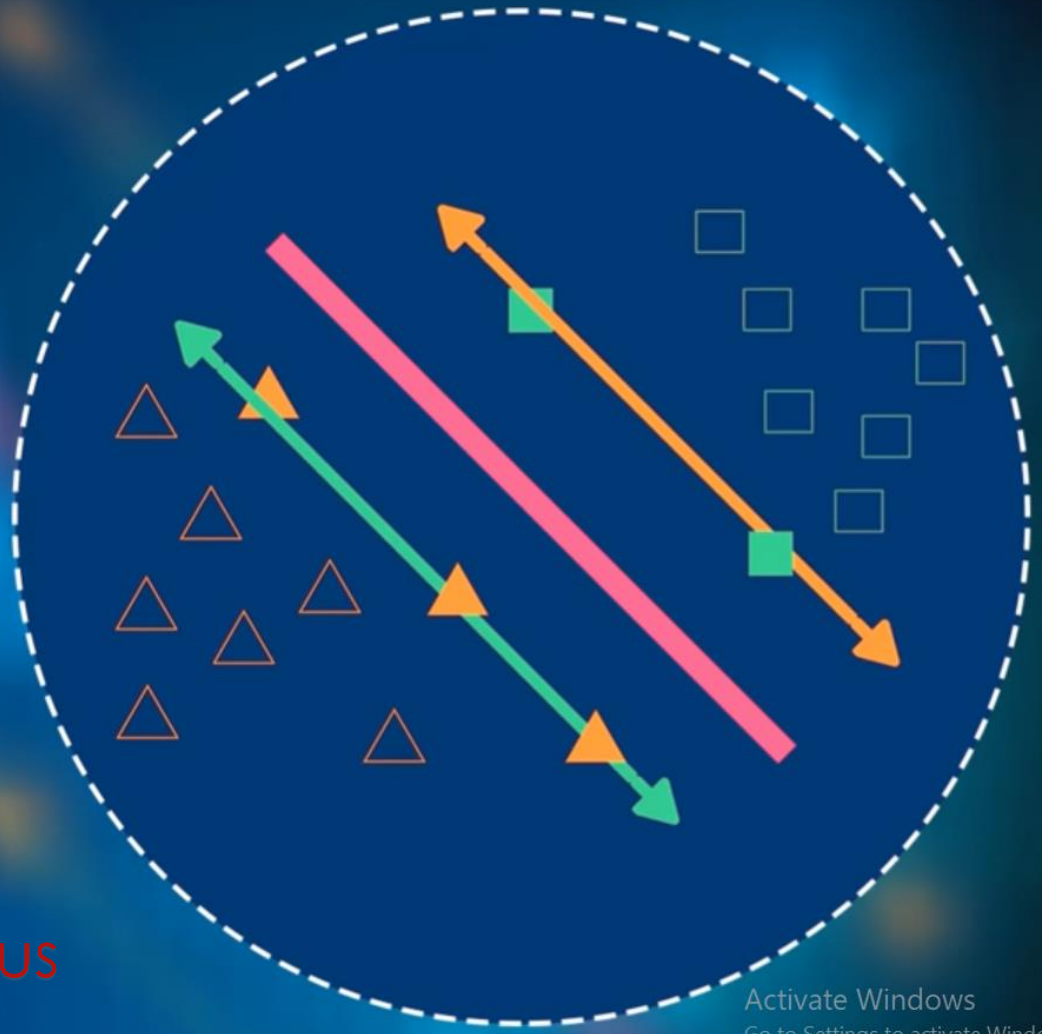
SUPPORT VECTOR MACHINE ALGORITHM



