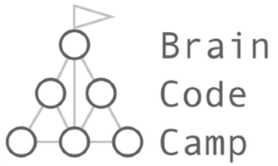
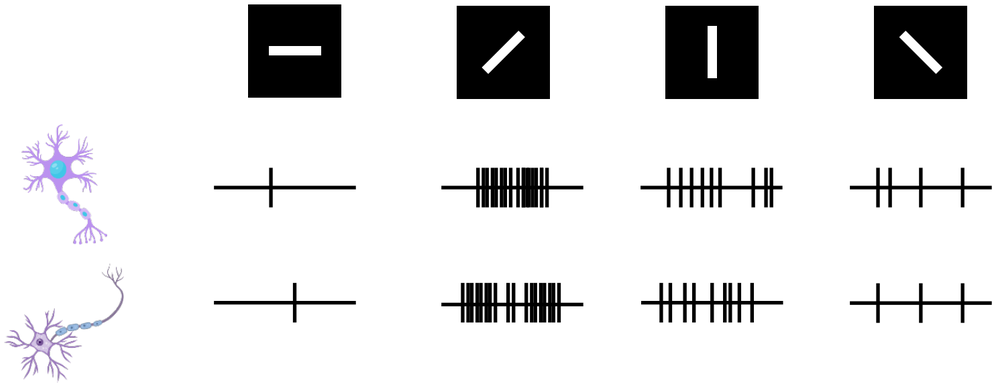


