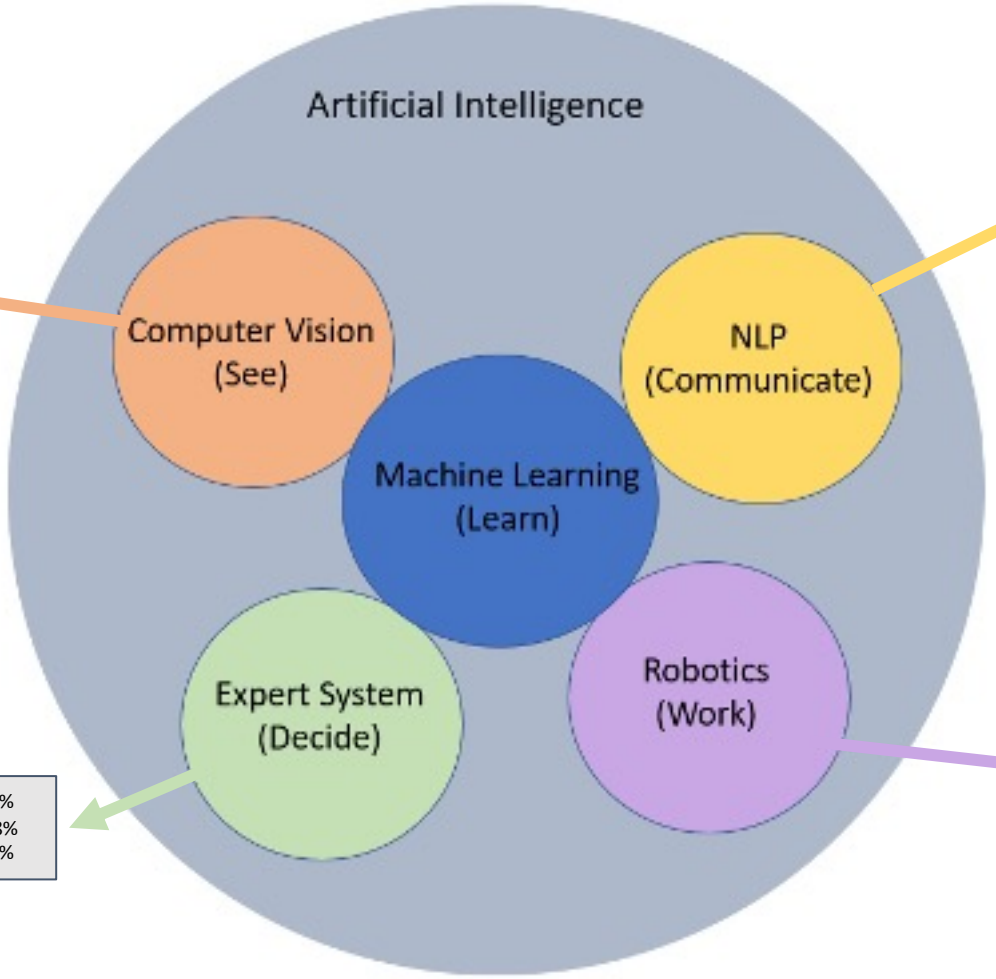
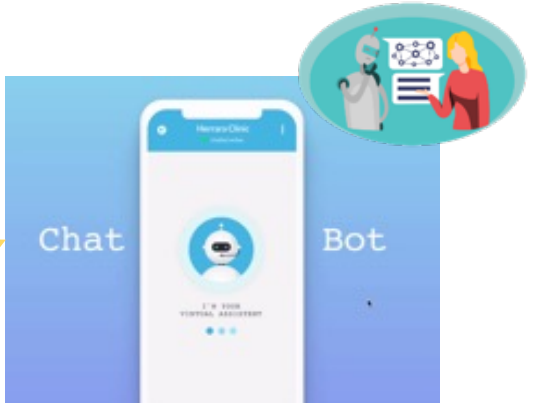
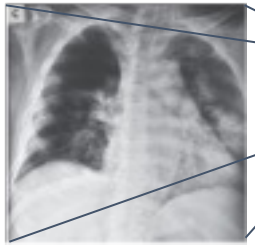
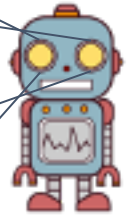
AI

What is Artificial Intelligence?