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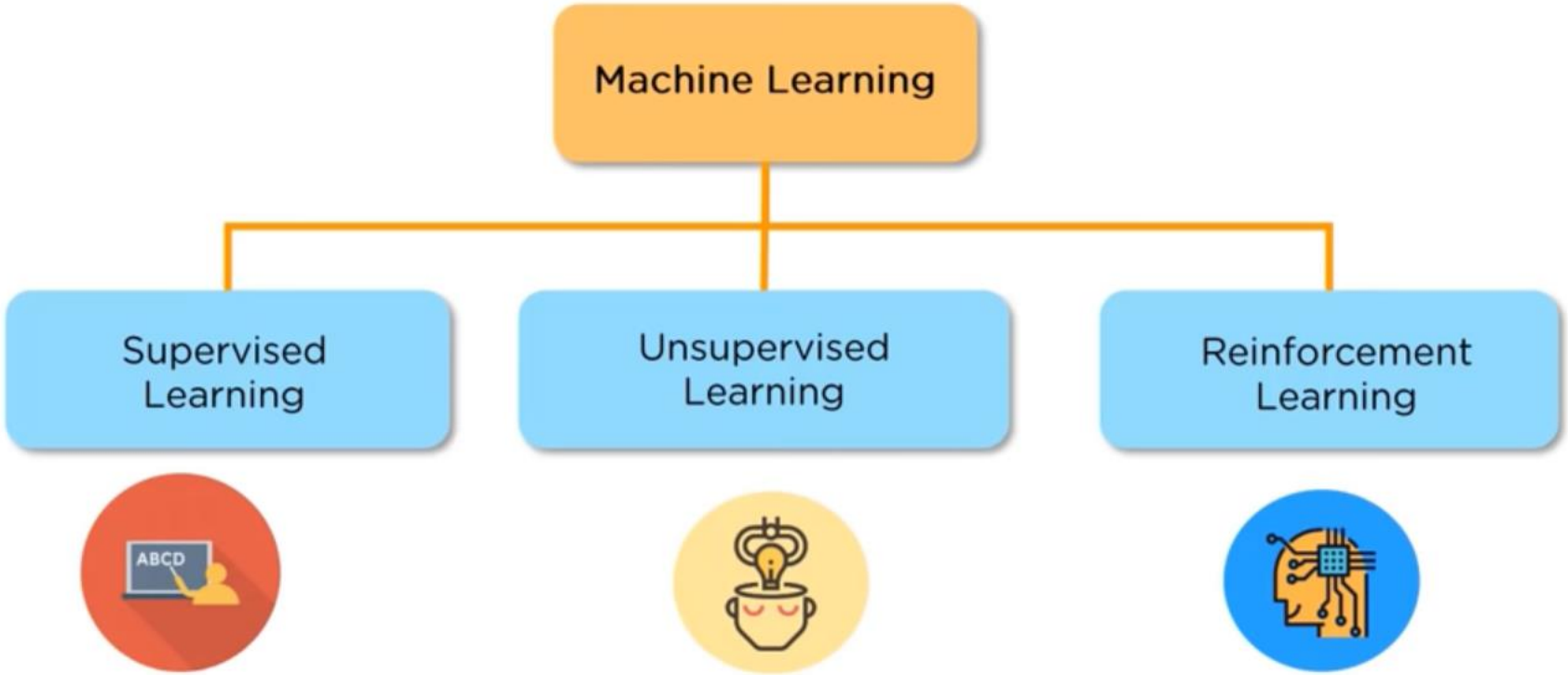