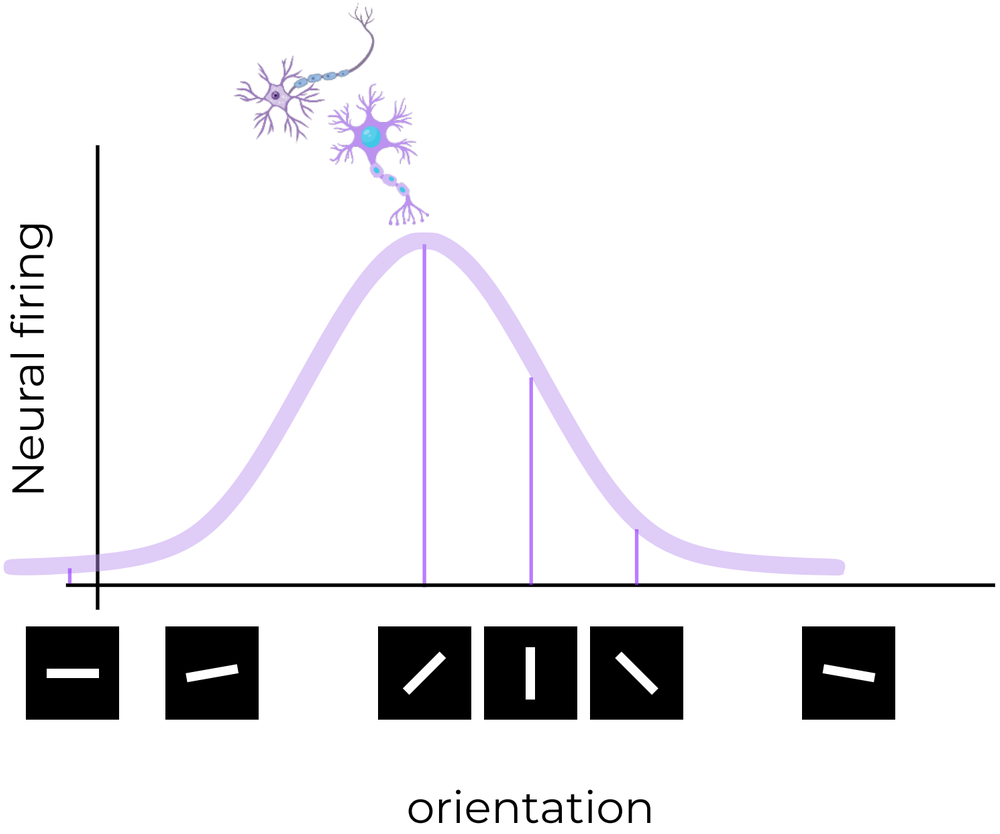
The Basics

Itthi Chatnuntawech

Brain Code Camp

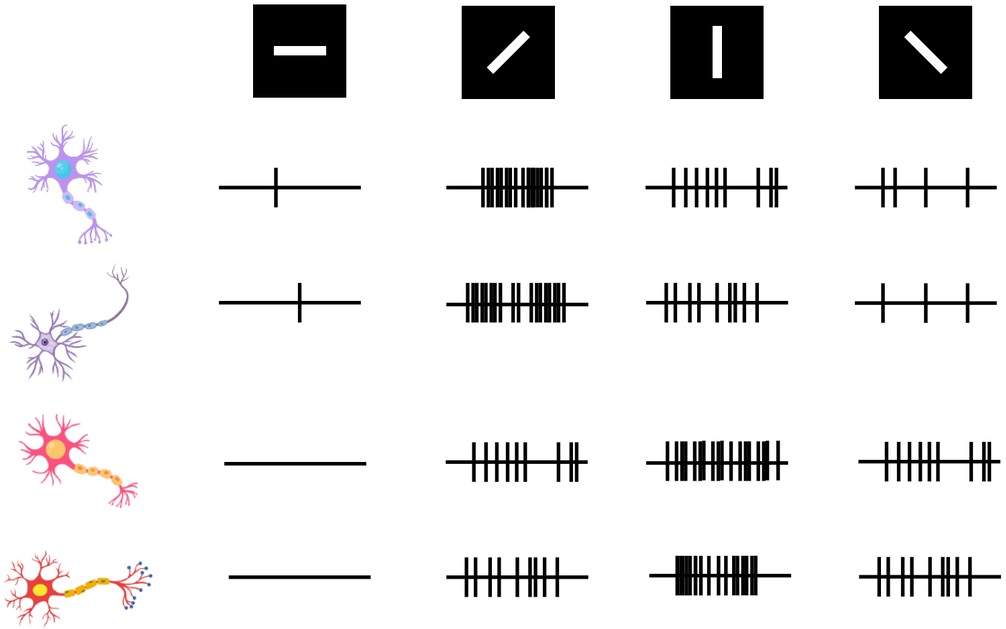
Data Visualization

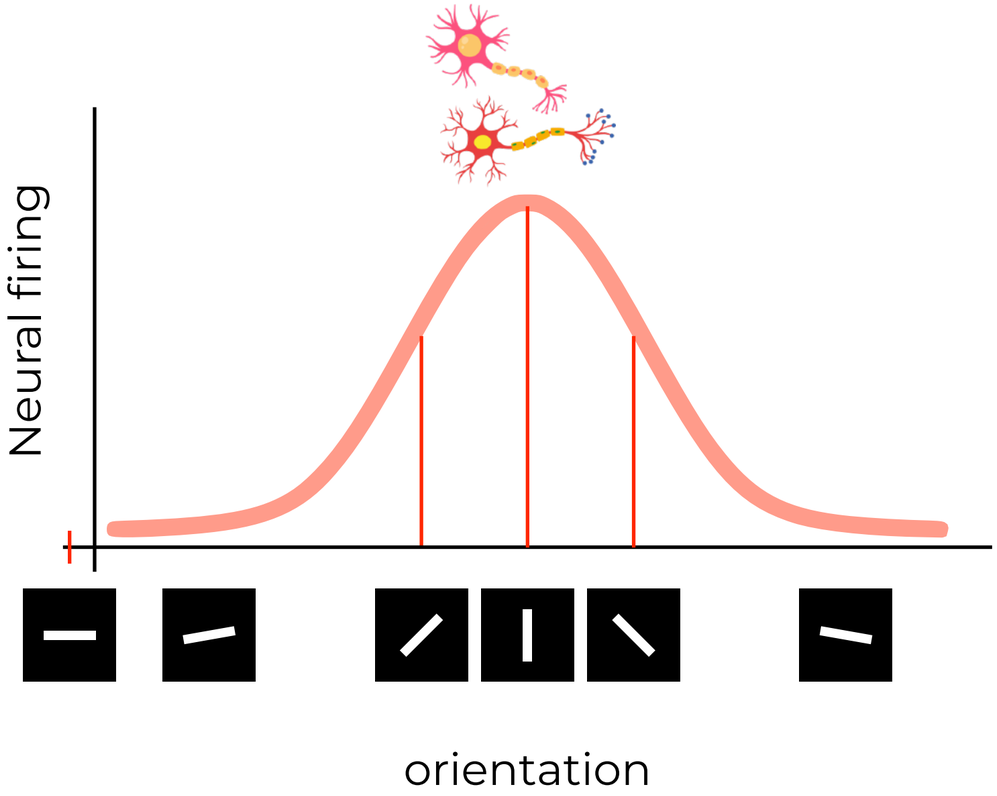