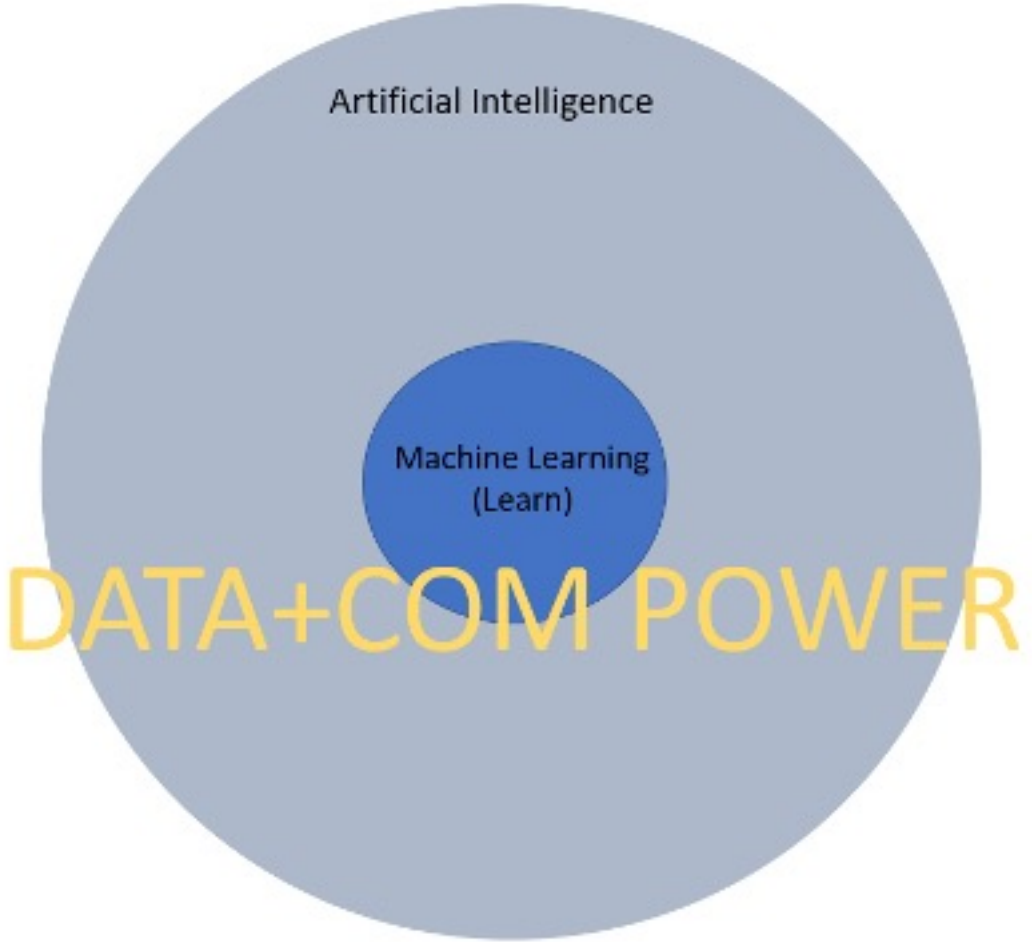




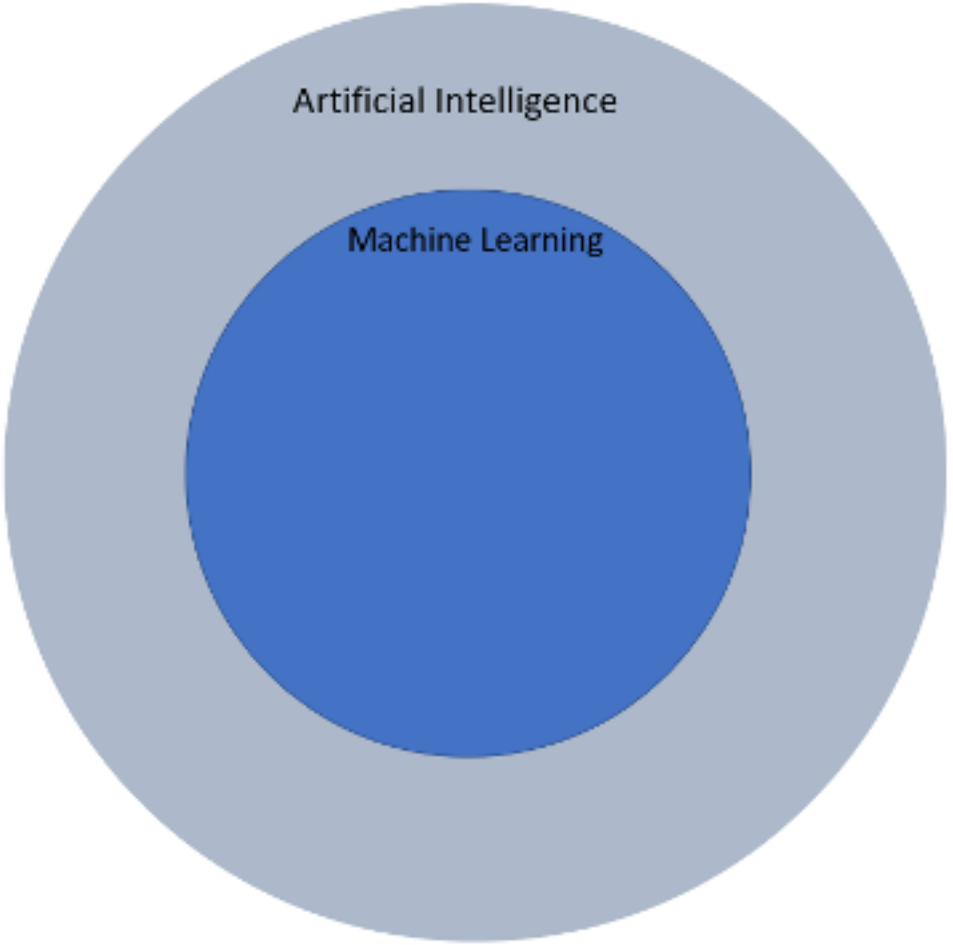


Covid-19 80%
Pneumonia 18%
Normal 2%

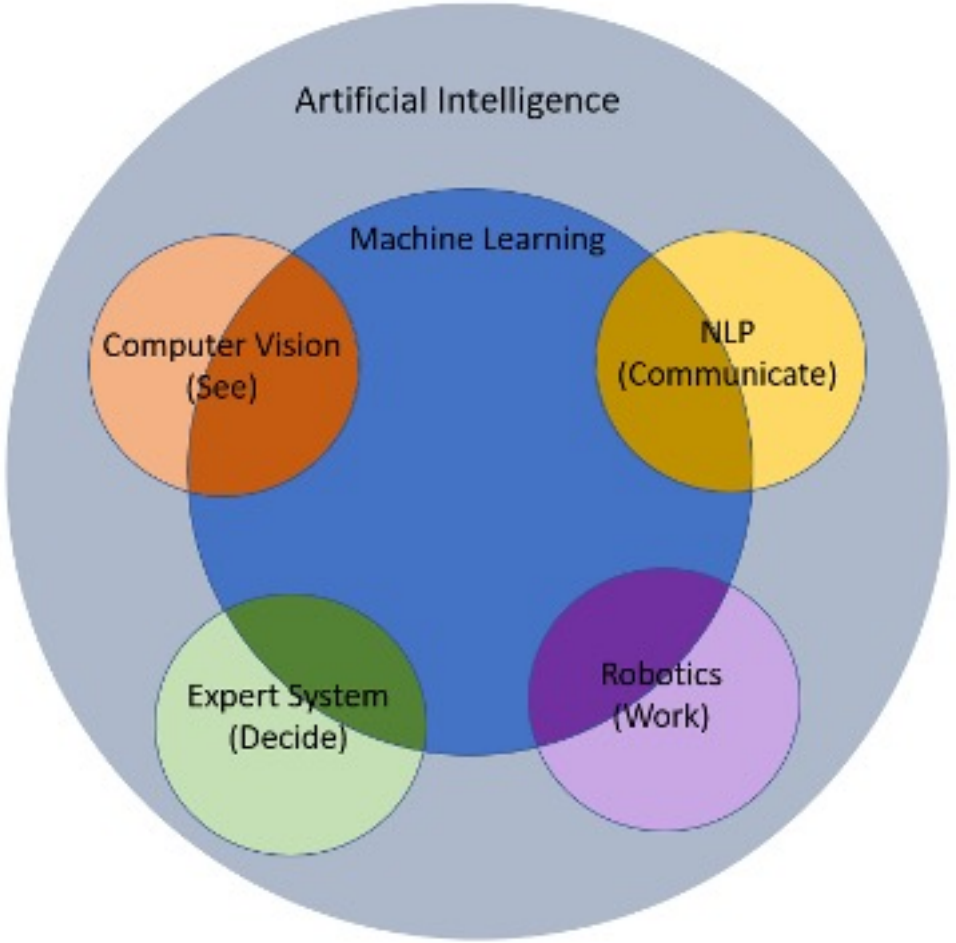
Artificial Intelligence



Artificial Intelligence

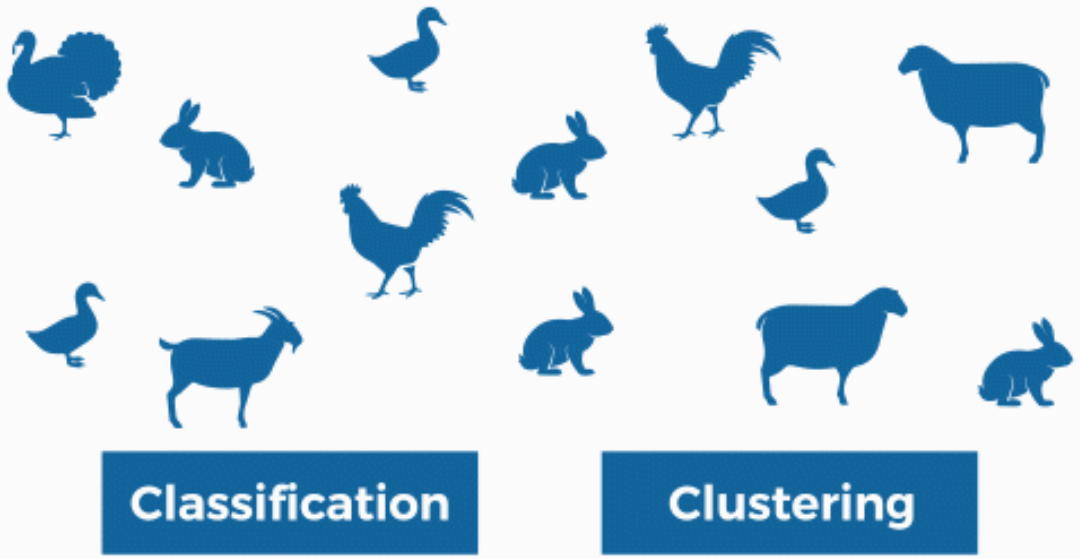


