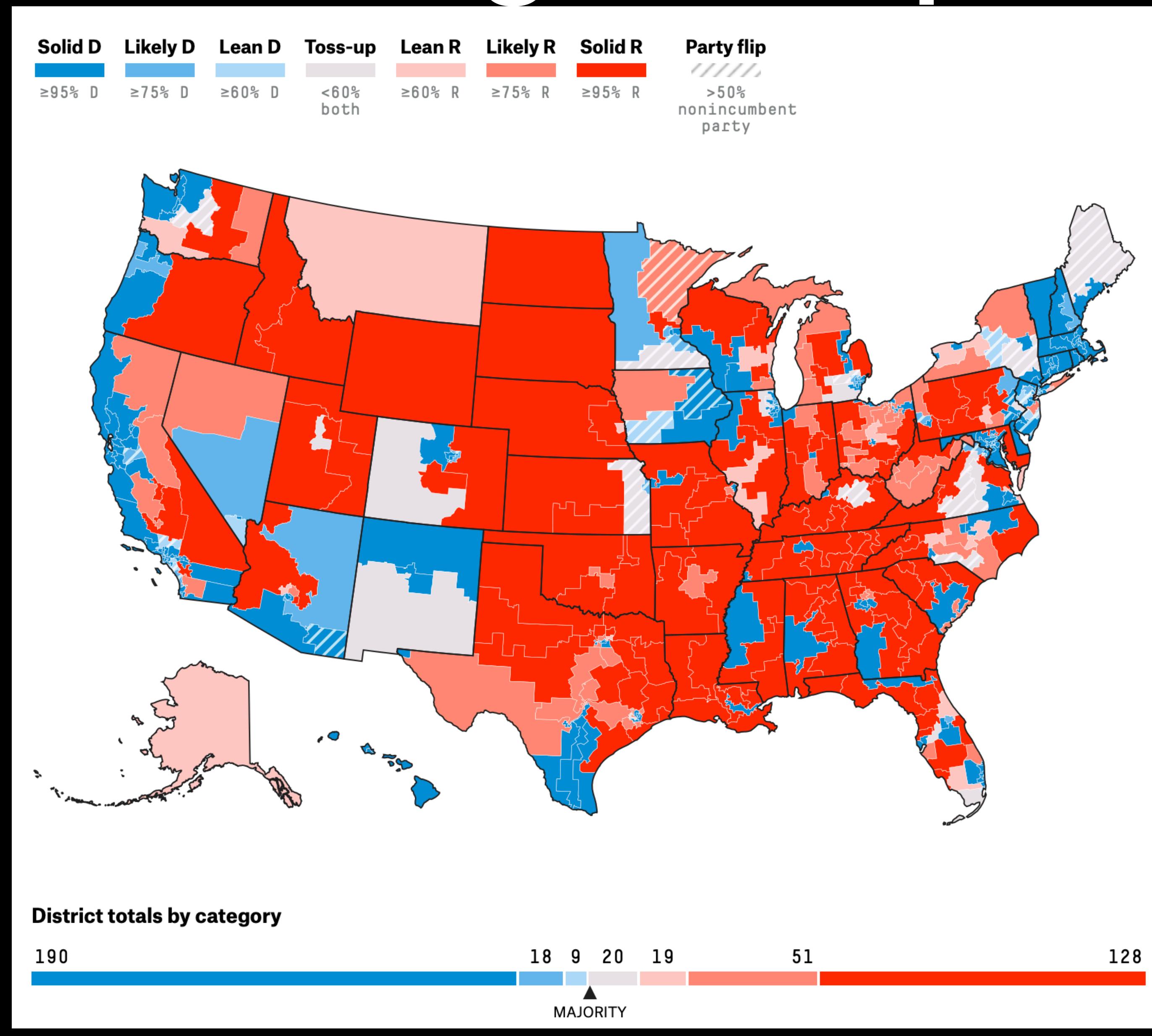
Motivating Example



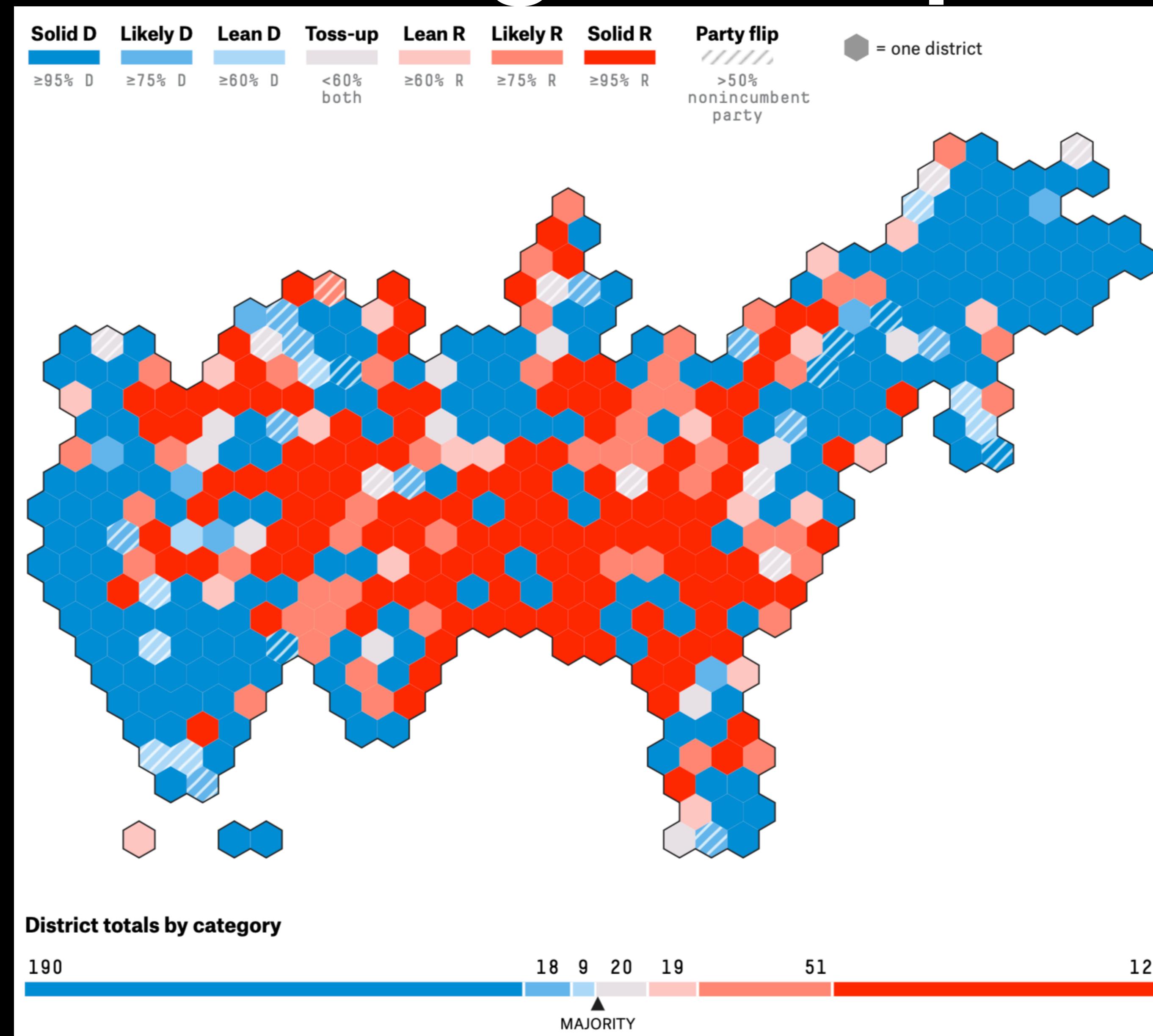