Brain Code Camp

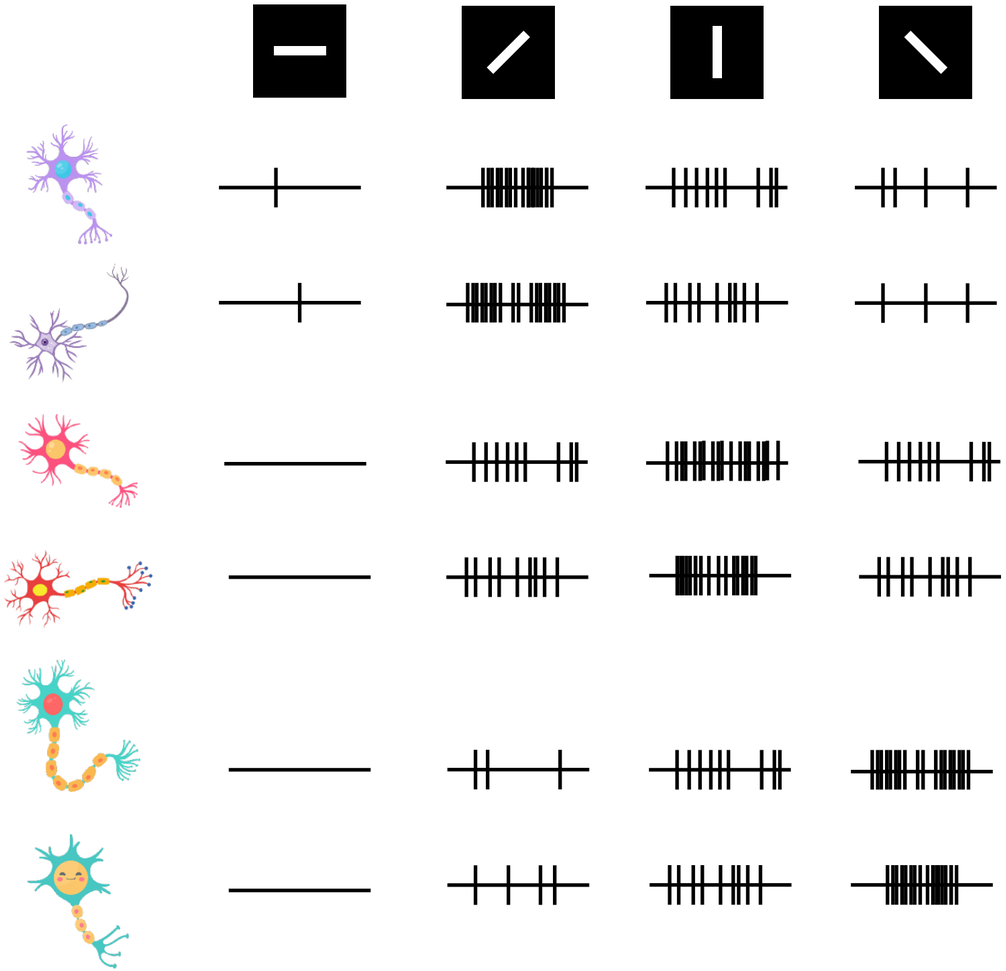
Data Visualization

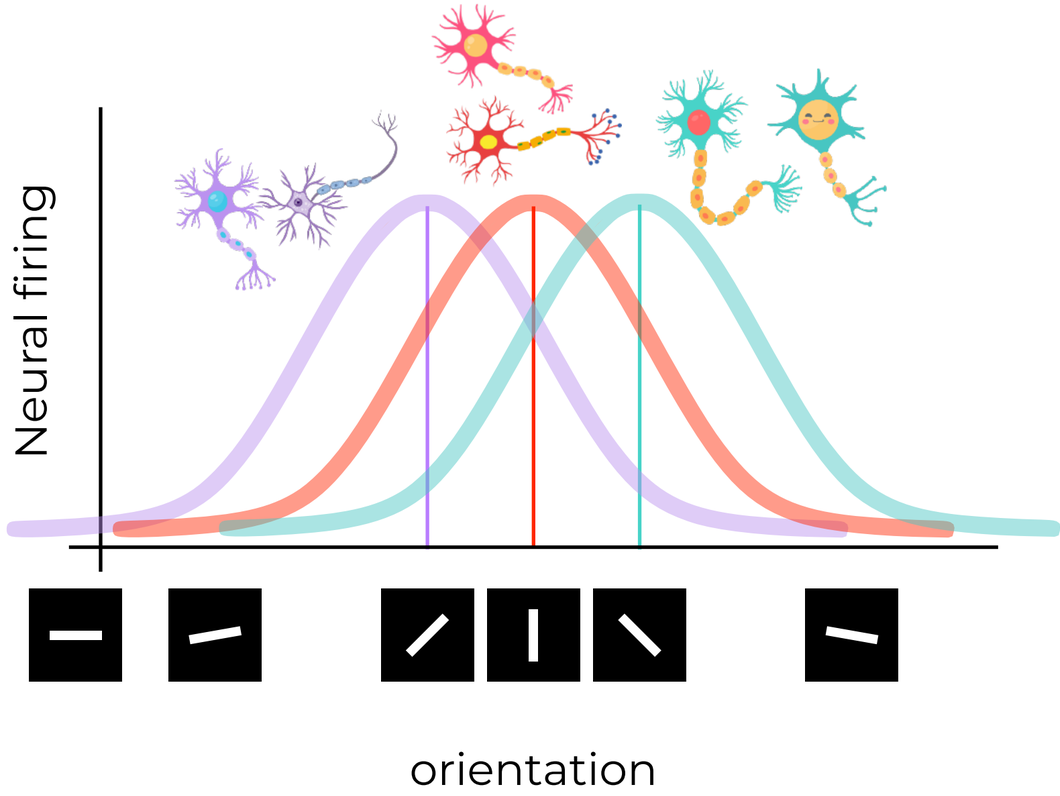




Brain Code Camp

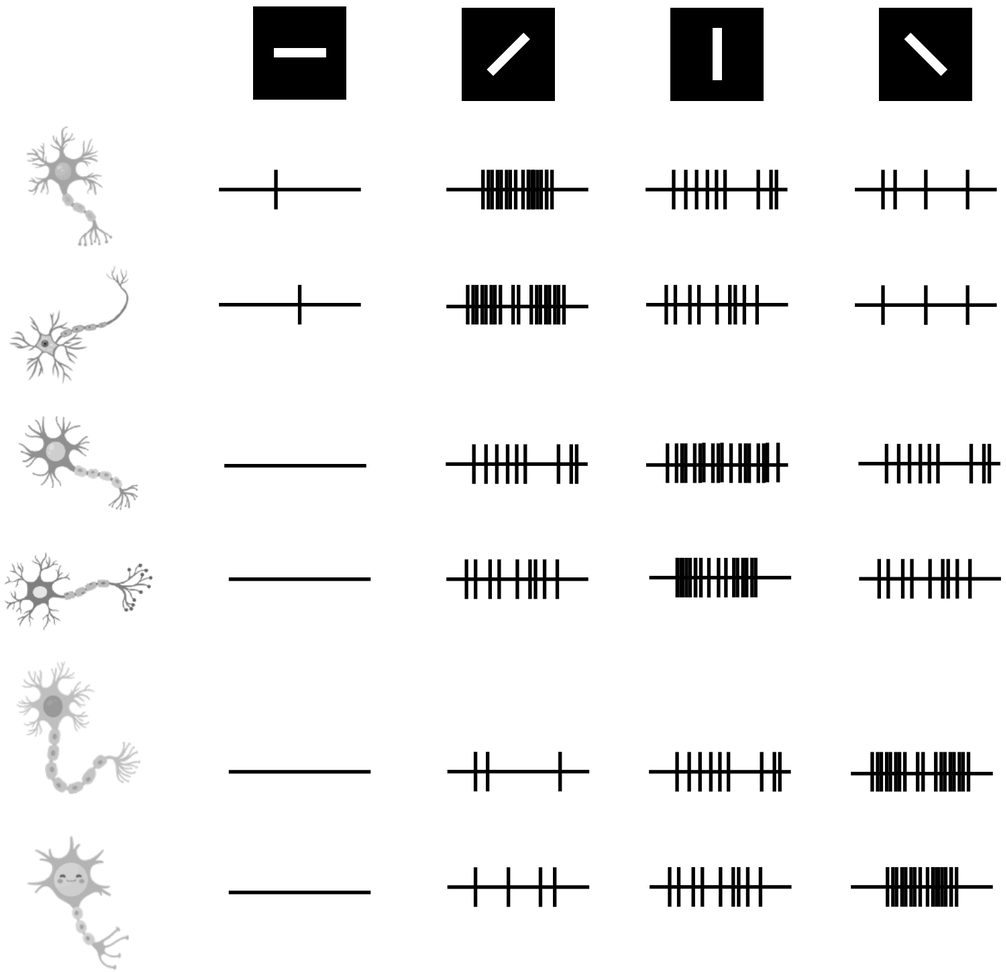
Data Visualization





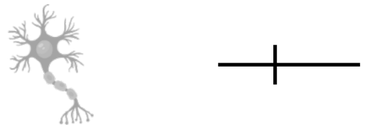
Brain Code Camp

Data Visualization



Feature extraction

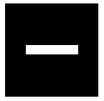
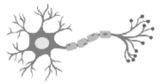
spike train → spike count