Artificial Intelligence



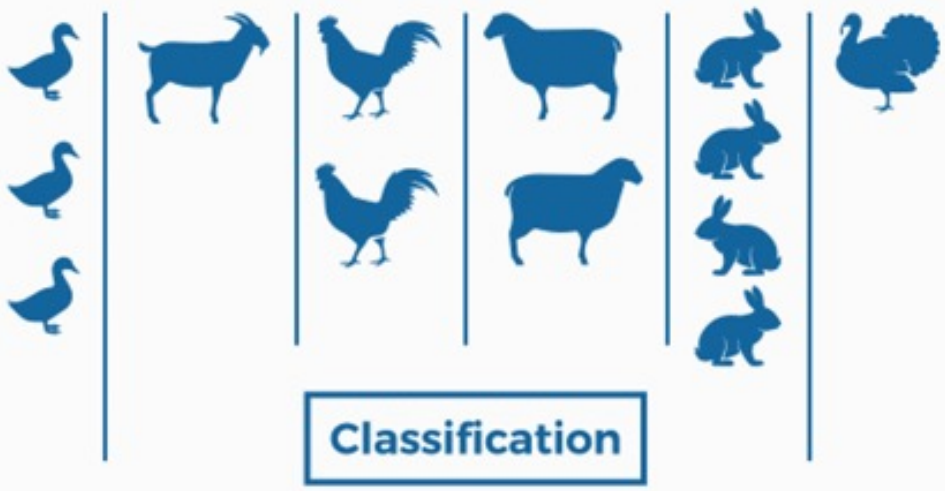
Machine Learning

Classification VS Clustering



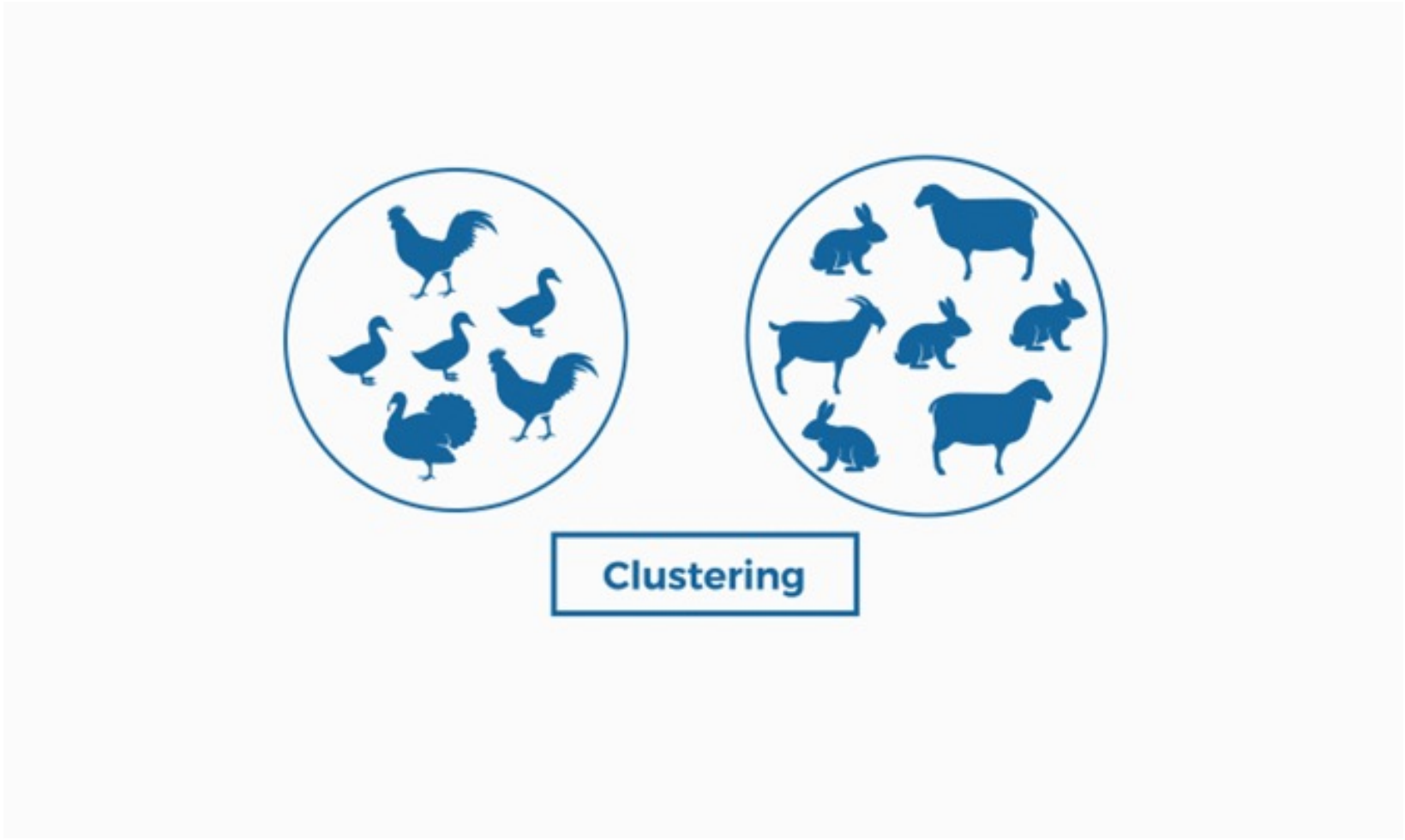
[image from] https://blog.bismart.com/en/classification-vs.-clustering-a-practical-explanation