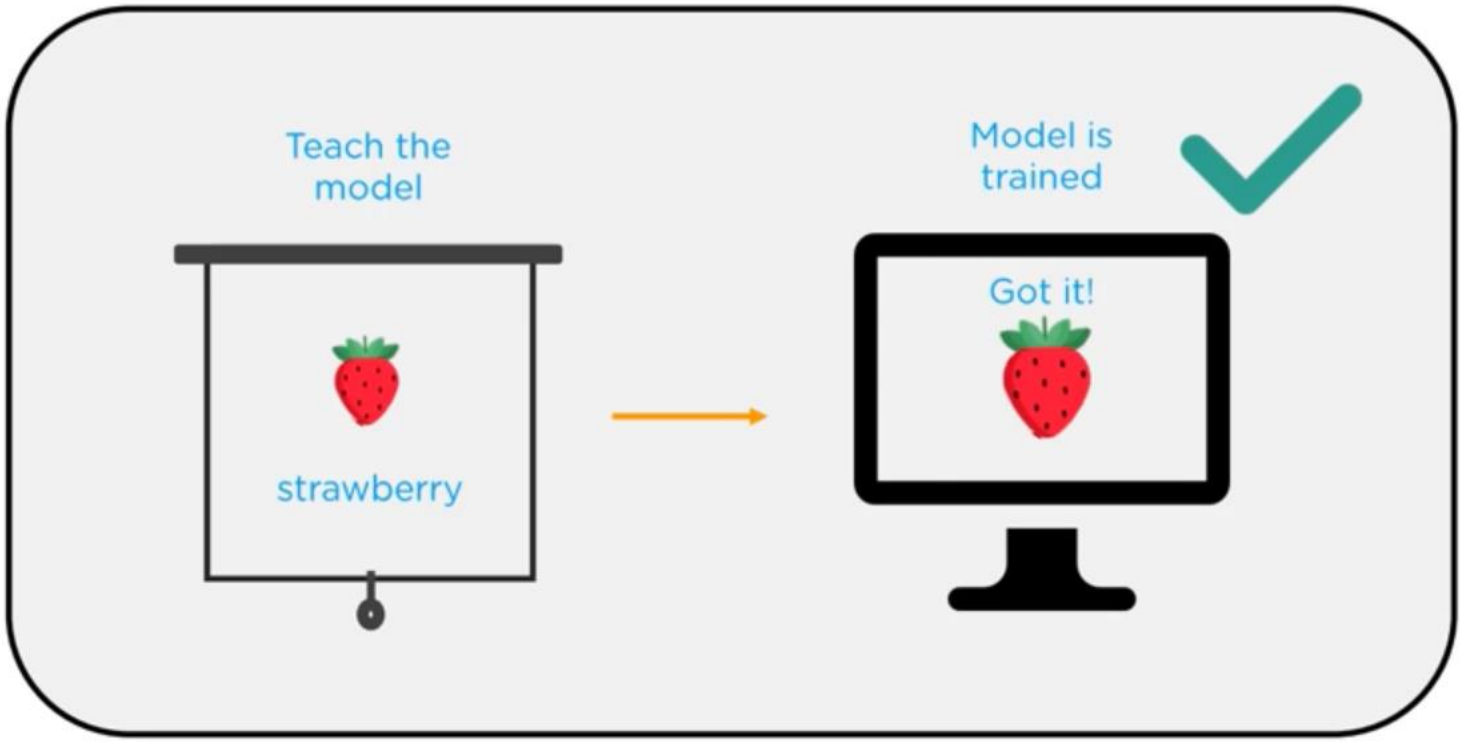
What is Machine learning?