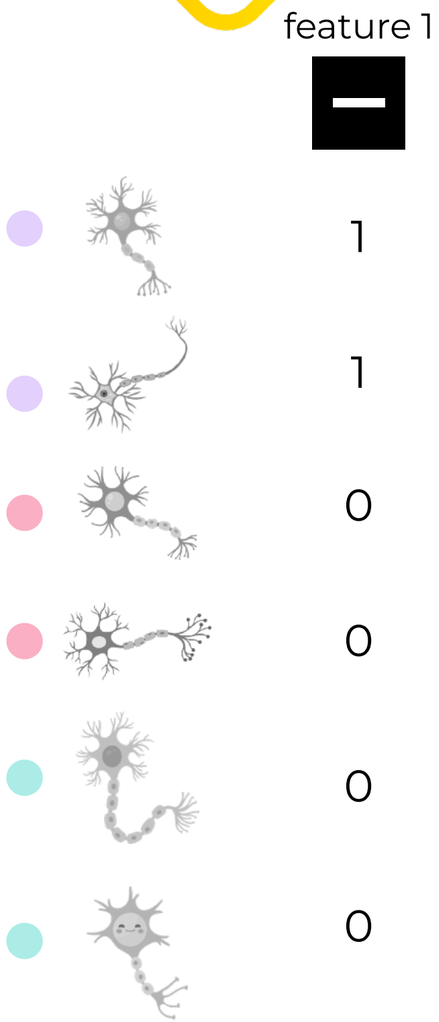
1

Brain Code Camp

Data Visualization

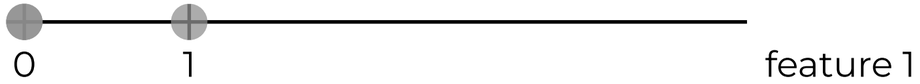
	feature 1	feature 2	feature 3	feature 4
				
	1	18	9	4
	1	20	9	3
	0	10	22	8
	0	11	17	9
	0	3	10	25
	0	4	10	23

Data Visualization

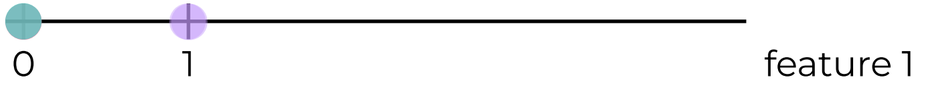


1D feature space

What we see

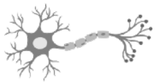


True colors (we do not get to observe)



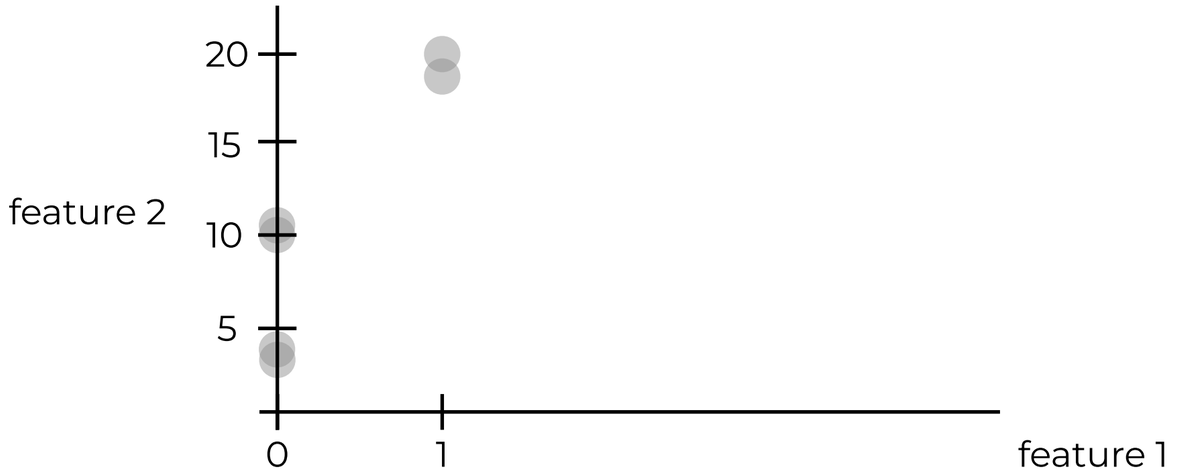
Brain Code Camp

Data Visualization

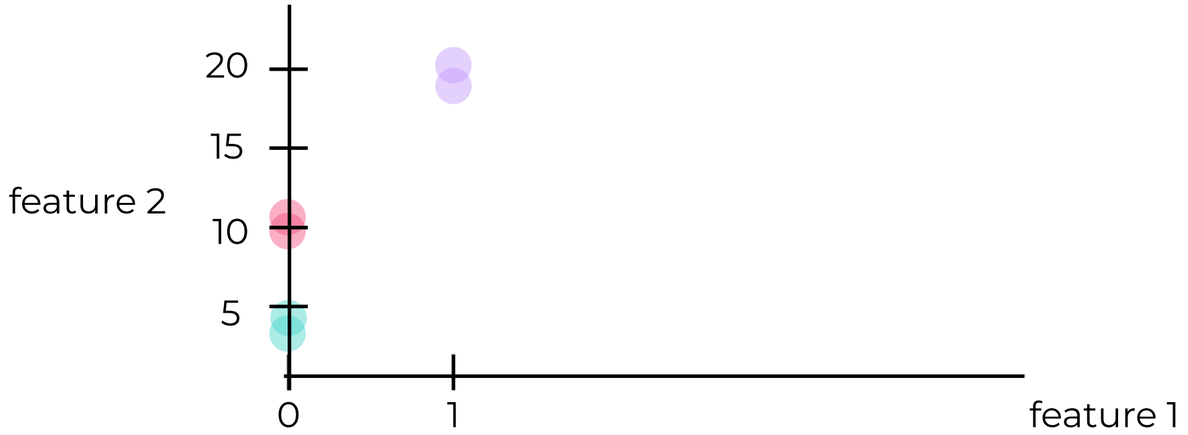
	feature 1	feature 2
	1	18
	1	20
	0	10
	0	11
	0	3
	0	4