Classification VS Clustering



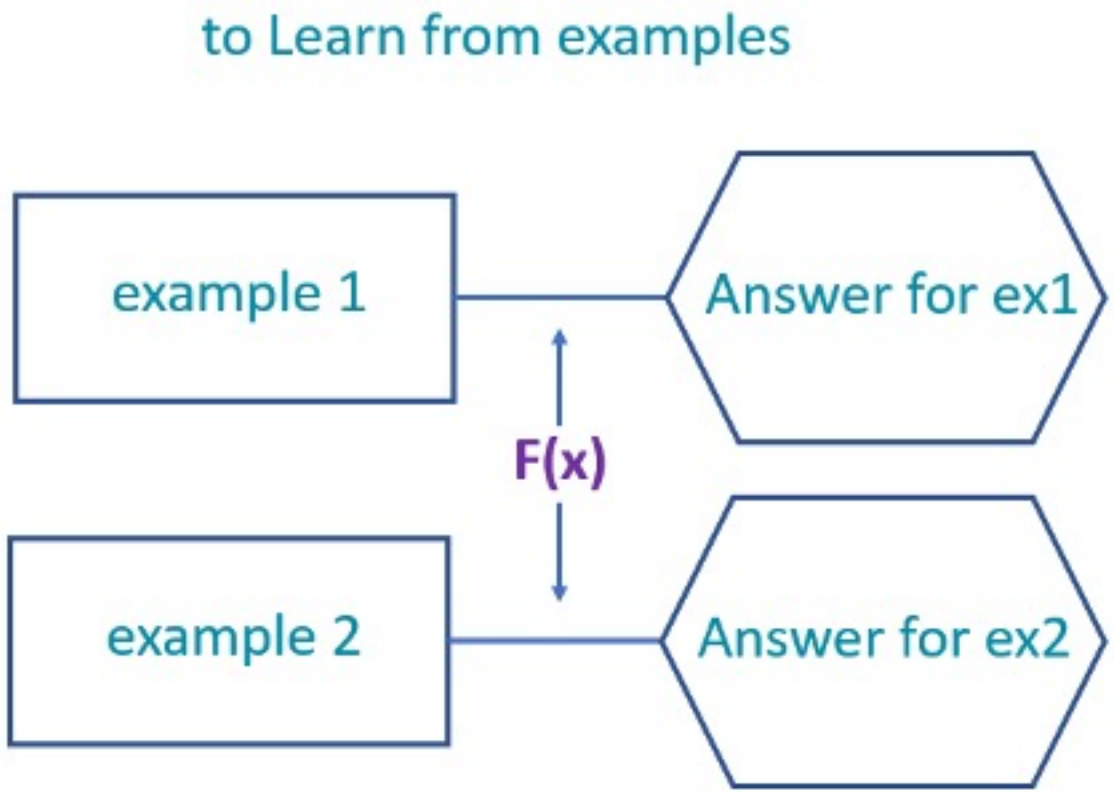
[image from] https://blog.bismart.com/en/classification-vs.-clustering-a-practical-explanation