Motivating Example



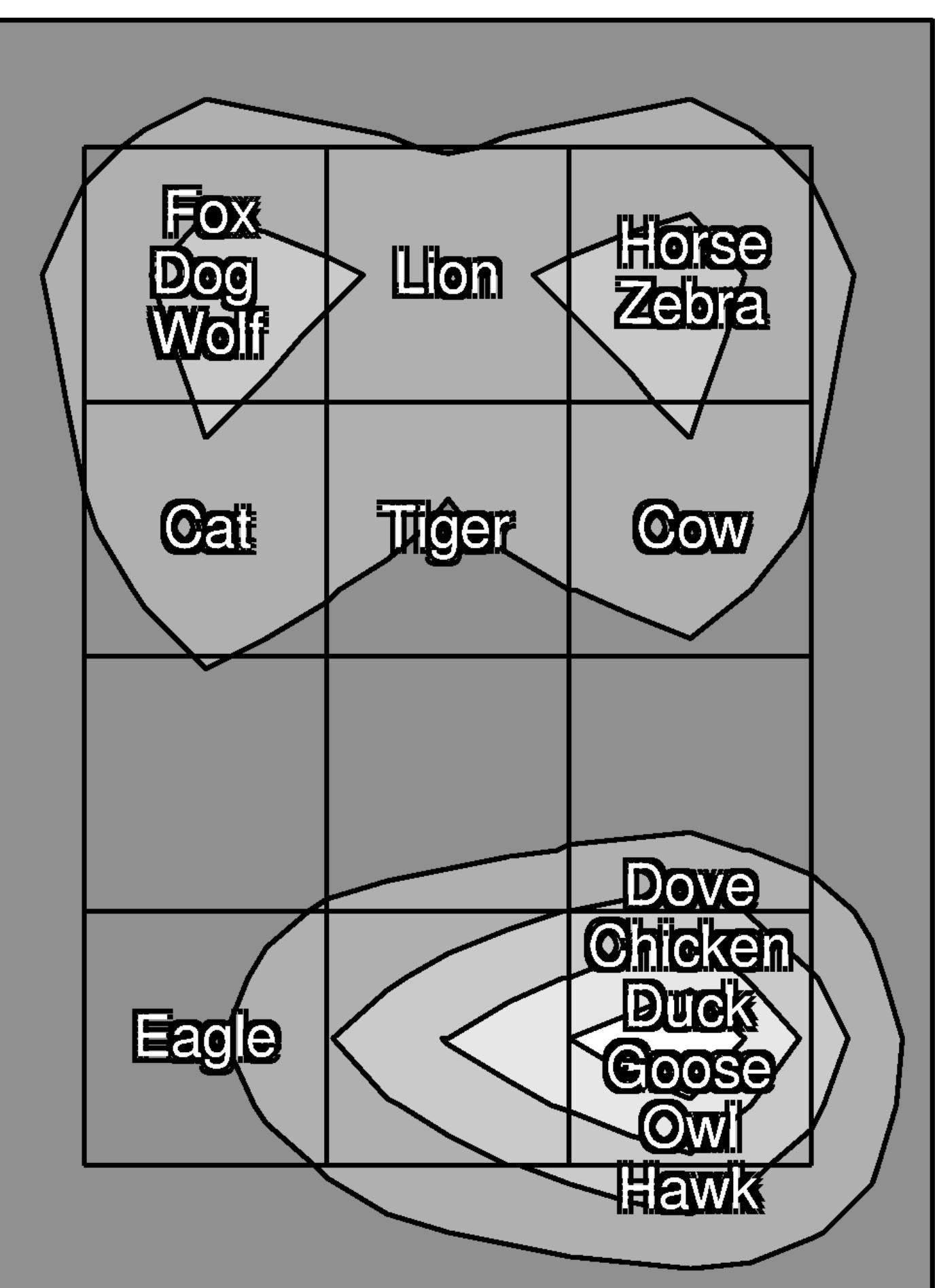
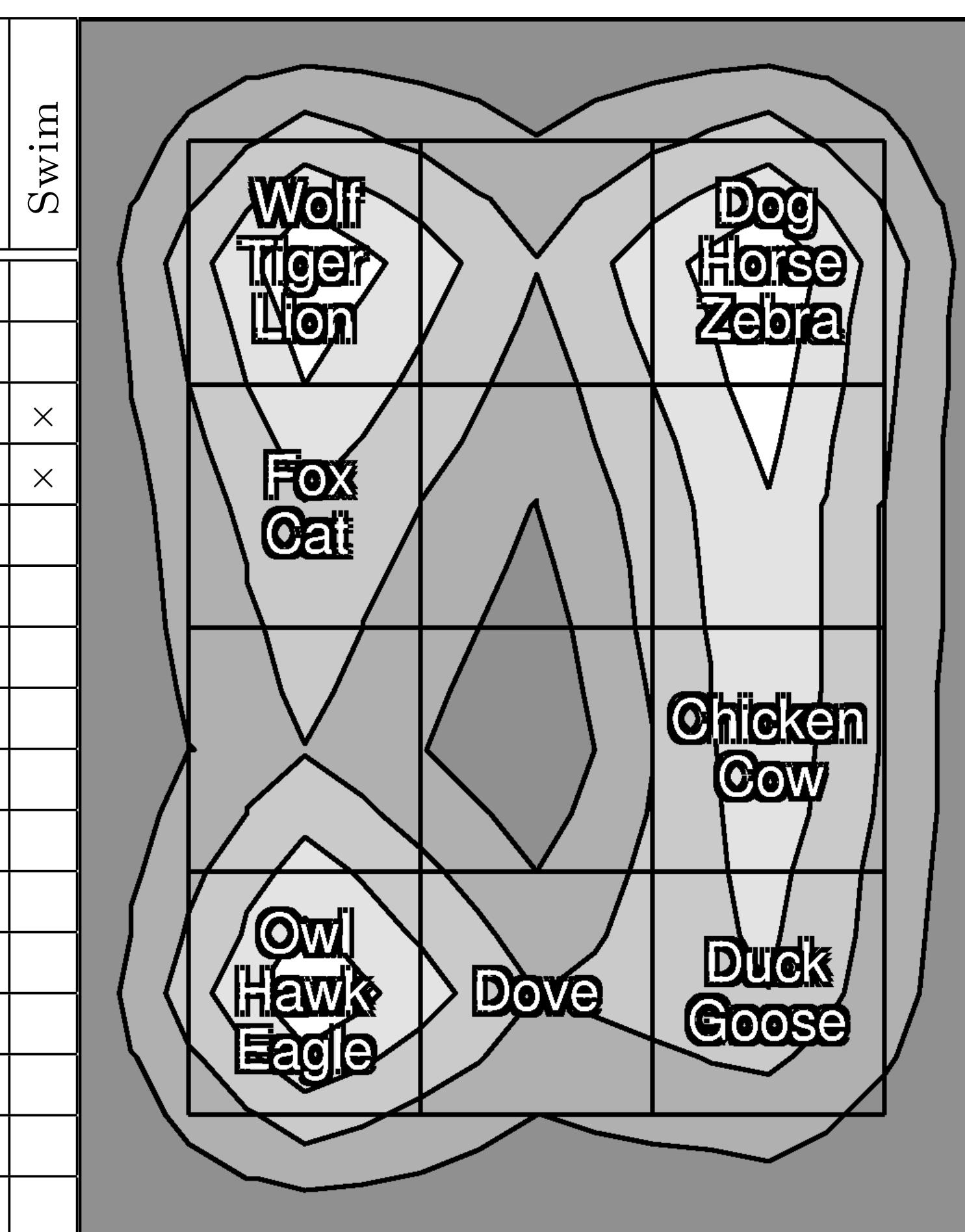
Motivating Example



