

KNN ALGORITHM IN MACHINE LEARNING

What is KNN Algorithm?

K-Nearest Neighbors, is one of the simplest **Supervised Machine Learning** Algorithm.

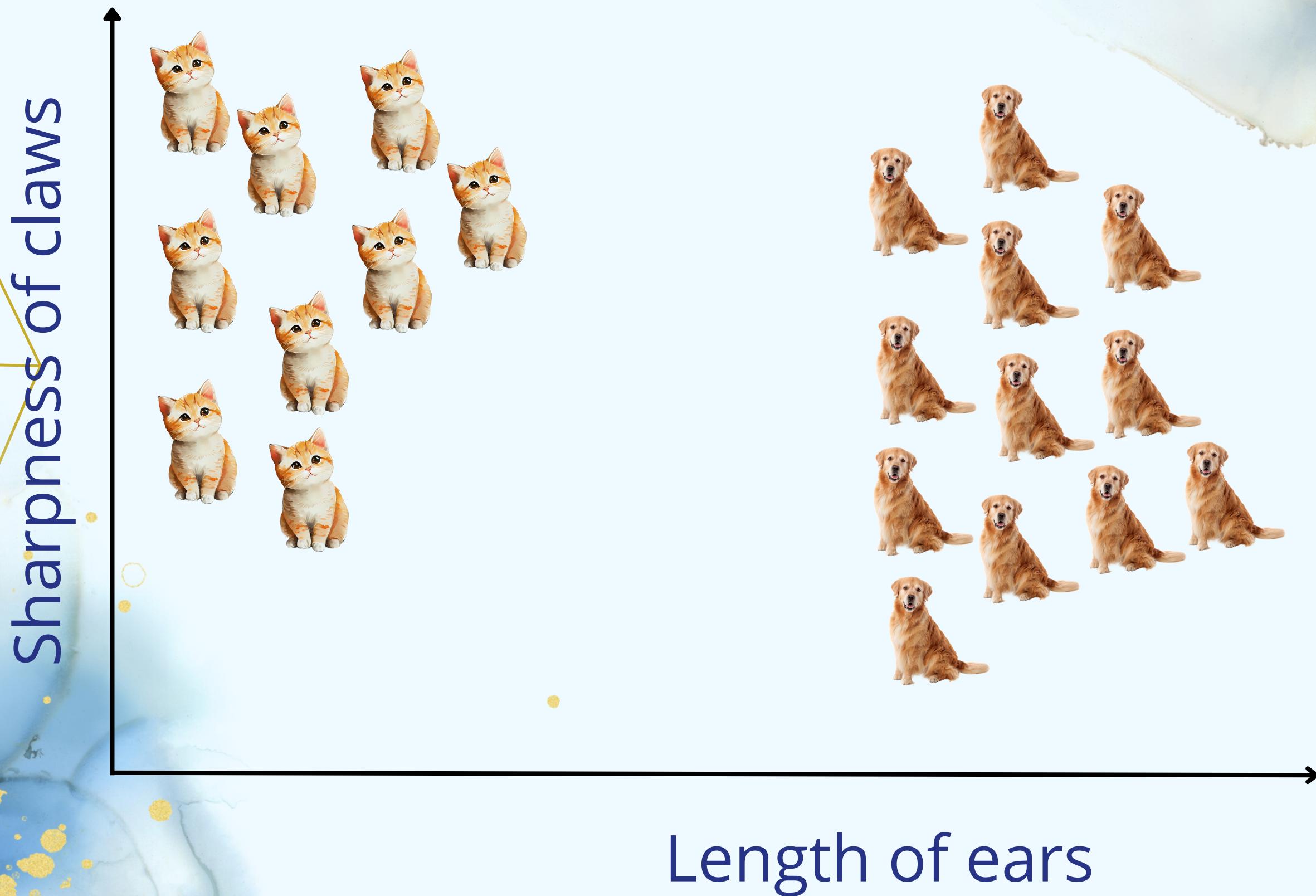
It is used for both **Regression** and **Classification** problem.