Classification VS Clustering

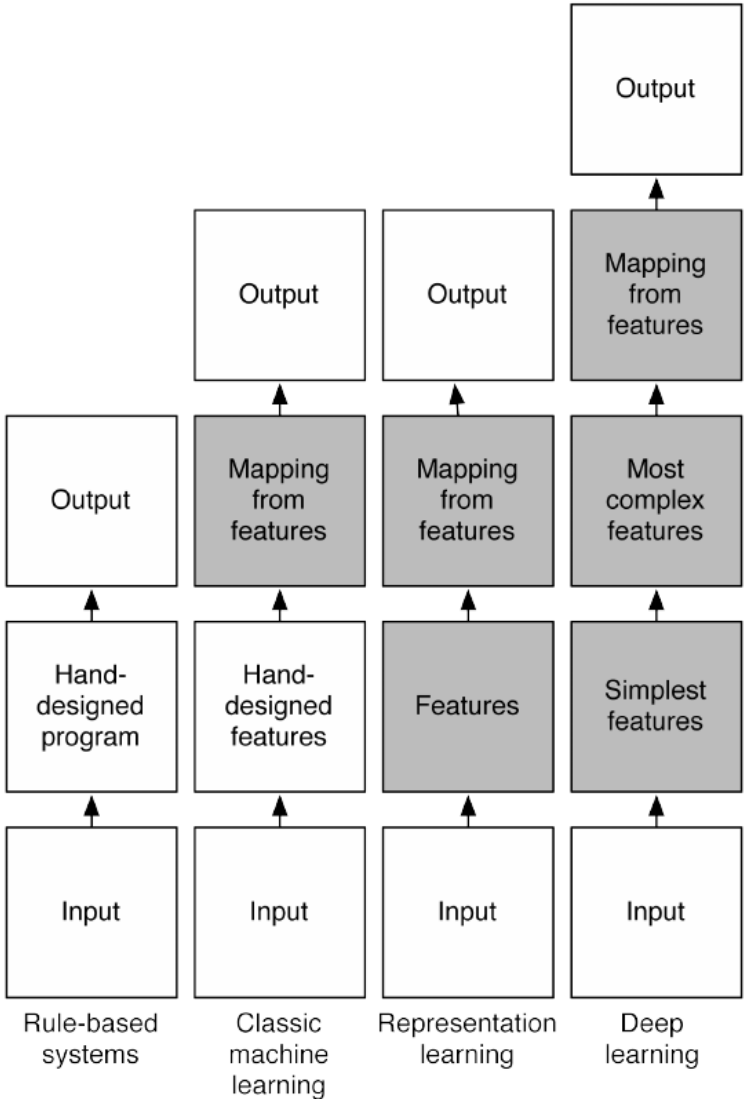


[image from] https://blog.bismart.com/en/classification-vs.-clustering-a-practical-explanation

Classification

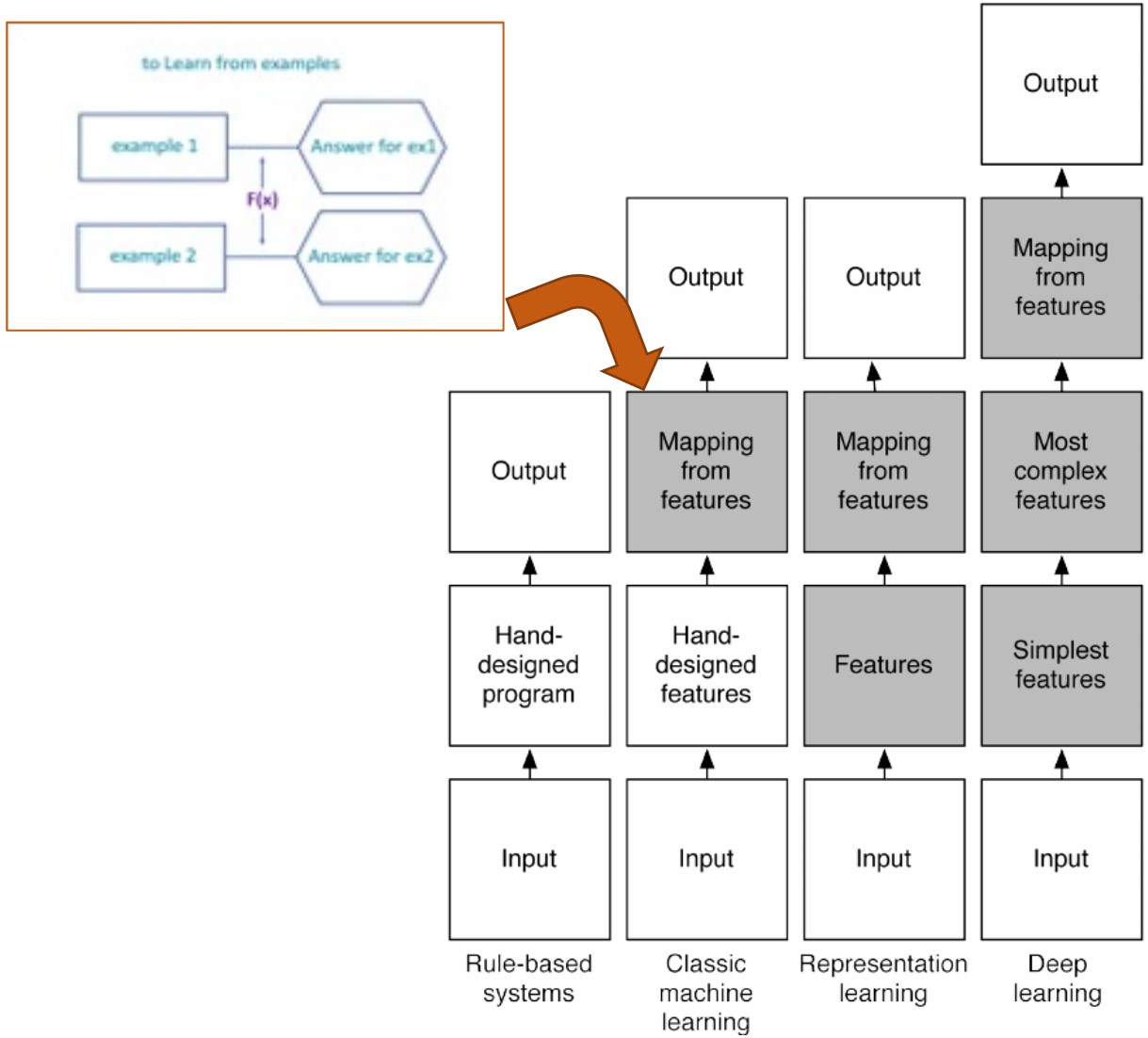


Classification Evolution



[image from] https://rinuboney.github.io/2015/10/18/theoretical-motivations-deep-learning.html