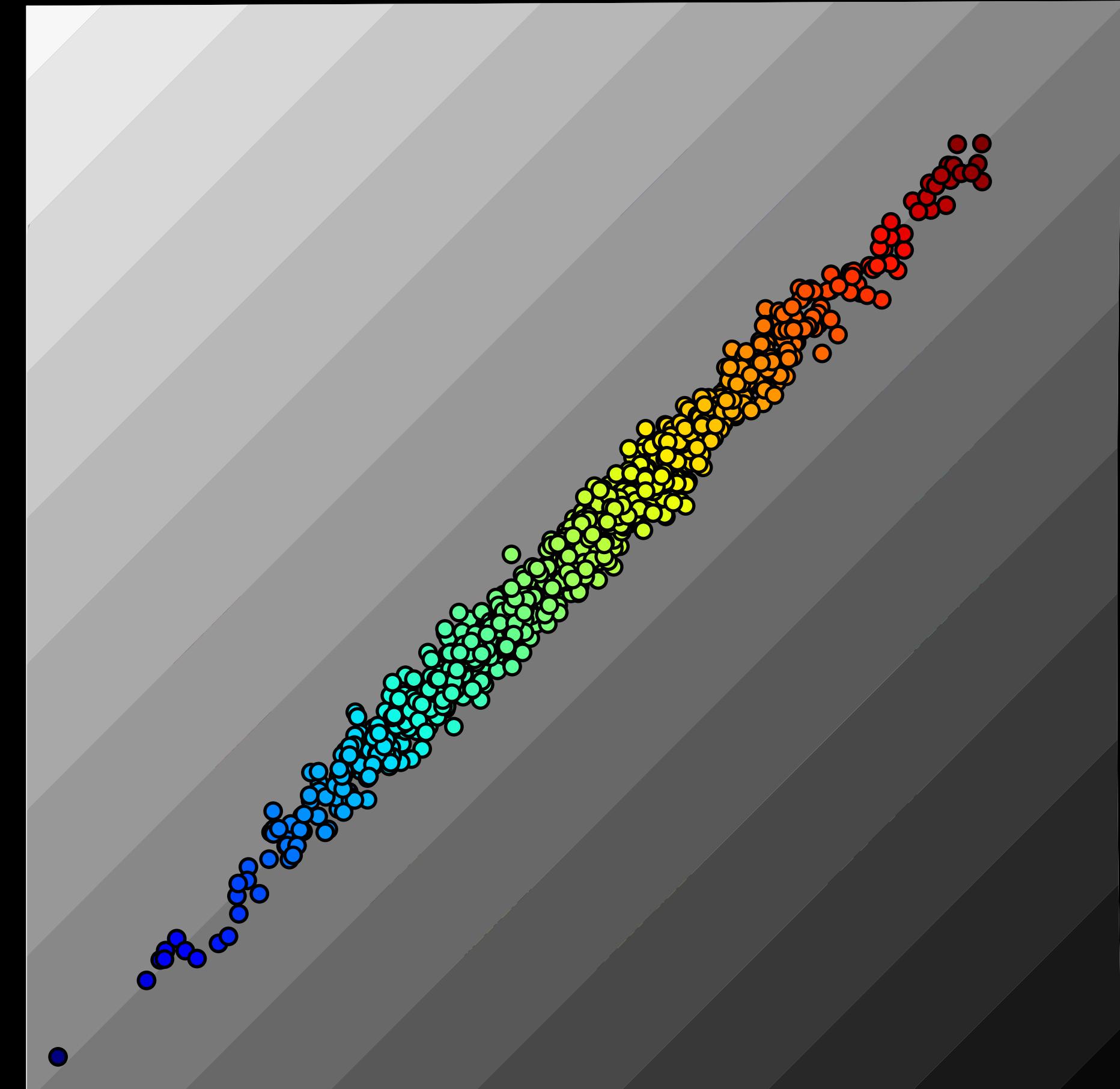
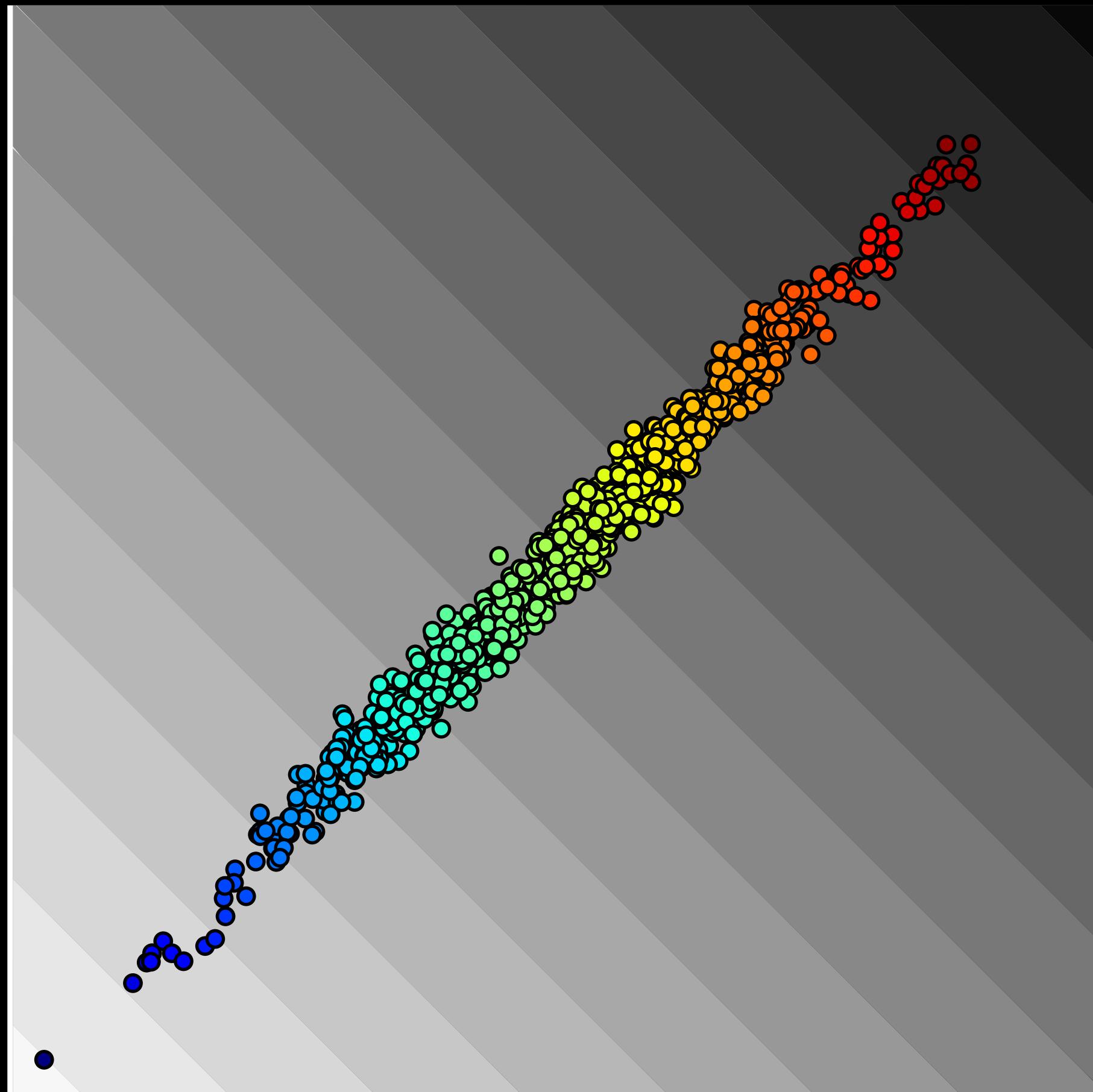
Motivating Example



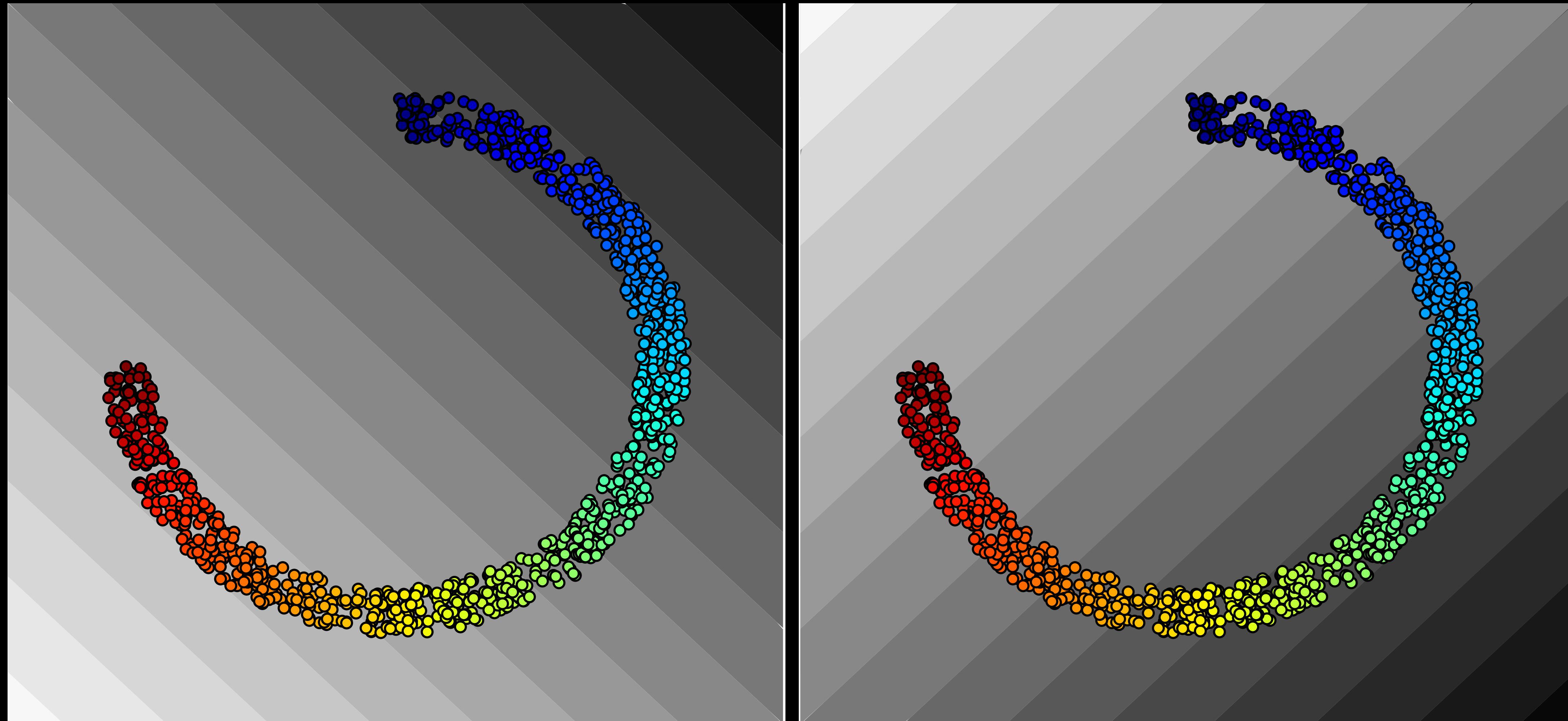
	Small	Medium	Large	2-Legs	4-Legs	Hair	Hooves	Mane	Feathers	
	Appearance					Activities				
Dove	×			×					×	
Chicken	×			×				×		
Duck	×			×				×		×
Goose	×			×				×		×
Owl	×			×				×	×	×
Hawk	×			×				×	×	×
Eagle		×		×				×	×	×
Fox		×			×	×			×	
Dog		×			×	×			×	
Wolf		×			×	×		×	×	
Cat	×				×	×			×	
Tiger			×		×	×			×	×
Lion			×		×	×		×	×	
Horse			×		×	×		×		
Zebra			×		×	×		×		
Cow			×		×	×				