It classifies a data point based on how its **neighbors** are classified.

What is KNN Algorithm?



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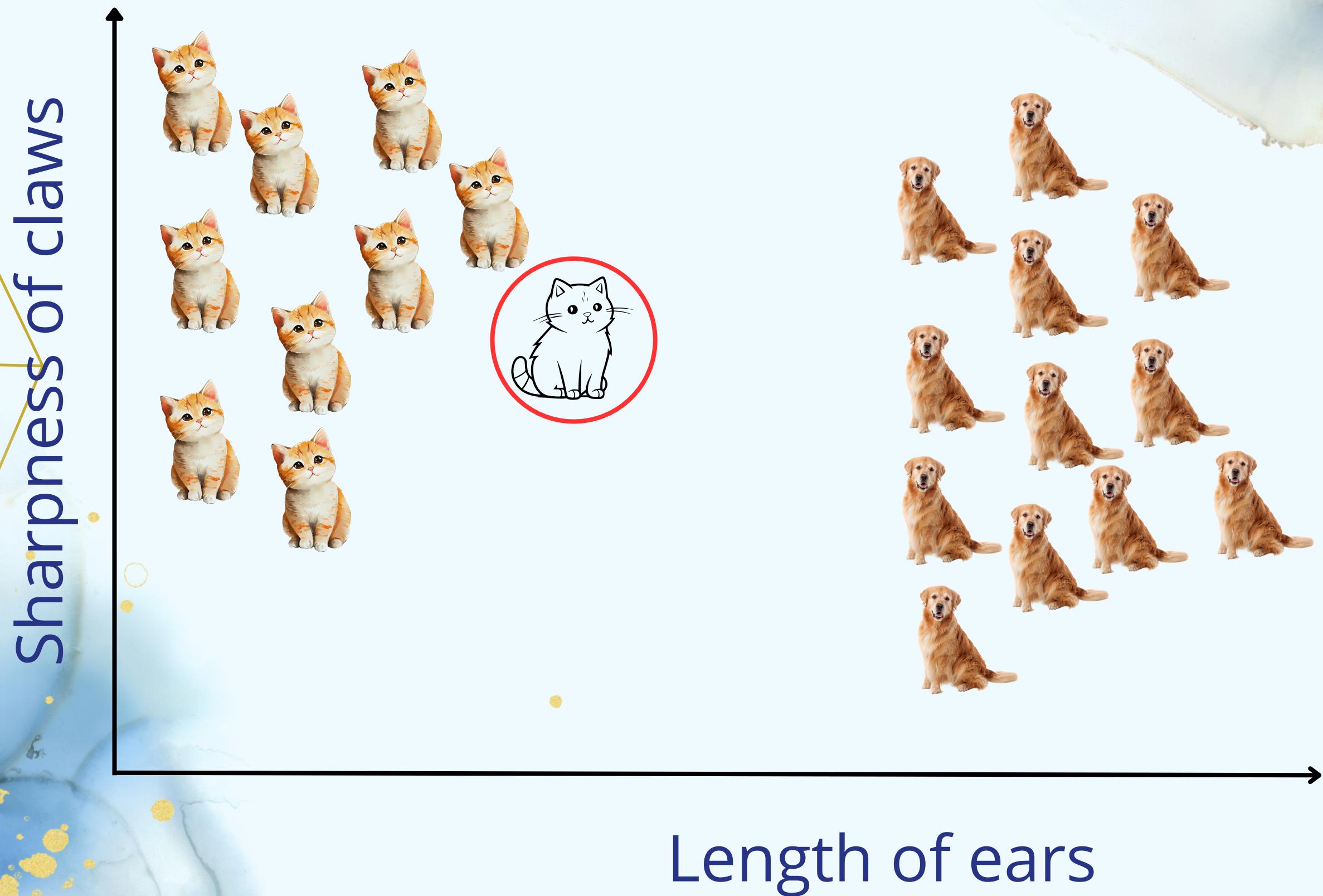


What is KNN Algorithm?