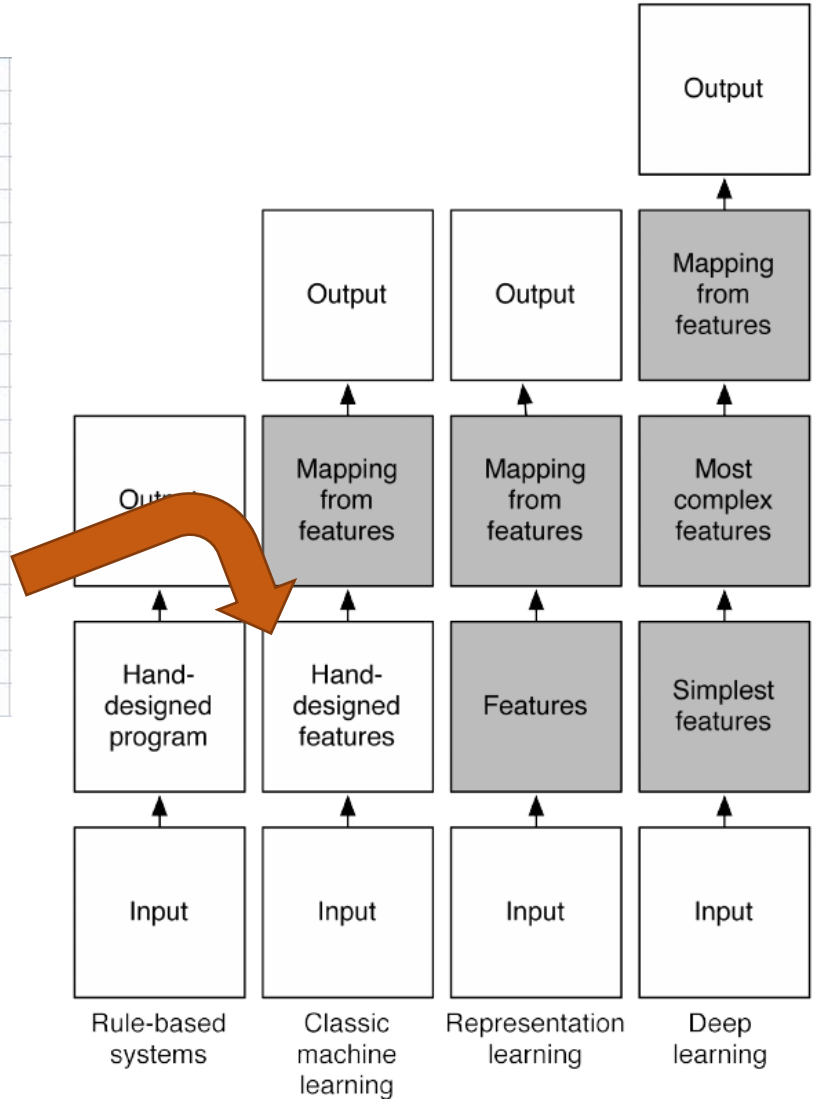
What we are focusing on



[image from] https://rinuboney.github.io/2015/10/18/theoretical-motivations-deep-learning.html

What we are focusing on

Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
1	5.1	3.5	1.4	0.2	Iris-setosa
2	4.9	3	1.4	0.2	Iris-setosa
3	4.7	3.2	1.3	0.2	Iris-setosa
4	4.6	3.1	1.5	0.2	Iris-setosa
5	5	3.6	1.4	0.2	Iris-setosa
6	5.4	3.9	1.7	0.4	Iris-setosa
7	4.6	3.4	1.4	0.3	Iris-setosa
8	5	3.4	1.5	0.2	Iris-setosa
9	4.4	2.9	1.4	0.2	Iris-setosa
10	4.9	3.1	1.5	0.1	Iris-setosa
11	5.4	3.7	1.5	0.2	Iris-setosa
12	4.8	3.4	1.6	0.2	Iris-setosa
13	4.8	3	1.4	0.1	Iris-setosa
14	4.3	3	1.1	0.1	Iris-setosa
15	5.8	4	1.2	0.2	Iris-setosa
16	5.7	4.4	1.5	0.4	Iris-setosa
17	5.4	3.9	1.3	0.4	Iris-setosa
18	5.1	3.5	1.4	0.3	Iris-setosa
19	5.7	3.8	1.7	0.3	Iris-setosa



[image from] https://rinuboney.github.io/2015/10/18/theoretical-motivations-deep-learning.html