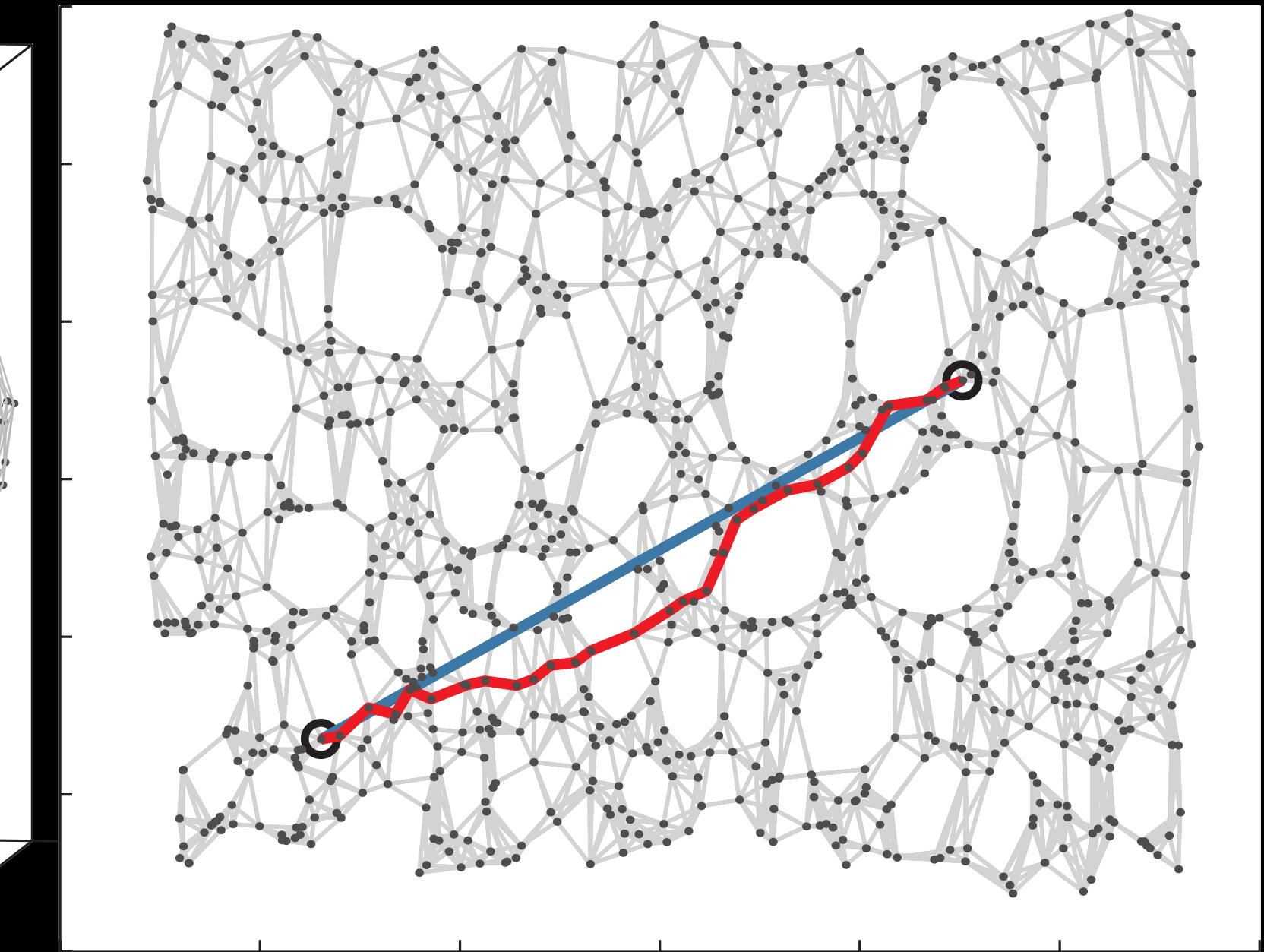
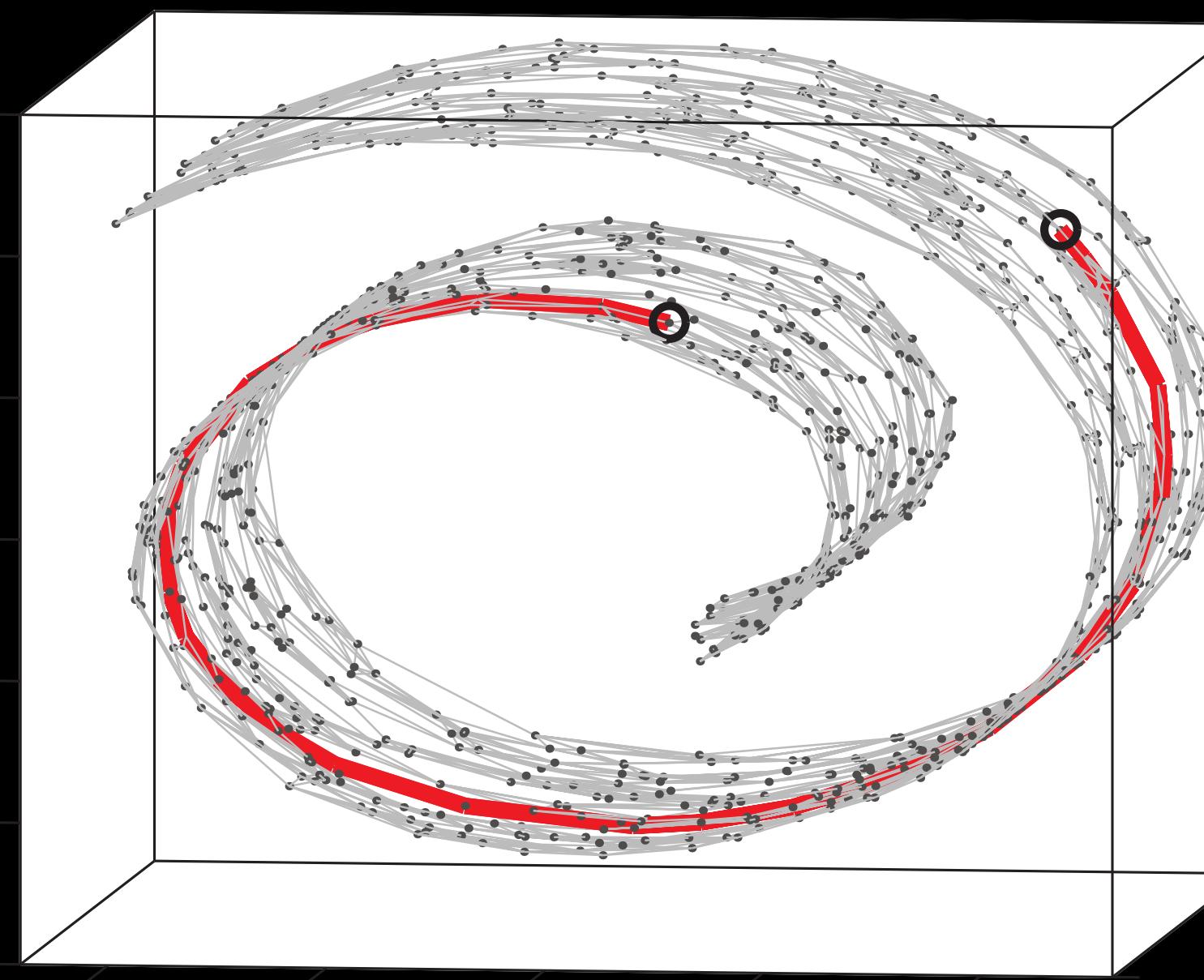
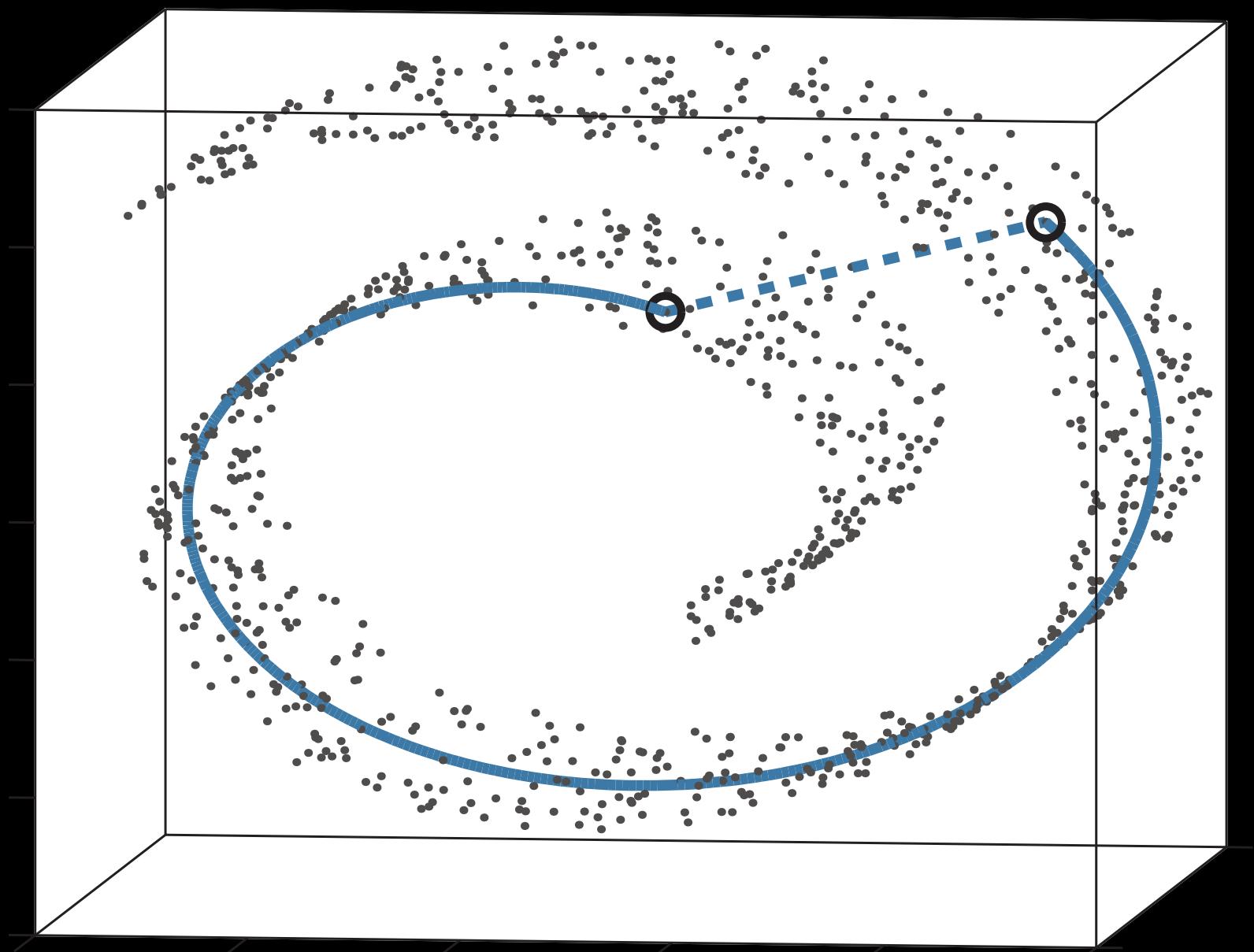
Principal Component Analysis