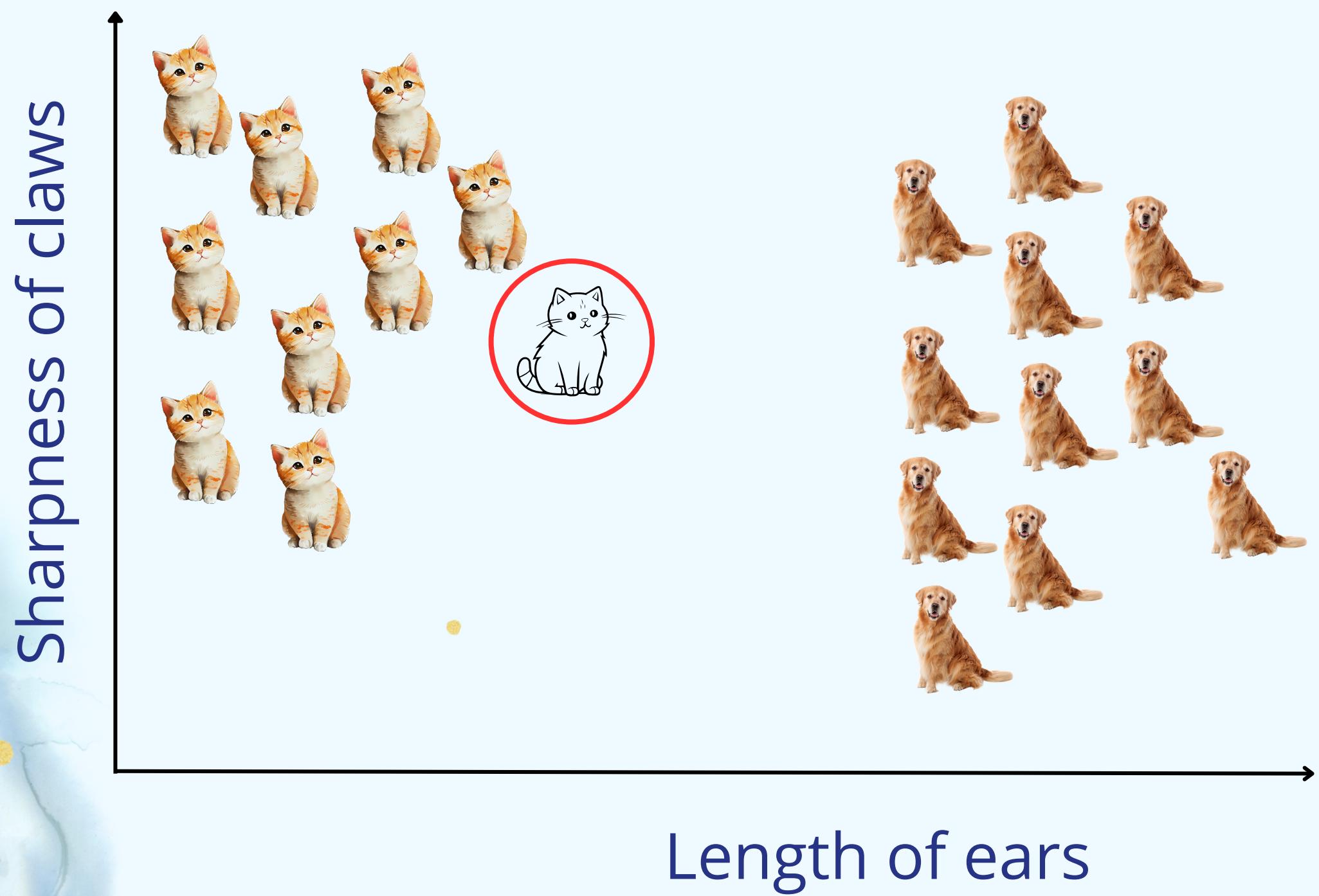
Dog or
Cat??

What is KNN Algorithm?