2D feature space

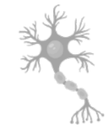
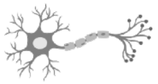
What we see



True colors (we do not get to observe)

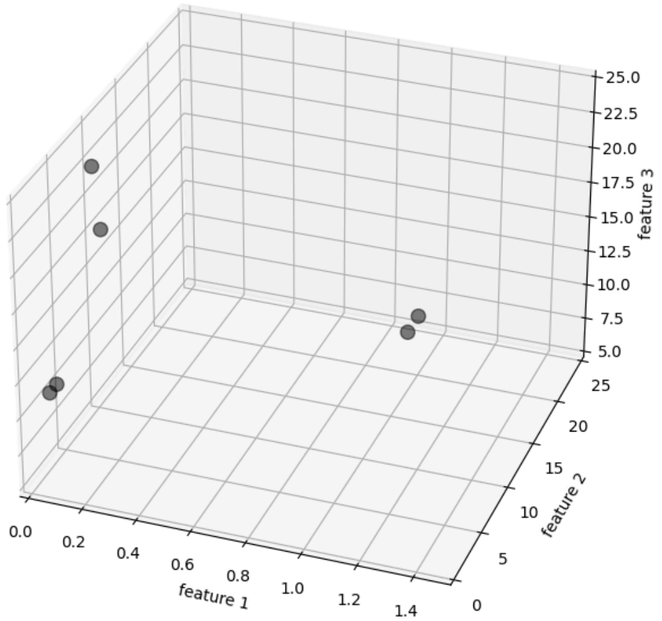


Data Visualization

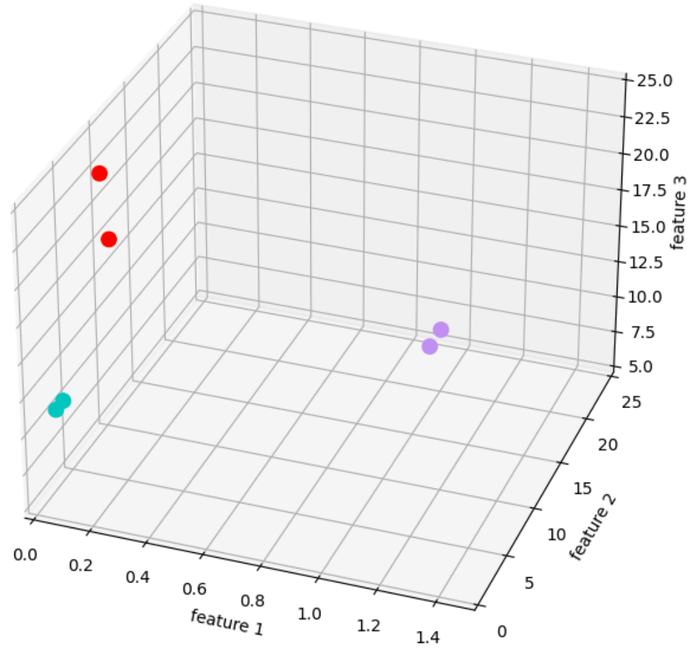
	feature 1	feature 2	feature 3
	1	18	9
	1	20	9
	0	10	22
	0	11	17
	0	3	10
	0	4	10