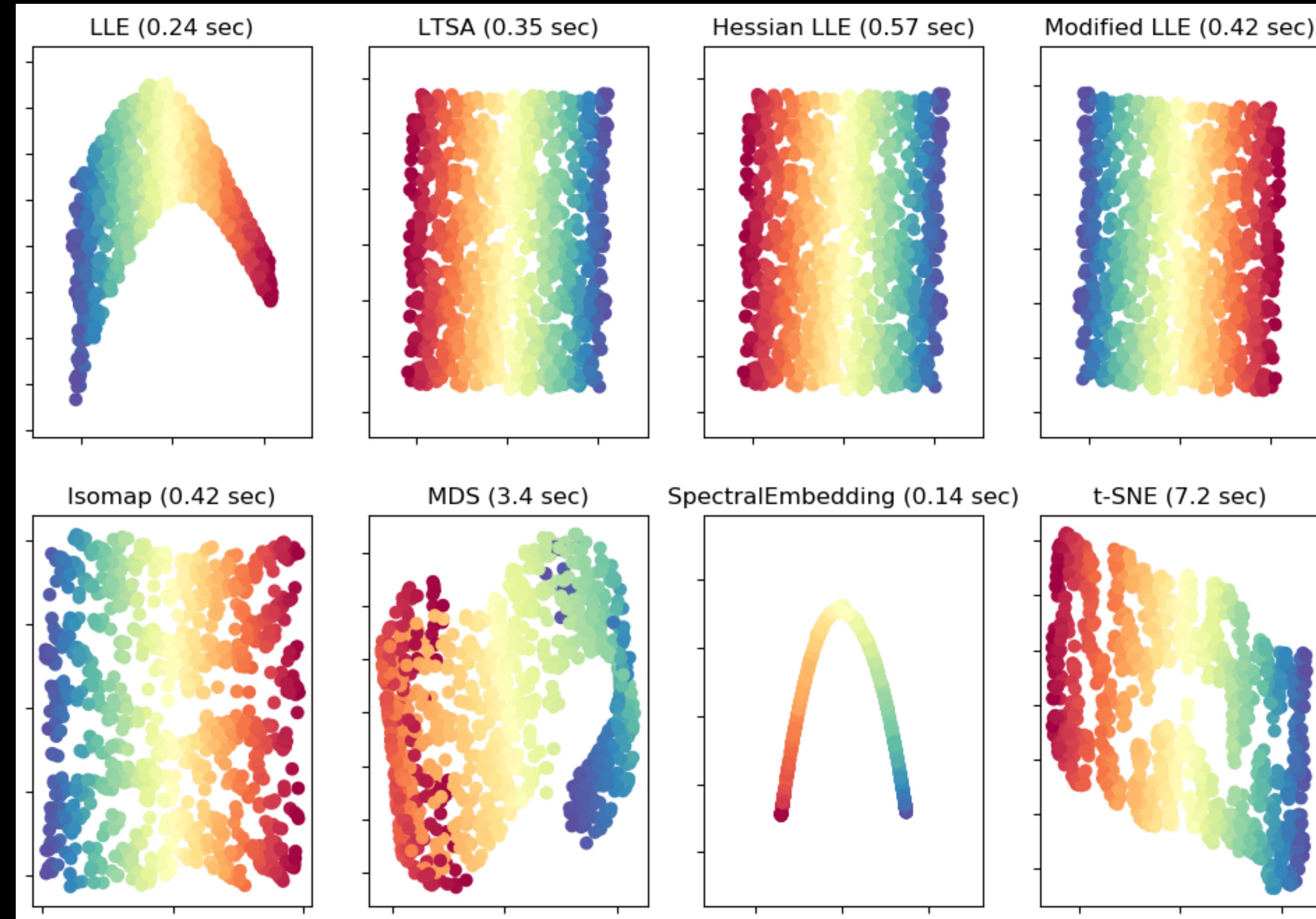
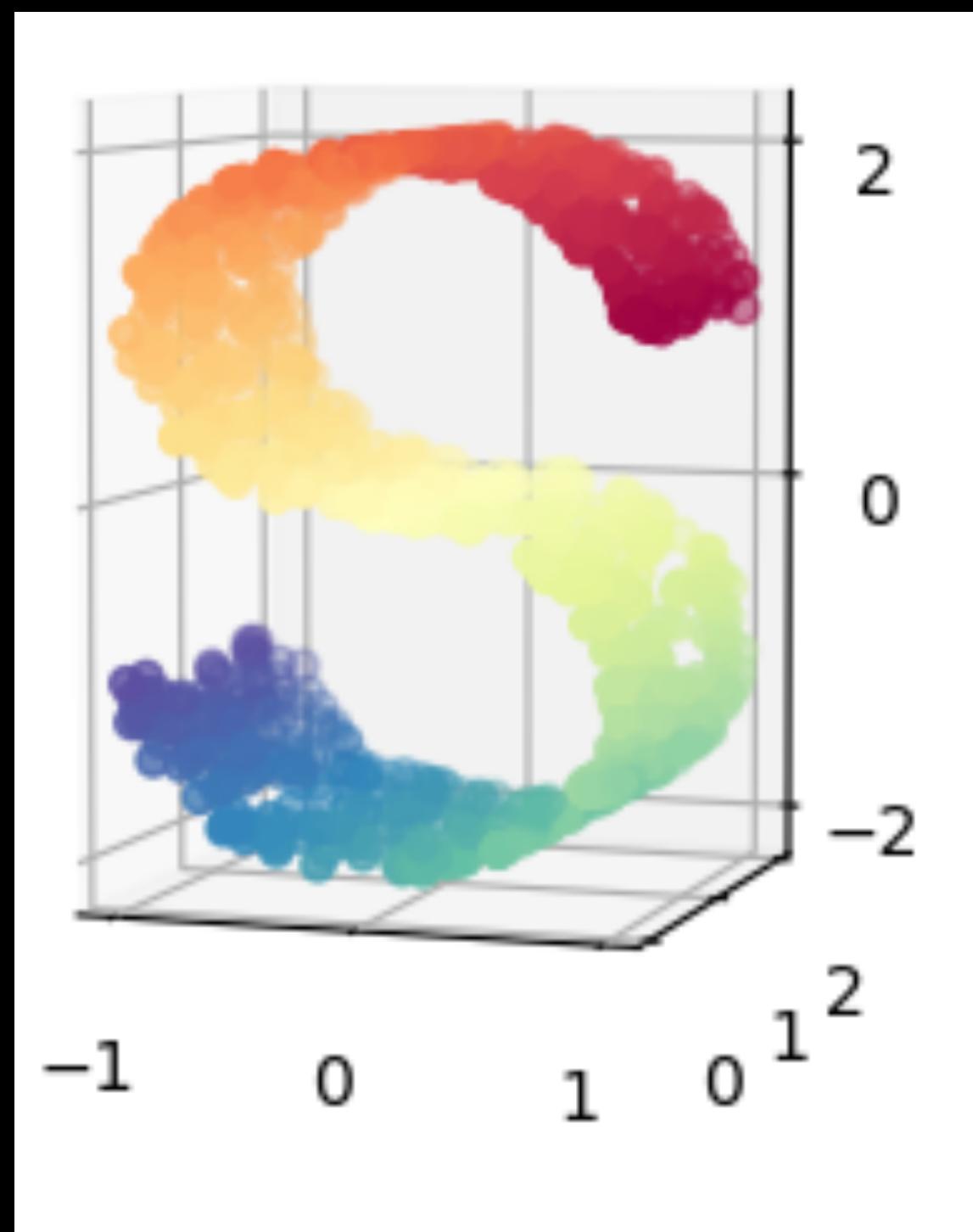
Principal Component Analysis