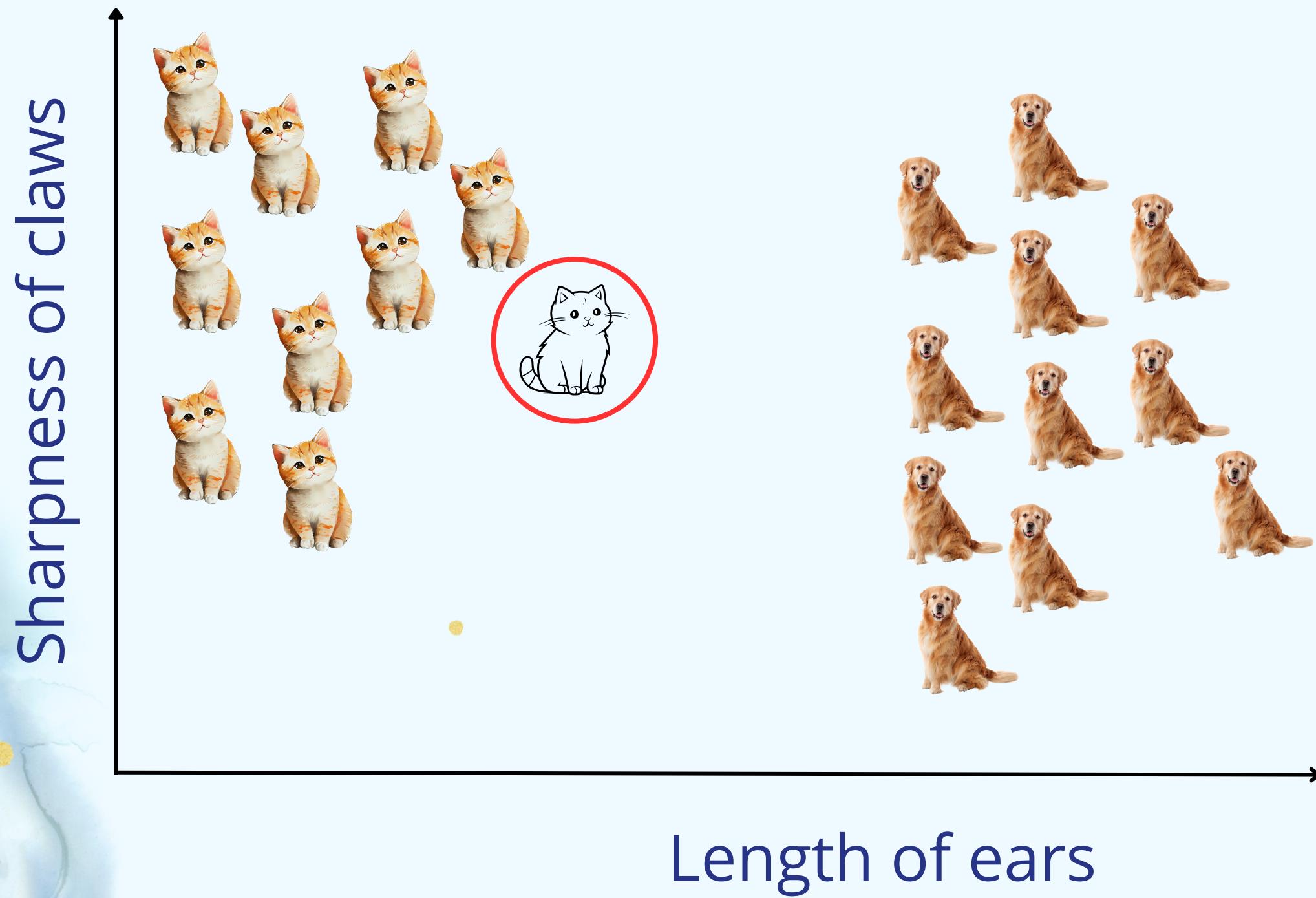
What is KNN Algorithm?

KNN stores all available cases and classifies new cases based on a similarity measure.