The data

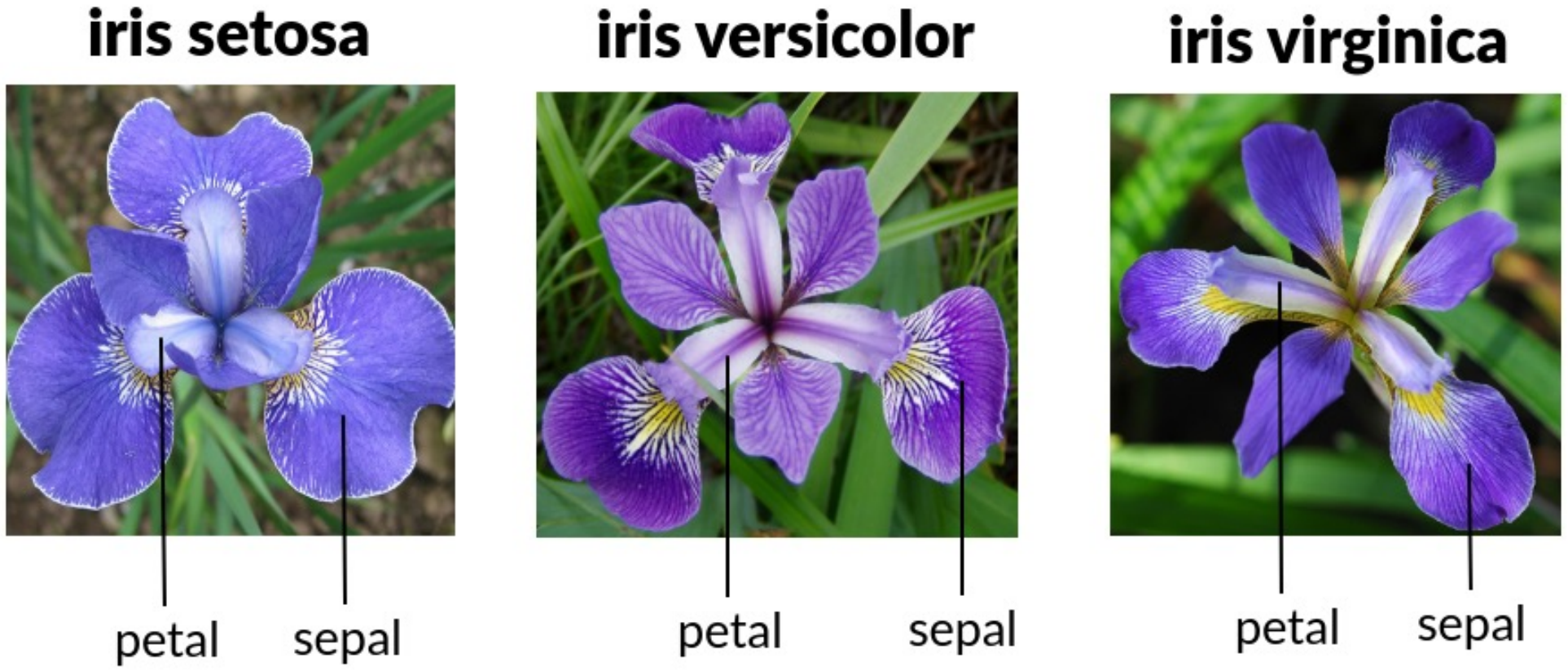
features

label

data point
data point
.
.
.
data point

Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
1	5.1	3.5	1.4	0.2	Iris-setosa
2	4.9	3	1.4	0.2	Iris-setosa
3	4.7	3.2	1.3	0.2	Iris-setosa
4	4.6	3.1	1.5	0.2	Iris-setosa
5	5	3.6	1.4	0.2	Iris-setosa
6	5.4	3.9	1.7	0.4	Iris-setosa
7	4.6	3.4	1.4	0.3	Iris-setosa
8	5	3.4	1.5	0.2	Iris-setosa
9	4.4	2.9	1.4	0.2	Iris-setosa
10	4.9	3.1	1.5	0.1	Iris-setosa
11	5.4	3.7	1.5	0.2	Iris-setosa
12	4.8	3.4	1.6	0.2	Iris-setosa
13	4.8	3	1.4	0.1	Iris-setosa
14	4.3	3	1.1	0.1	Iris-setosa
15	5.8	4	1.2	0.2	Iris-setosa
16	5.7	4.4	1.5	0.4	Iris-setosa
17	5.4	3.9	1.3	0.4	Iris-setosa
18	5.1	3.5	1.4	0.3	Iris-setosa
19	5.7	3.8	1.7	0.3	Iris-setosa

Iris Dataset



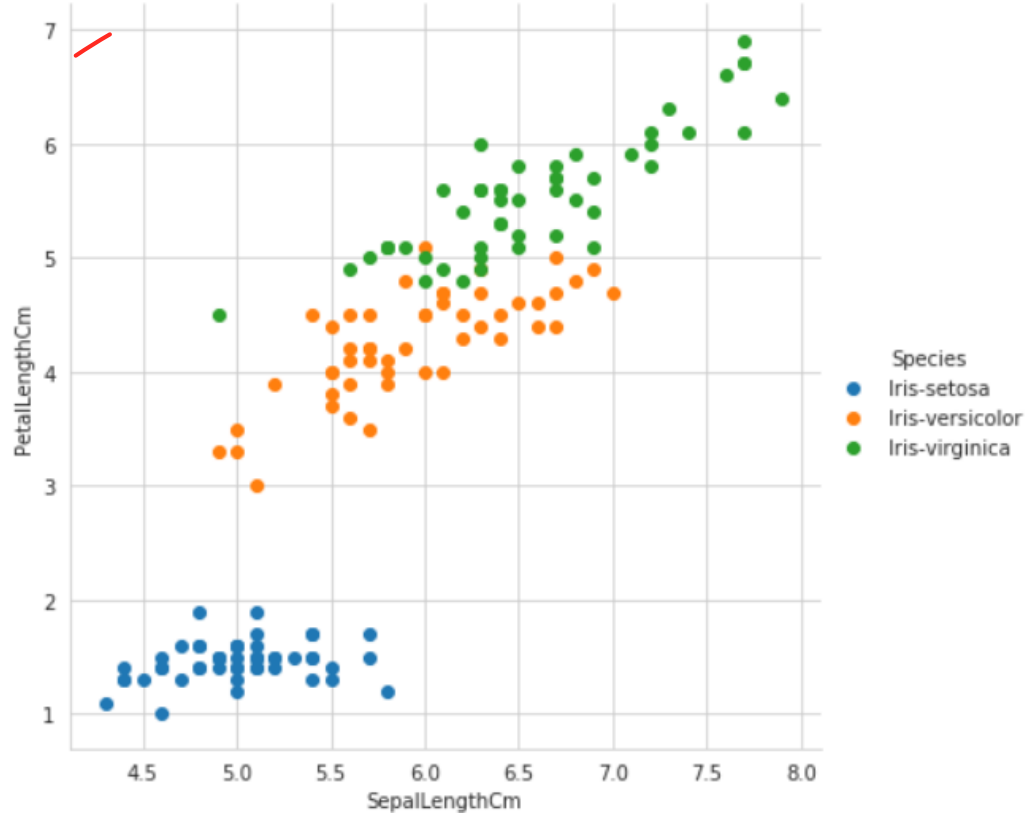
[image from] https://machinelearninghd.com/iris-dataset-uci-machine-learning-repository-project/

The data

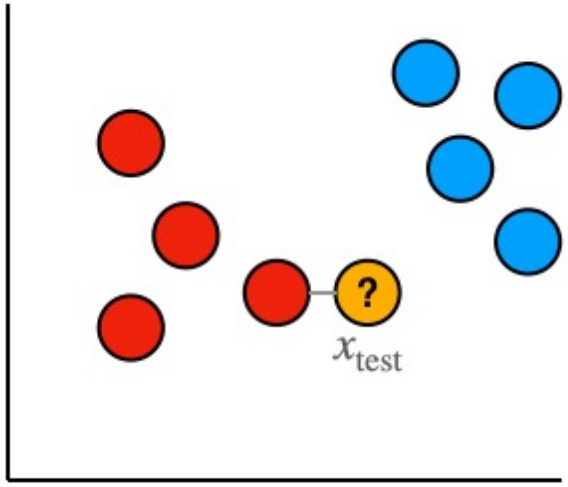
Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
1	5.1	3.5	1.4	0.2	Iris-setosa
2	4.9	3	1.4	0.2	Iris-setosa
3	4.7	3.2	1.3	0.2	Iris-setosa
4	4.6	3.1	1.5	0.2	Iris-setosa
5	5	3.6	1.4	0.2	Iris-setosa
6	5.4	3.9	1.7	0.4	Iris-setosa
7	4.6	3.4	1.4	0.3	Iris-setosa
8	5	3.4	1.5	0.2	Iris-setosa
9	4.4	2.9	1.4	0.2	Iris-setosa
10	4.9	3.1	1.5	0.1	Iris-setosa
11	5.4	3.7	1.5	0.2	Iris-setosa
12	4.8	3.4	1.6	0.2	Iris-setosa
13	4.8	3	1.4	0.1	Iris-setosa
14	4.3	3	1.1	0.1	Iris-setosa
15	5.8	4	1.2	0.2	Iris-setosa
16	5.7	4.4	1.5	0.4	Iris-setosa
17	5.4	3.9	1.3	0.4	Iris-setosa
18	5.1	3.5	1.4	0.3	Iris-setosa
19	5.7	3.8	1.7	0.3	Iris-setosa