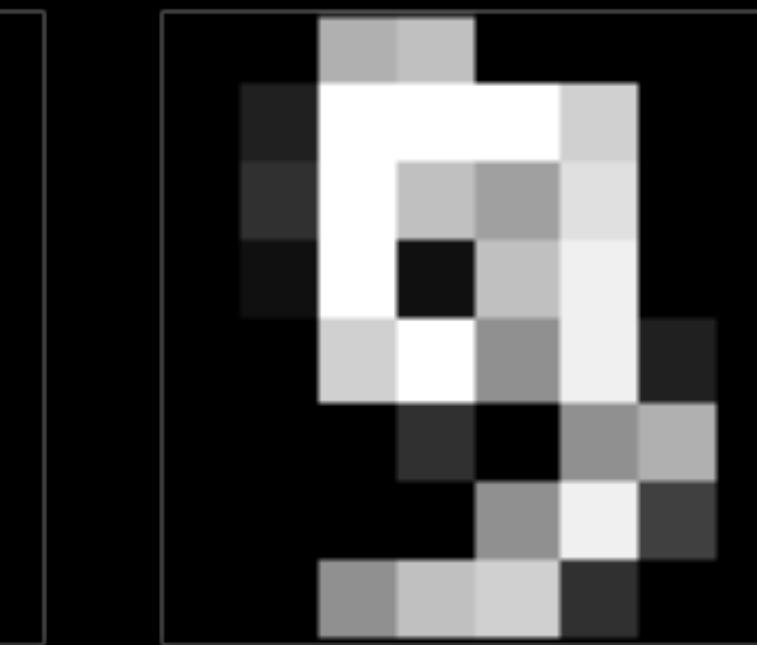
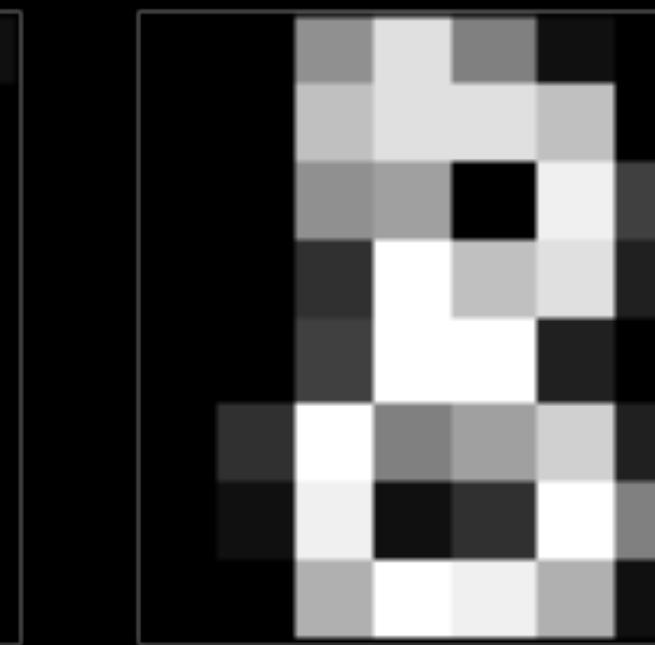
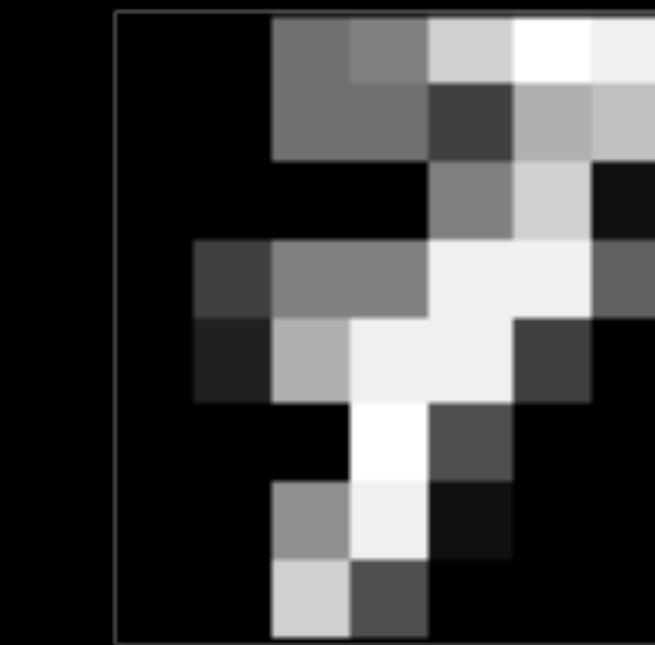
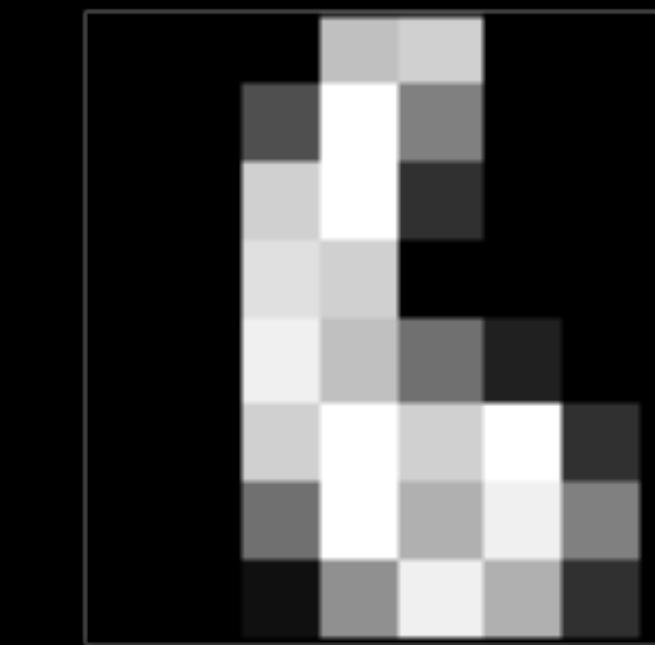
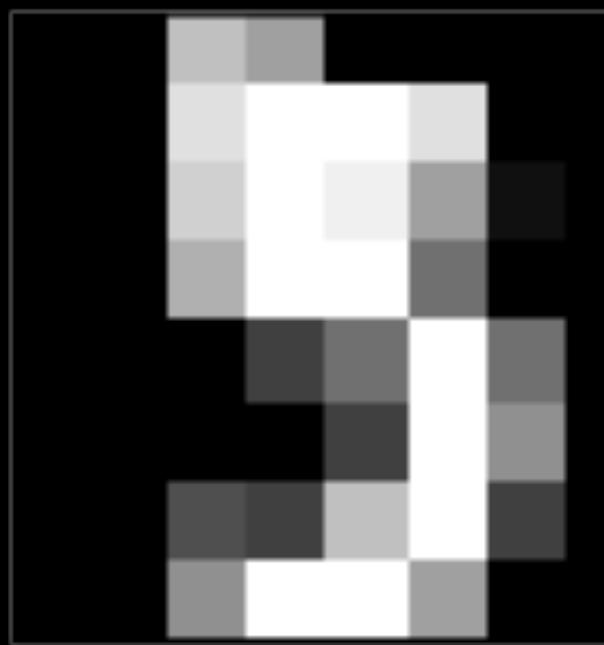
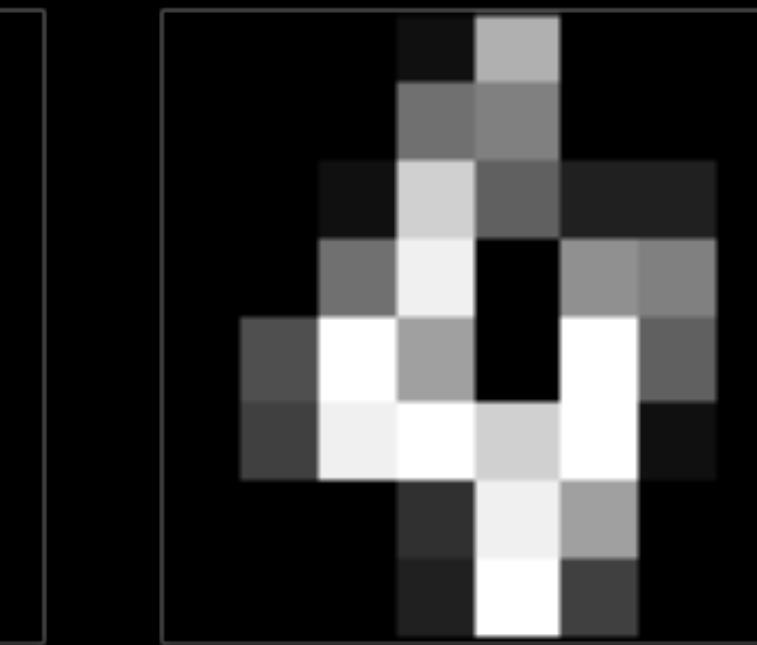
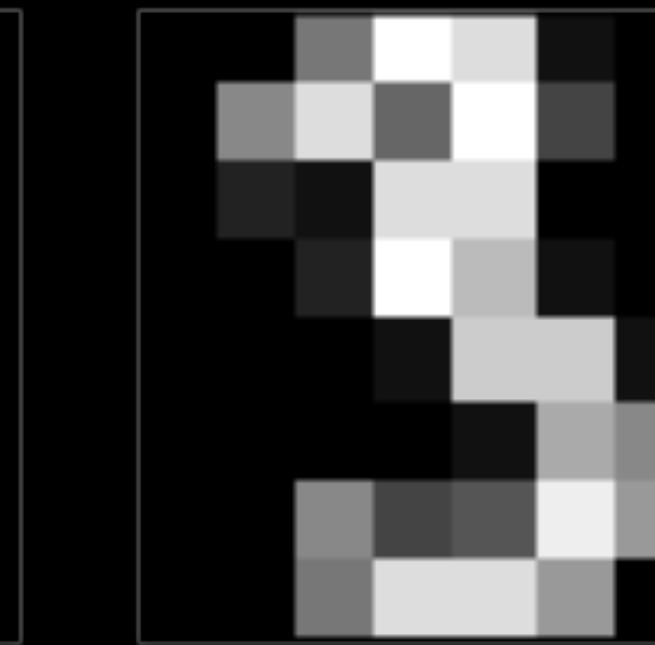
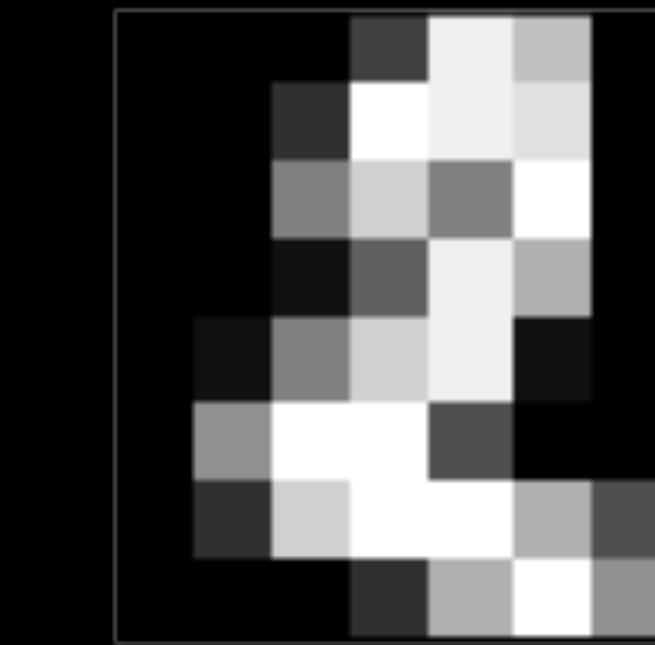
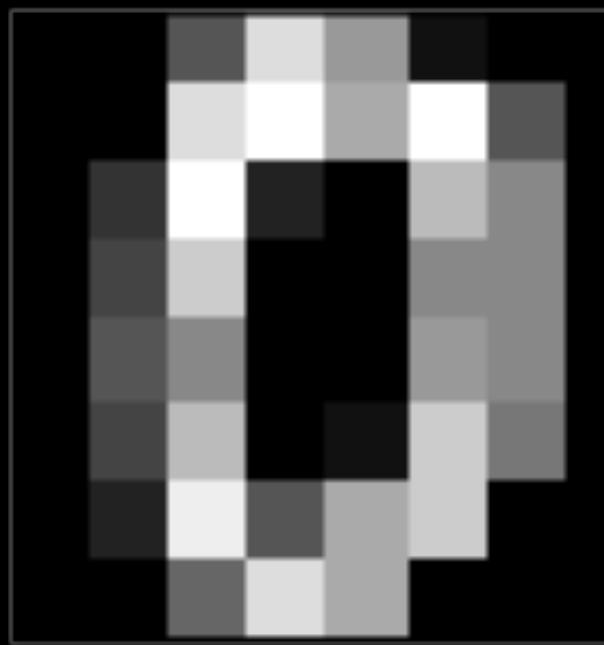
Metric Learning Methods