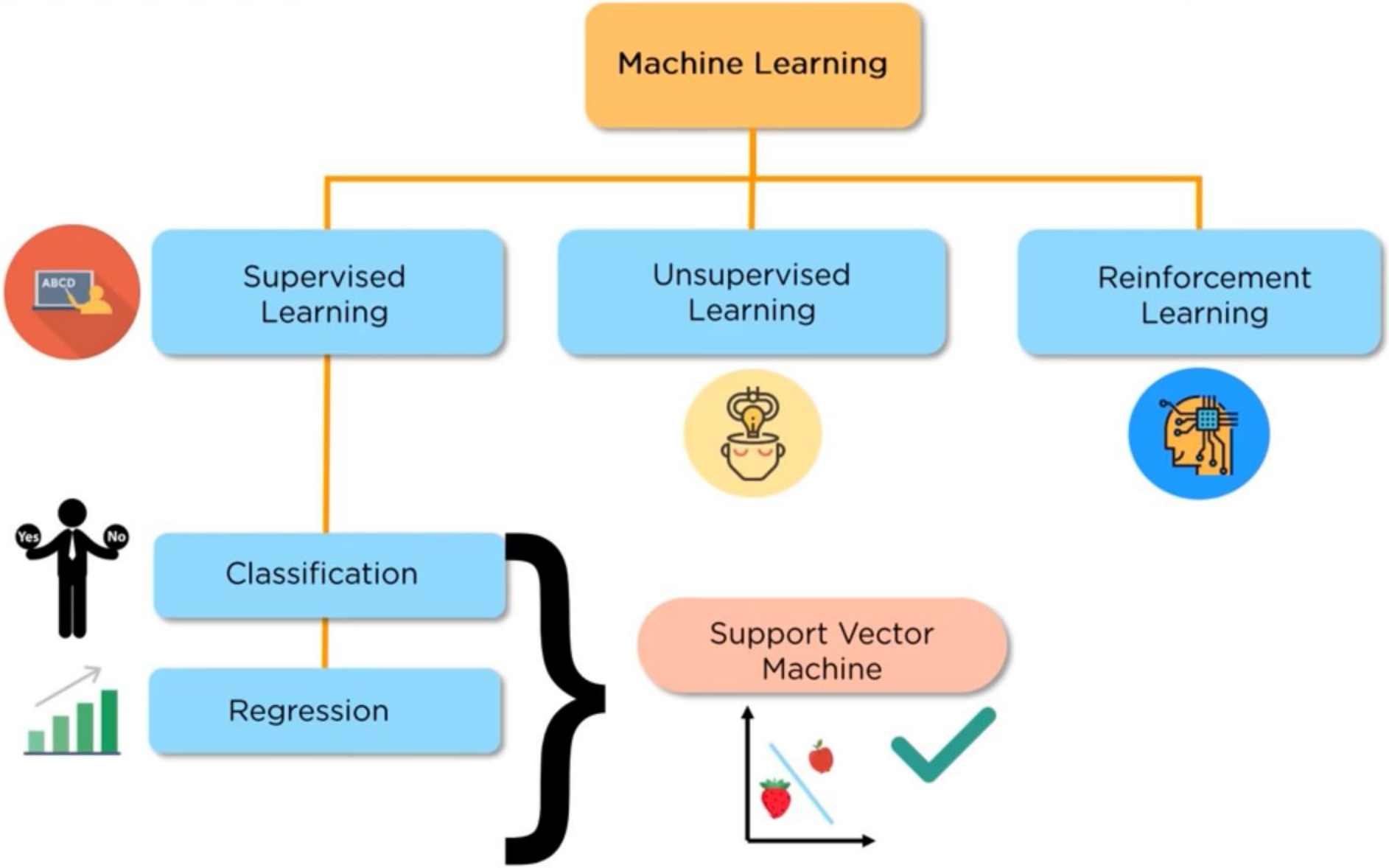
What is Machine learning?