The data

SepalLengthCm	PetalLengthCm
5.1	1.4
4.9	1.4
4.7	1.3
4.6	1.5
5	1.4
5.4	1.7
4.6	1.4
5	1.5
4.4	1.4
4.9	1.5
5.4	1.5
4.8	1.6
4.8	1.4
4.3	1.1
5.8	1.2
5.7	1.5
5.4	1.3
5.1	1.4
5.7	1.7

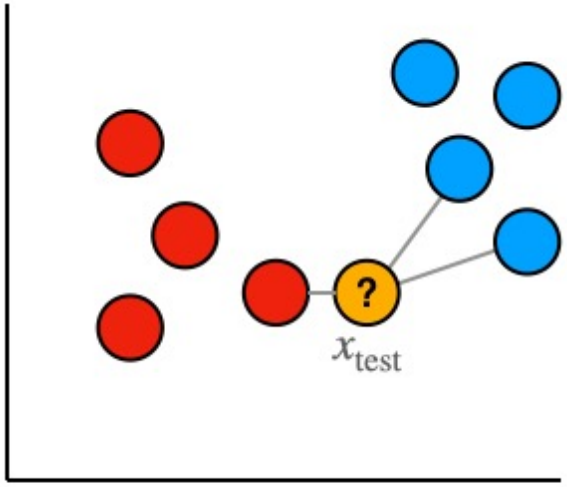


KNN-K Nearest Neighbour



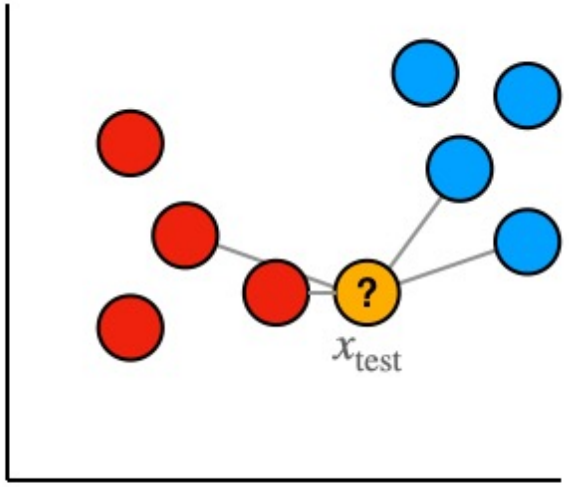
$k = 1$

Nearest point is red, so x_{test} classified as red



$k = 3$

Nearest points are {red, blue, blue} so x_{test} classified as blue

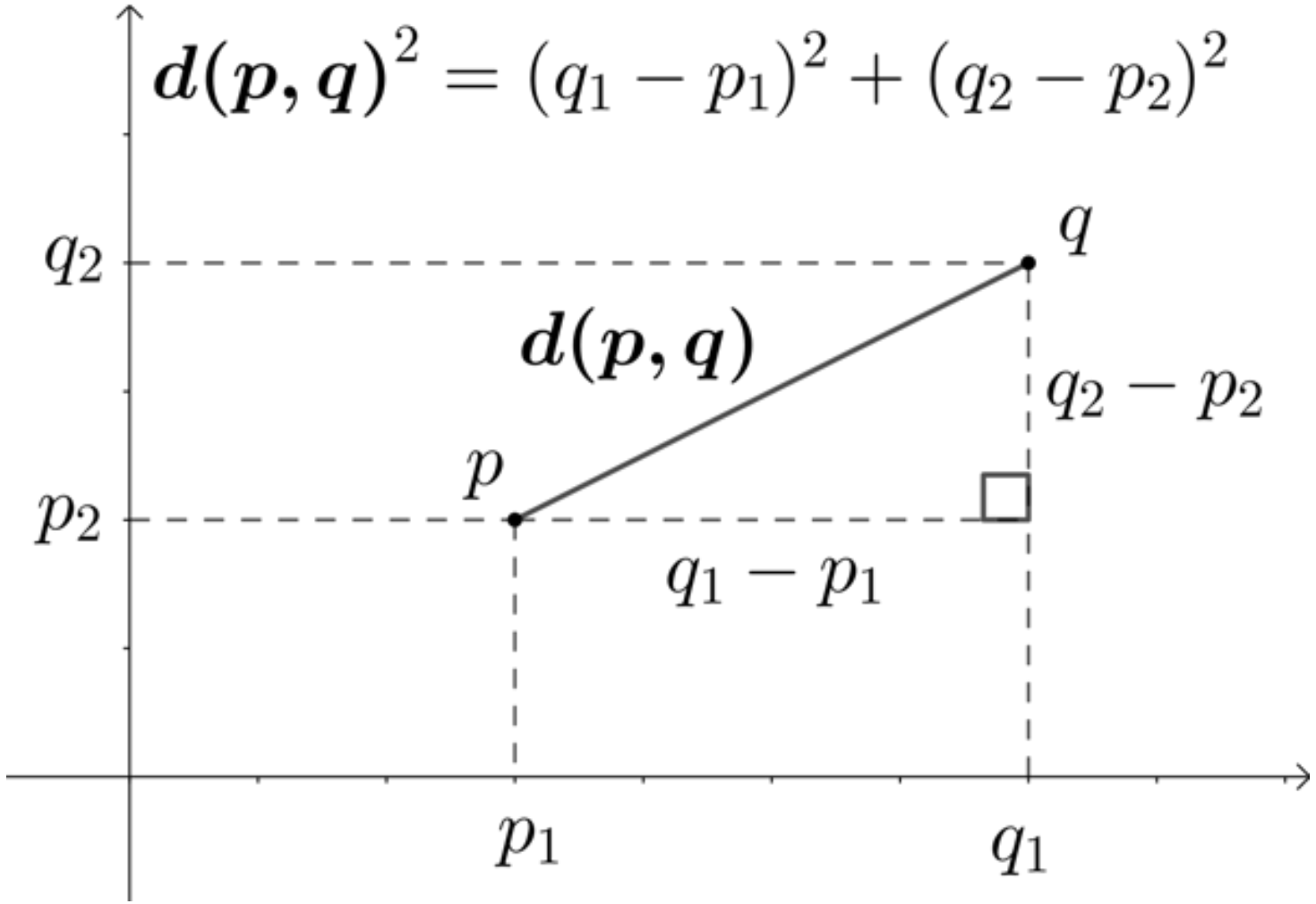


$k = 4$

Nearest points are {red, red, blue, blue} so classification of x_{test} is not properly defined

[image from] https://towardsdatascience.com/why-does-increasing-k-decrease-variance-in-knn-9ed6de2f5061

How similar



Euclidean Distance

Coding Exercise