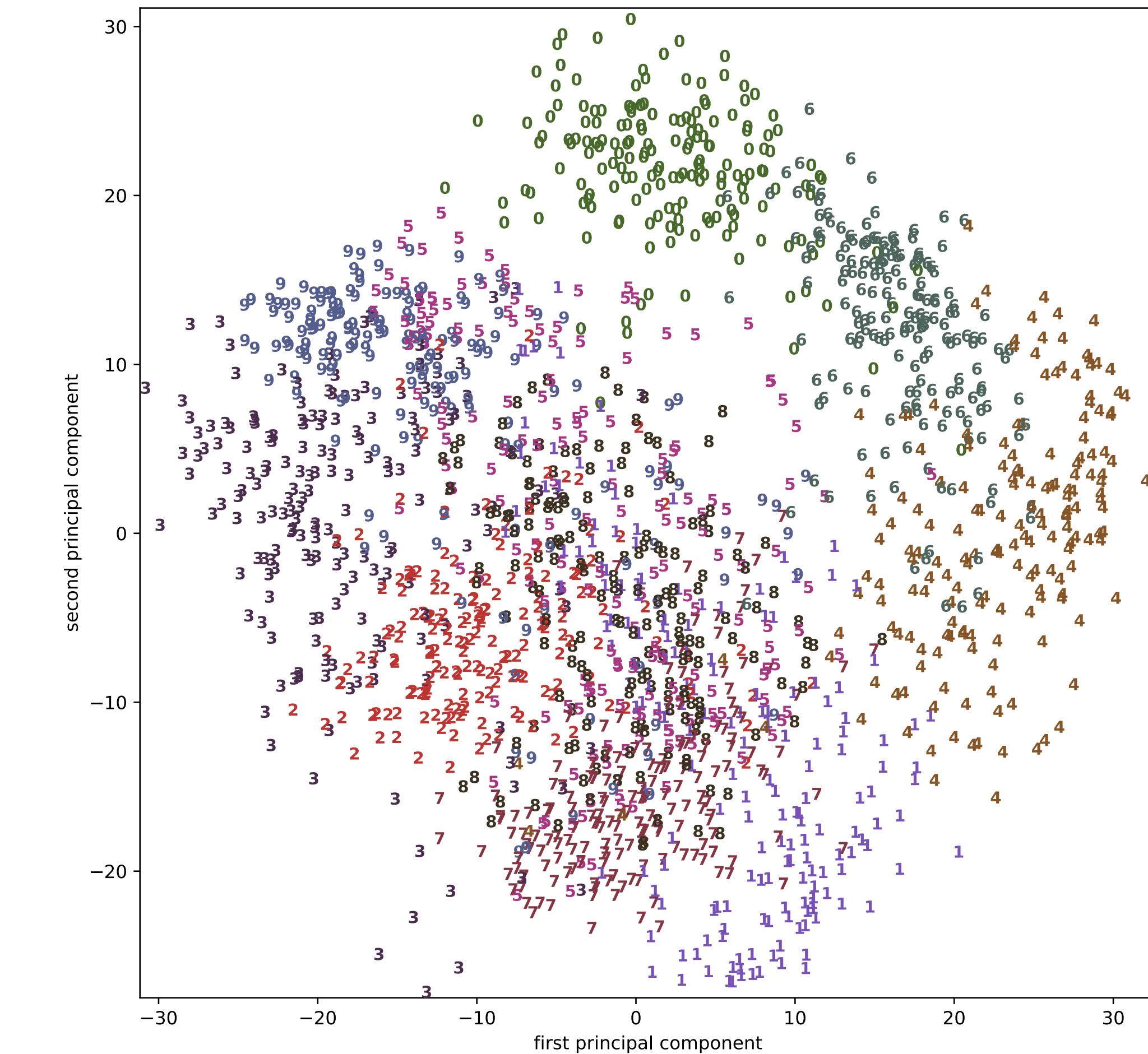
Examples of Dimensionality Reduction Models