Supervised Learning

Machine learning model learns from the past input data and makes future prediction as output

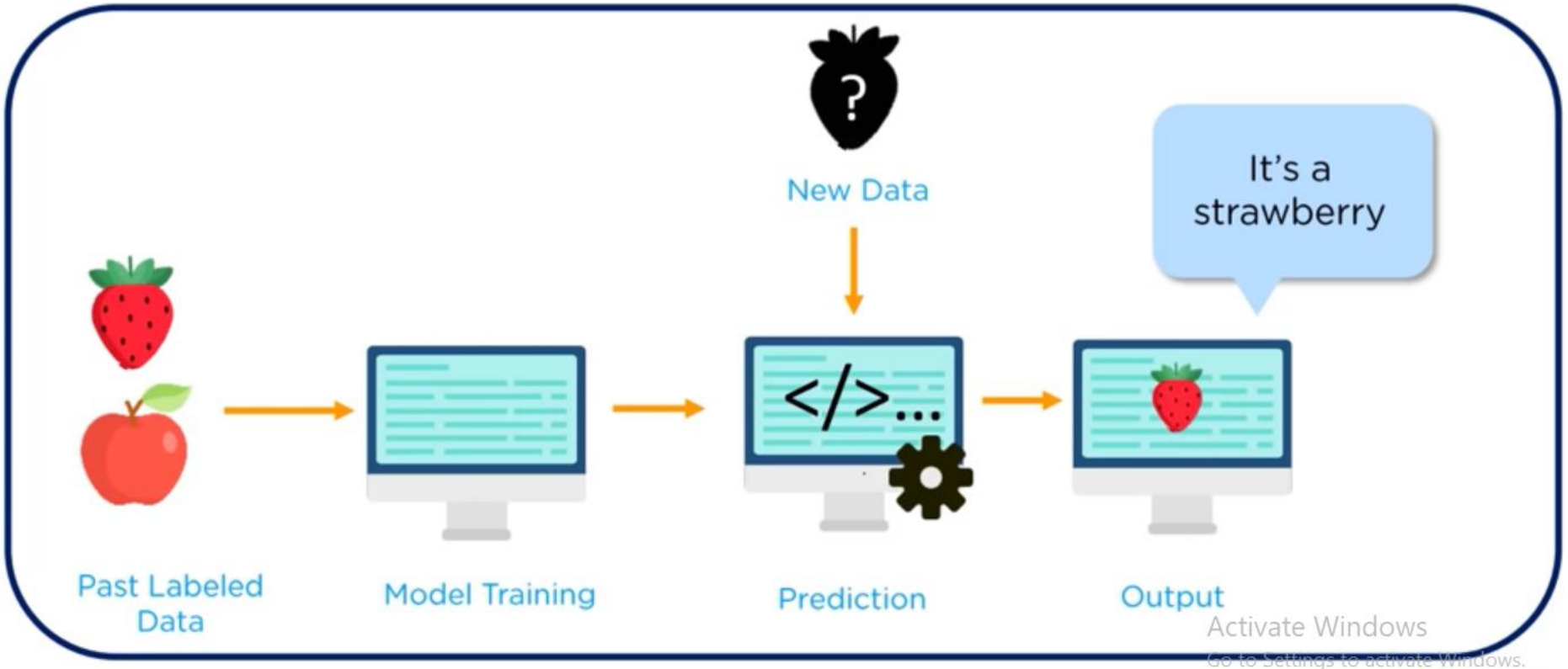


What is Machine learning?

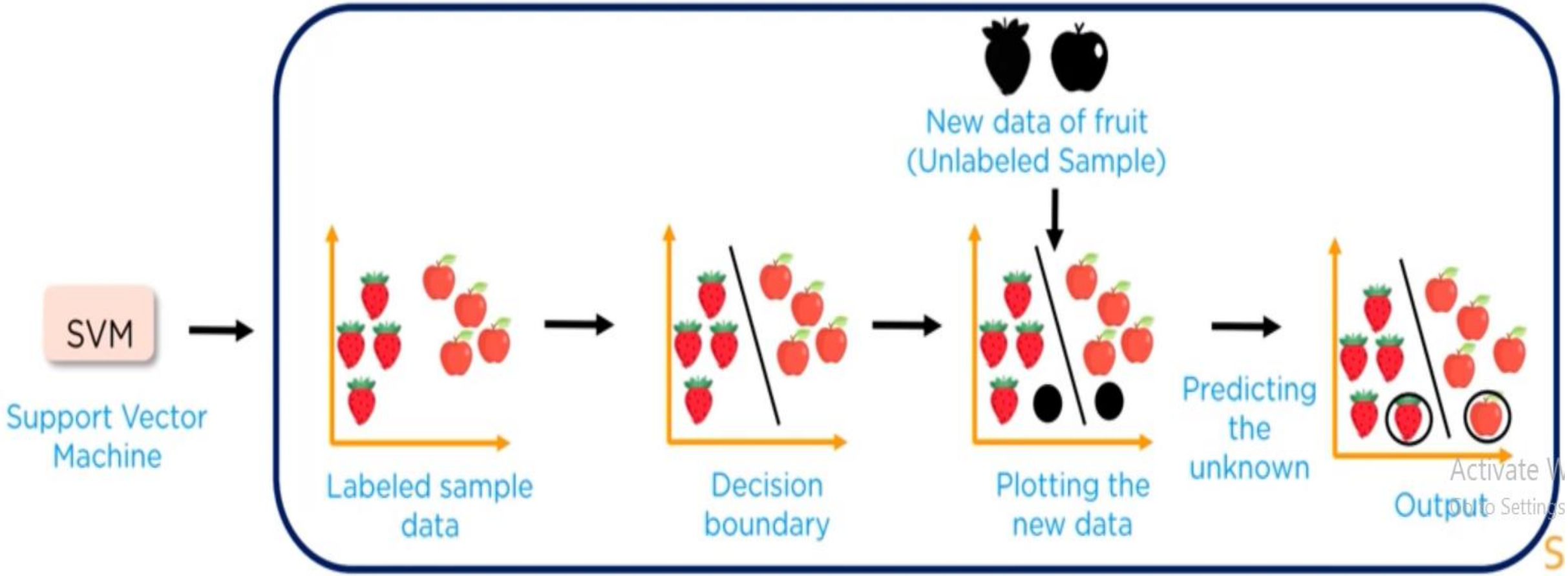


Why Support Vector Machine?