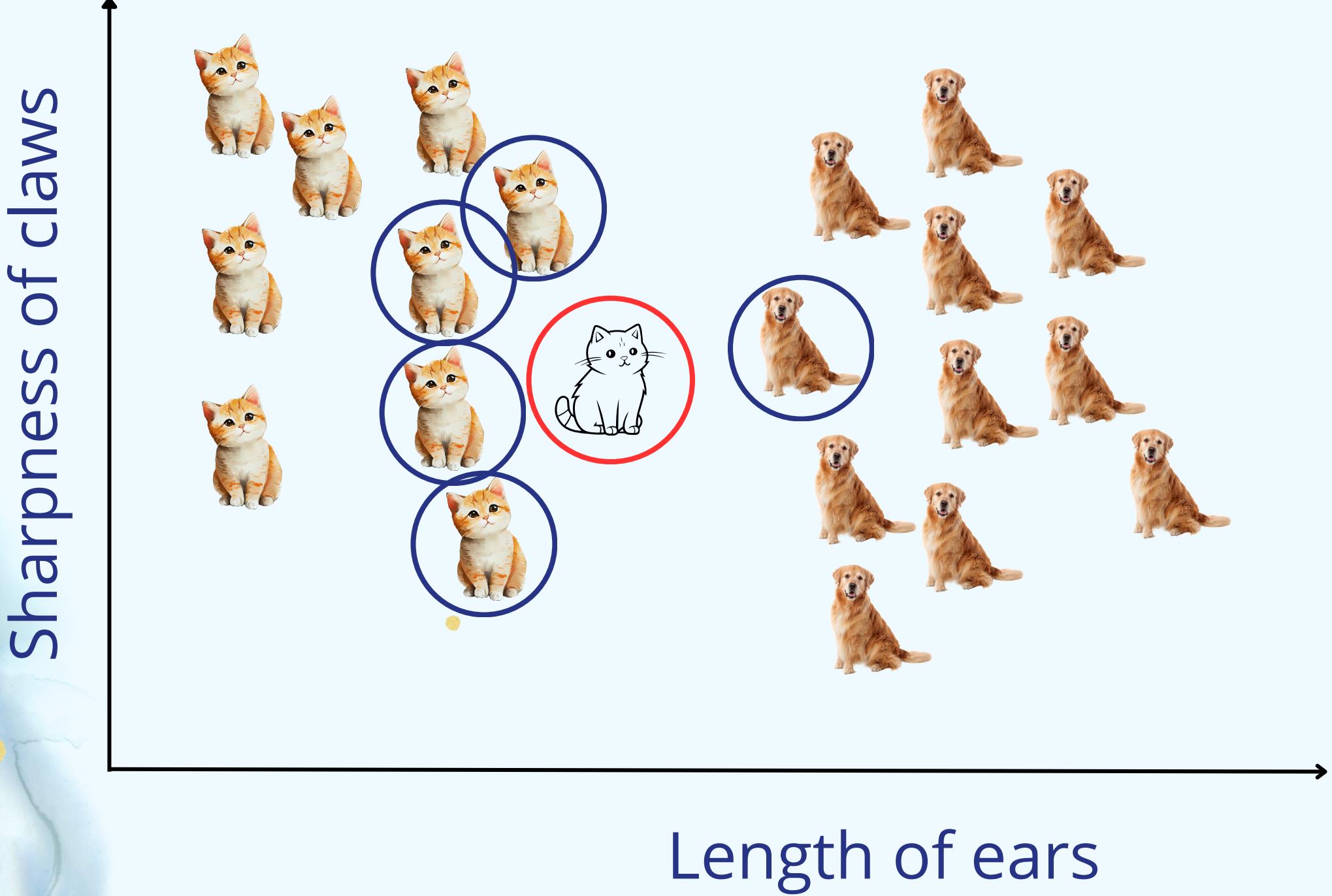
What is KNN Algorithm?

'K' in **KNN** is a parameter that refers to the number of nearest neighbors to include in the majority voting process.



What is KNN Algorithm?