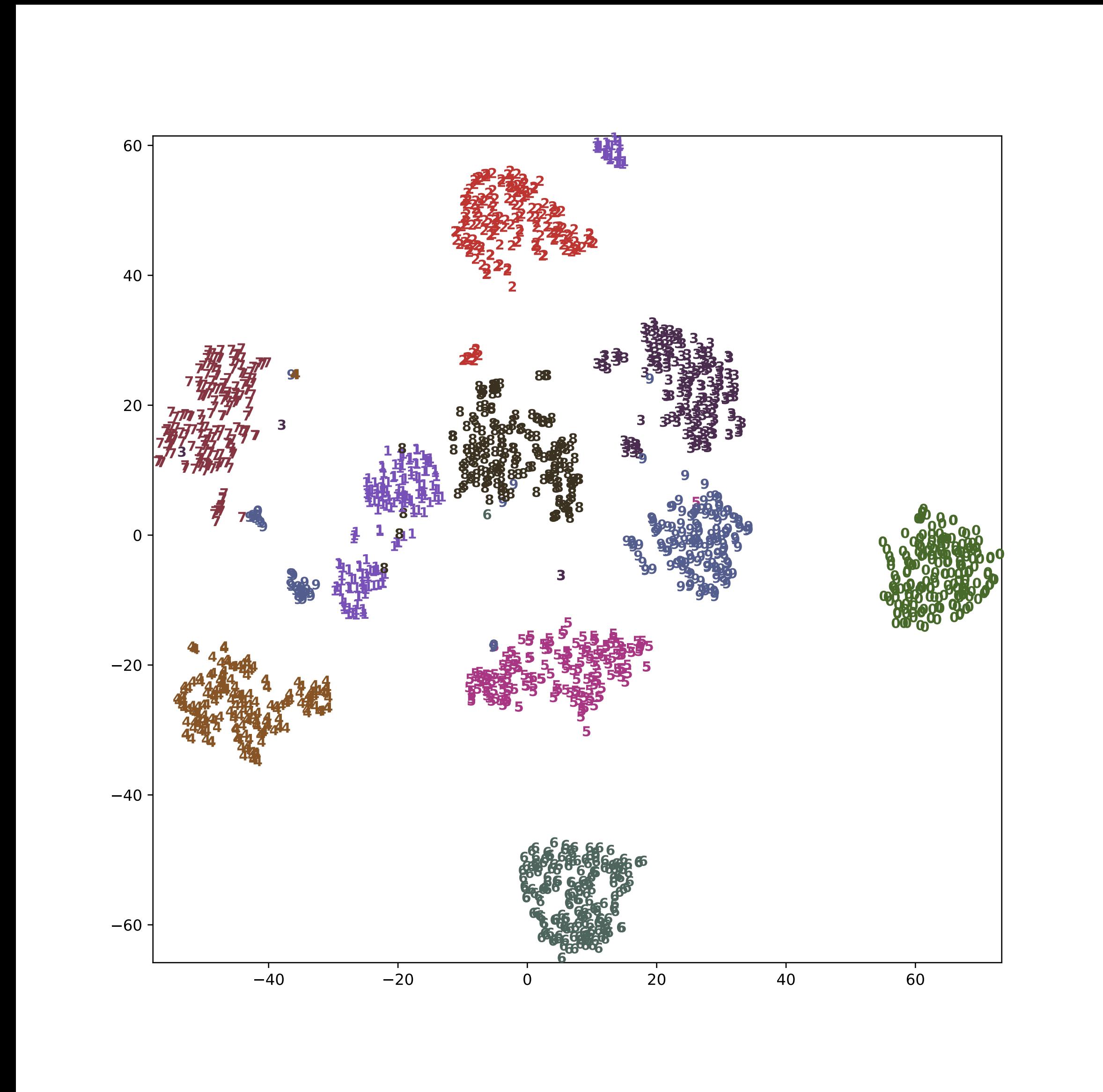
Application: Digit Classification



Application: Digit Classification Using PCA



Application: Digit Classification Using TSNE



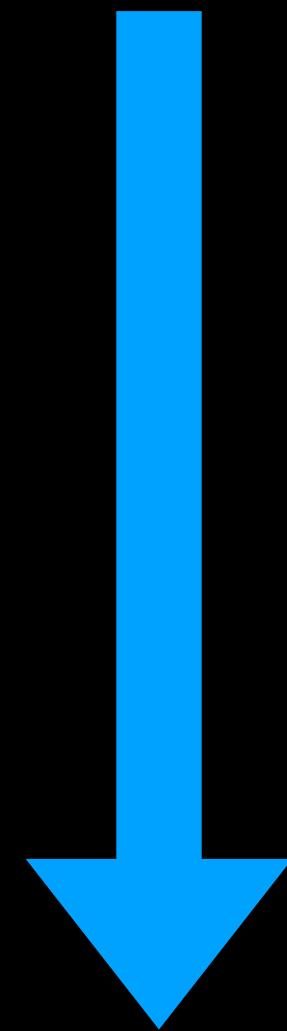
A Very Complex Example

<http://gallantlab.org/huth2016/>

Regression Implies a Model of Reality

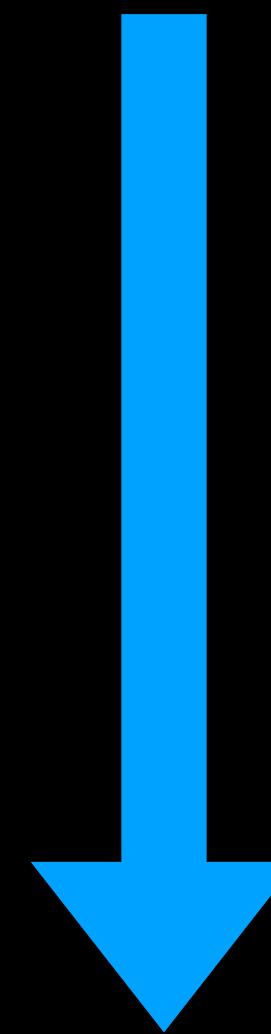
Supervised Implies a Model of Reality

Supervised Implies a Model of Reality



Unsupervised Implies a Exploring
Automatically-Inferred Reality Models

Supervised Implies a Model of Reality



~~Unsupervised Implies a Model of Reality~~
~~Exploring~~
~~Automatically-Inferred Reality Models~~

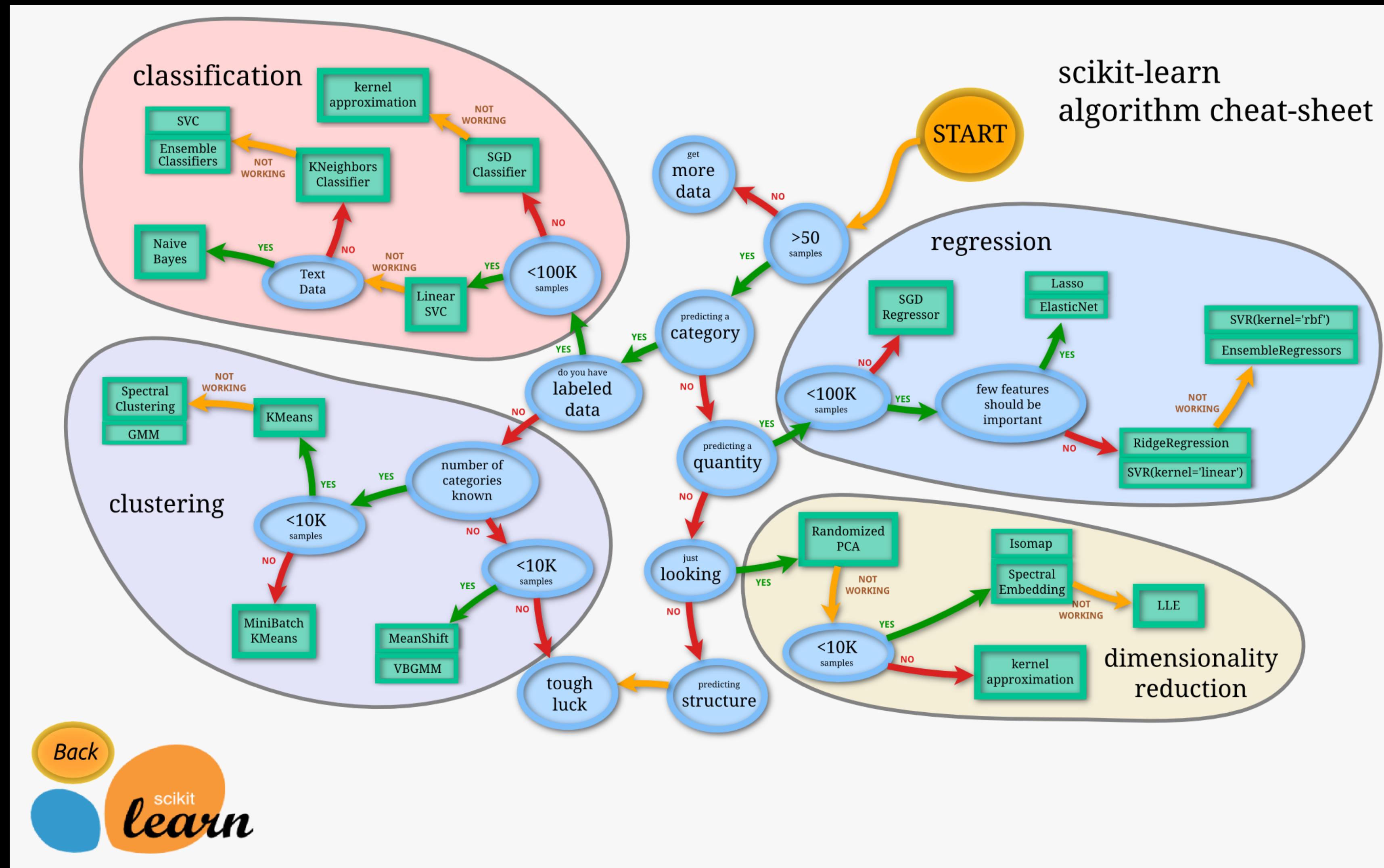
Supervised Implies a Model of Reality

In Unsupervised Methods the model of reality is implicit in the method choice.

Each method mathematically represents an inherent reality viewpoint.

Unsupervised Implies a Exploring
Automatically-Inferred Reality Models

Where are we in the Data Science Landscape?



Thanks!