3D feature space

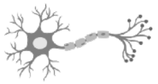
What we see



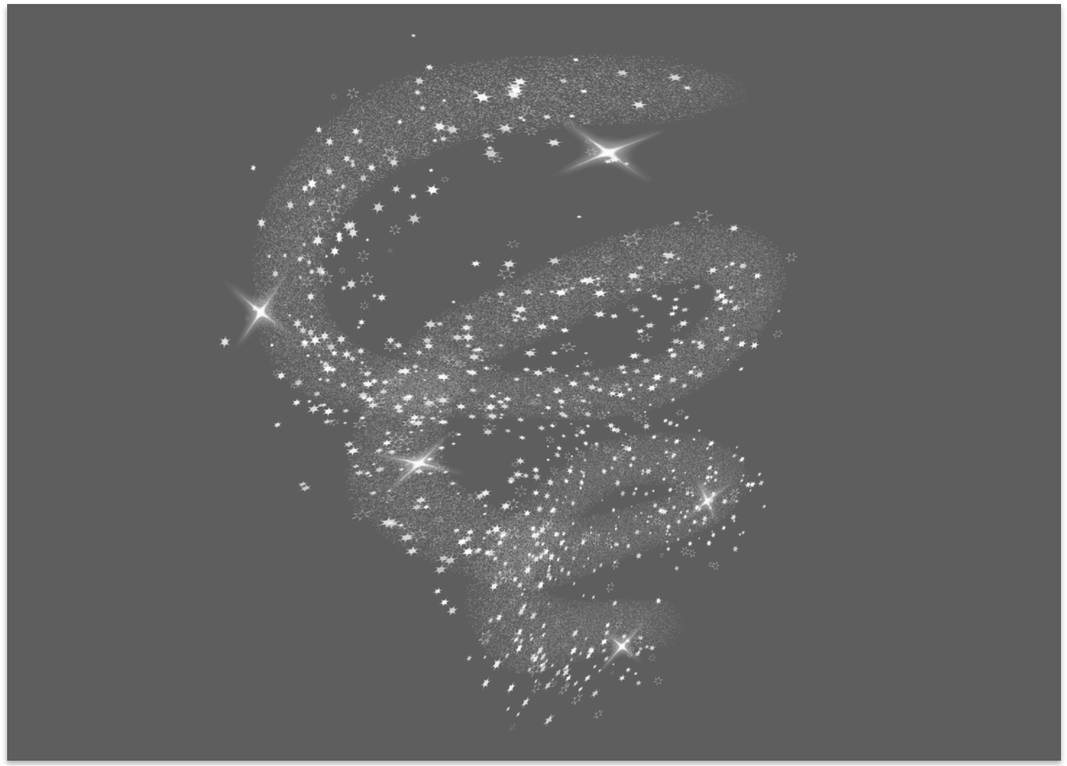
True colors (we do not get to observe)



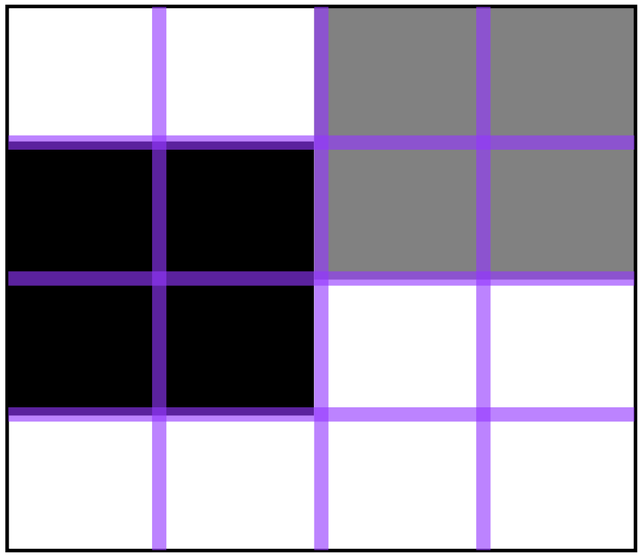
Data Visualization

	feature 1	feature 2	feature 3	feature 4
	1	18	9	4
	1	20	9	3
	0	10	22	8
	0	11	17	9
	0	3	10	25
	0	4	10	23

4D feature space



Grayscale Images



4 x 4 pixels

2D array

255	255	120	120
0	0	120	120
0	0	255	255
255	255	255	255

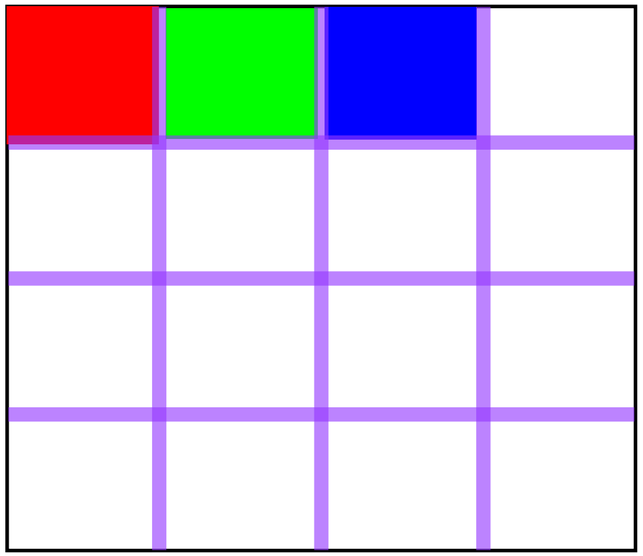
vector

	255	feature 1
	0	feature 2
	0	
	255	
	255	
	0	
	0	
	255	
	120	
	120	
	255	
	255	
	120	
	120	
	255	
	255	feature 16

16-dimensional feature space!