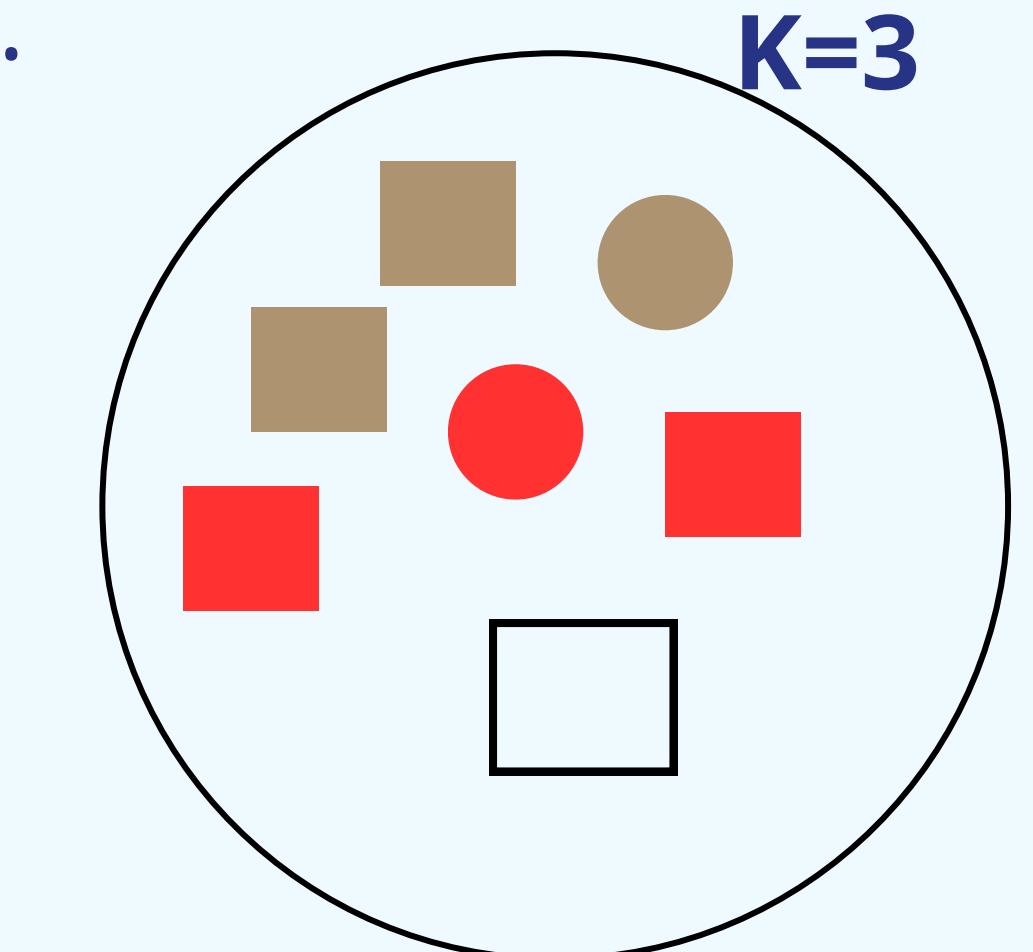
Let the value of K is 5.