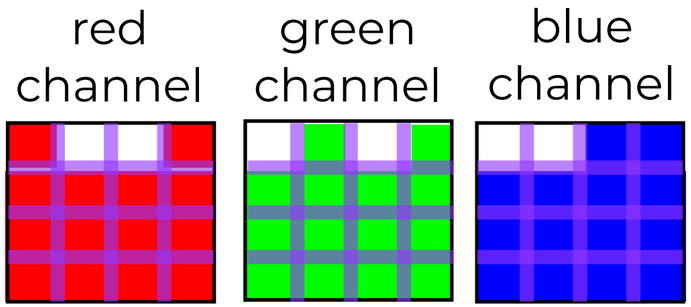
Brain Code Camp

RGB Images

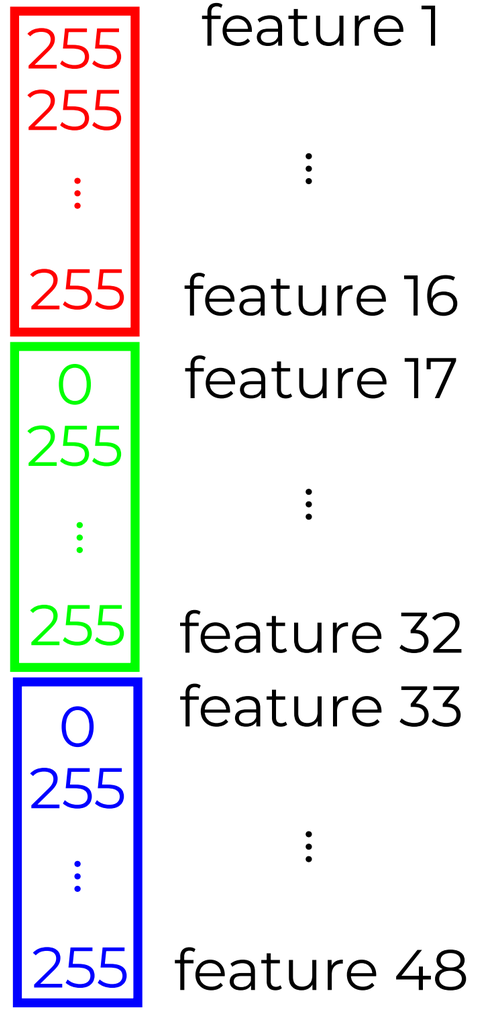


4 x 4 pixels

2D-arrays

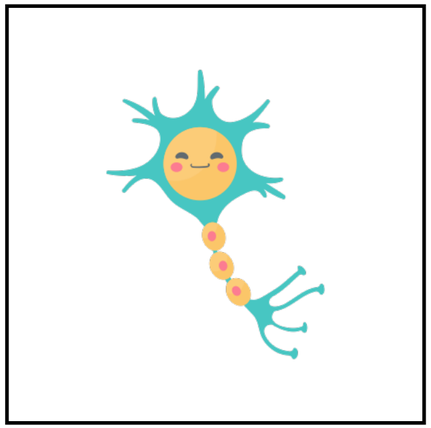


vector



48-dimensional feature space!

RGB Images



1024 x 1024 pixels

If we use raw pixels as features, we will have

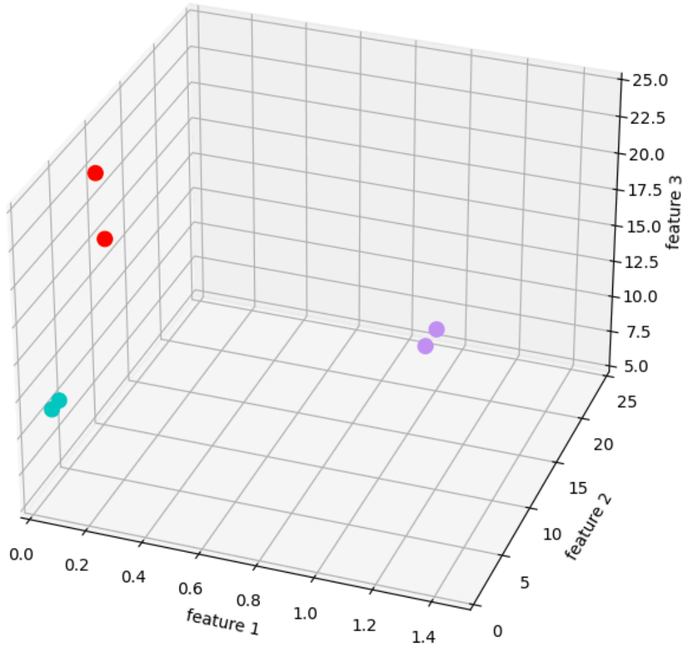
1024 x 1024 x 3 = 3,145,728 features.

# of rows	# of columns	# of channels

3,145,728-dimensional feature space!

Dimensionality Reduction

data visualization



reduced computational resources

high-dim space

low-dim space

data analysis in lower dimensional space