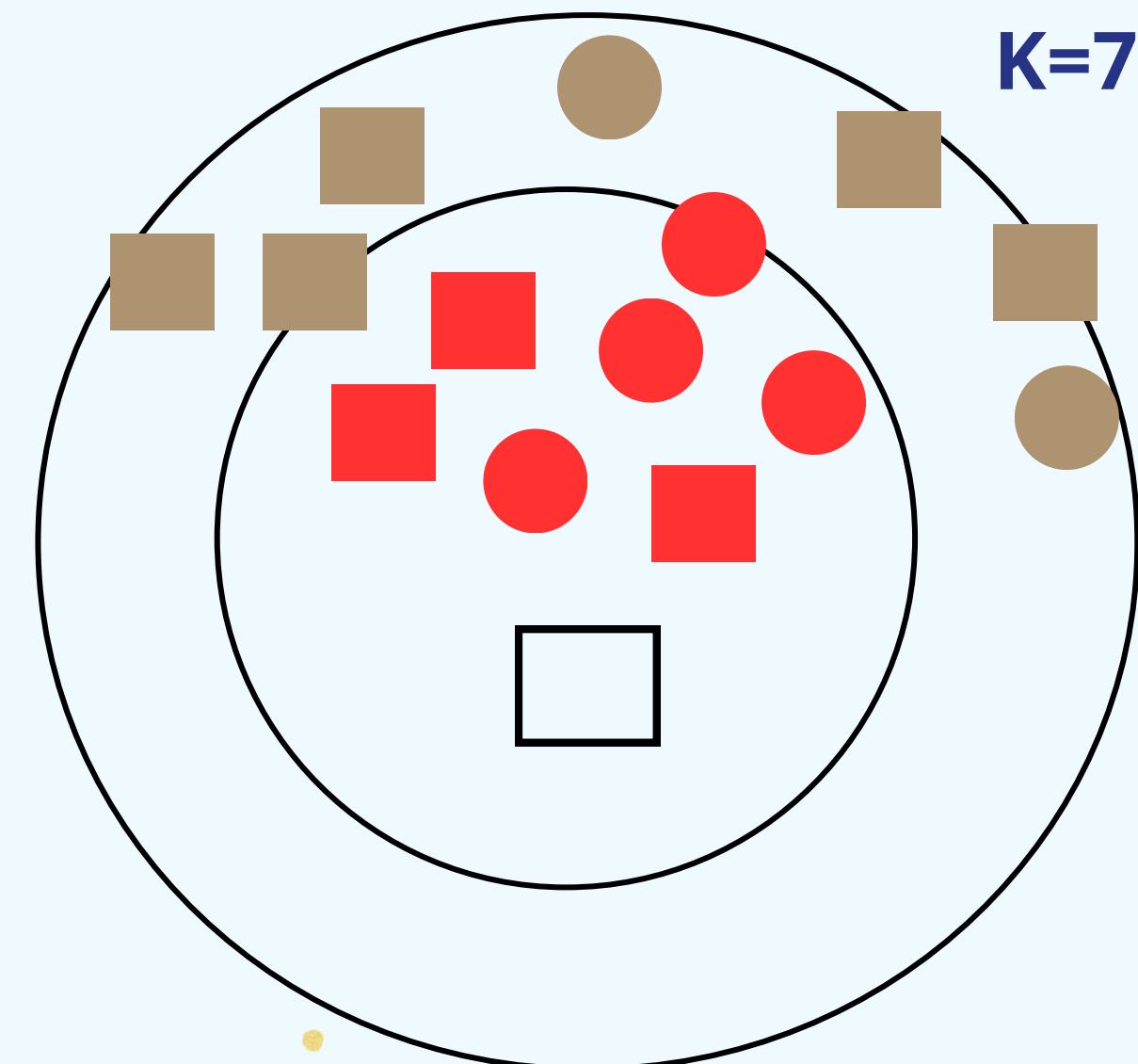
How do we choose the value of K?

KNN algorithm is based on **feature similarity**.

Choosing right value of K is a process called **Parameter Tuning** and it is important for better accuracy.



How do we choose the value of K?



How do we choose the value of K?

Sqrt(n), where n is the total number of datapoints.

Odd value of K is selected to avoid confusion between two classes of data.

When to use KNN Algorithm?

Data is labeled.

Data is noise free.

Dataset is small.

How does KNN Algorithm works?

Weight(x2)	Height(y2)	Class
51	167	Underweight
62	182	Normal
69	176	Normal
64	173	Normal
65	172	Normal
56	174	Underweight
58	169	Normal
57	173	Normal
55	170	Normal

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57	173	Normal
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Weight(x2)	Height(y2)	Class
57 kg	170 cm	???

How does KNN Algorithm works?

On the basis of dataset given we have to classify the given set is Underweight or Normal.

To find the nearest neighbors we will calculate **Euclidean distance**.

According to Euclidean distance formula, the distance between two points in the plane coordinates (x,y) and (a,b) is given by

$$\text{dist}(d) = \sqrt{(x-a)^2 + (y-b)^2}$$