SVM is a supervised learning method that looks at data and sorts it into one of the two categories



Why Support Vector Machine?



Sample data set

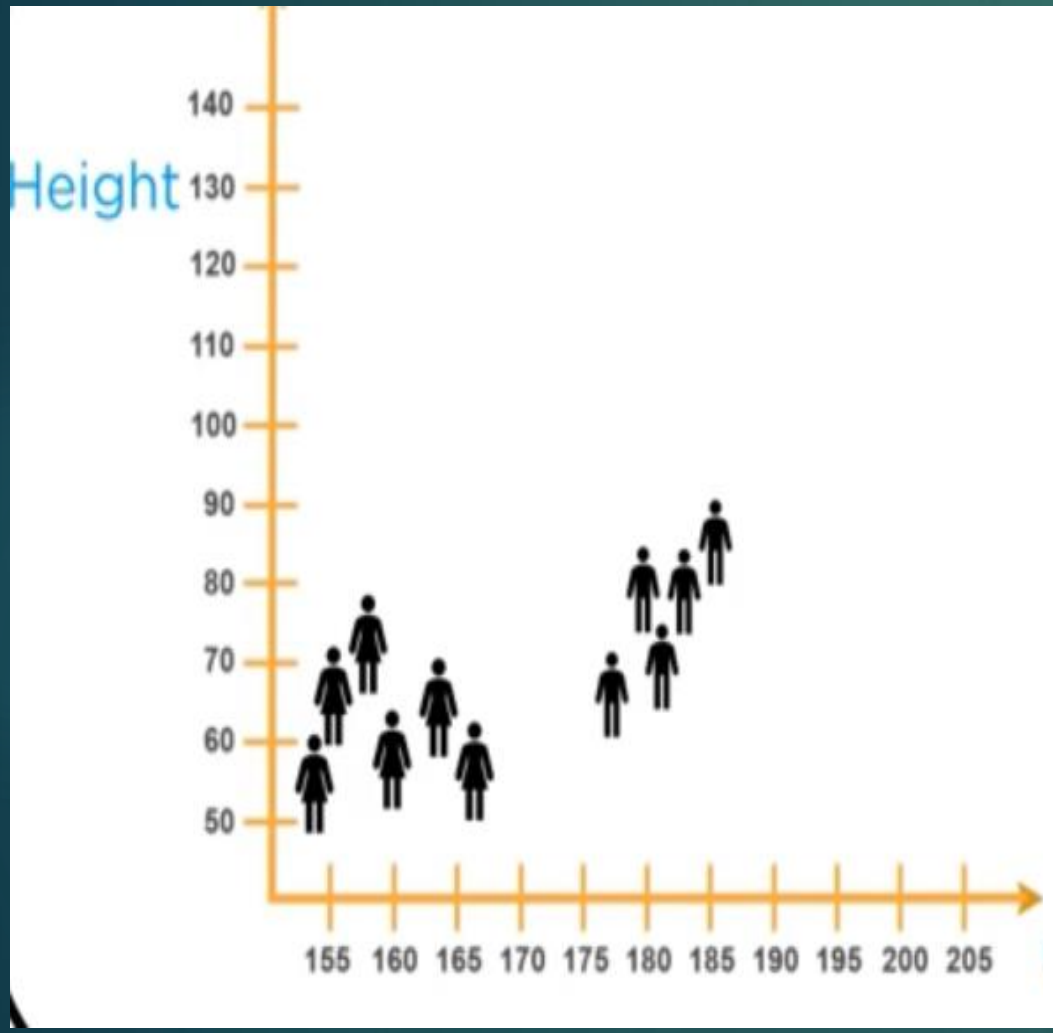
Female

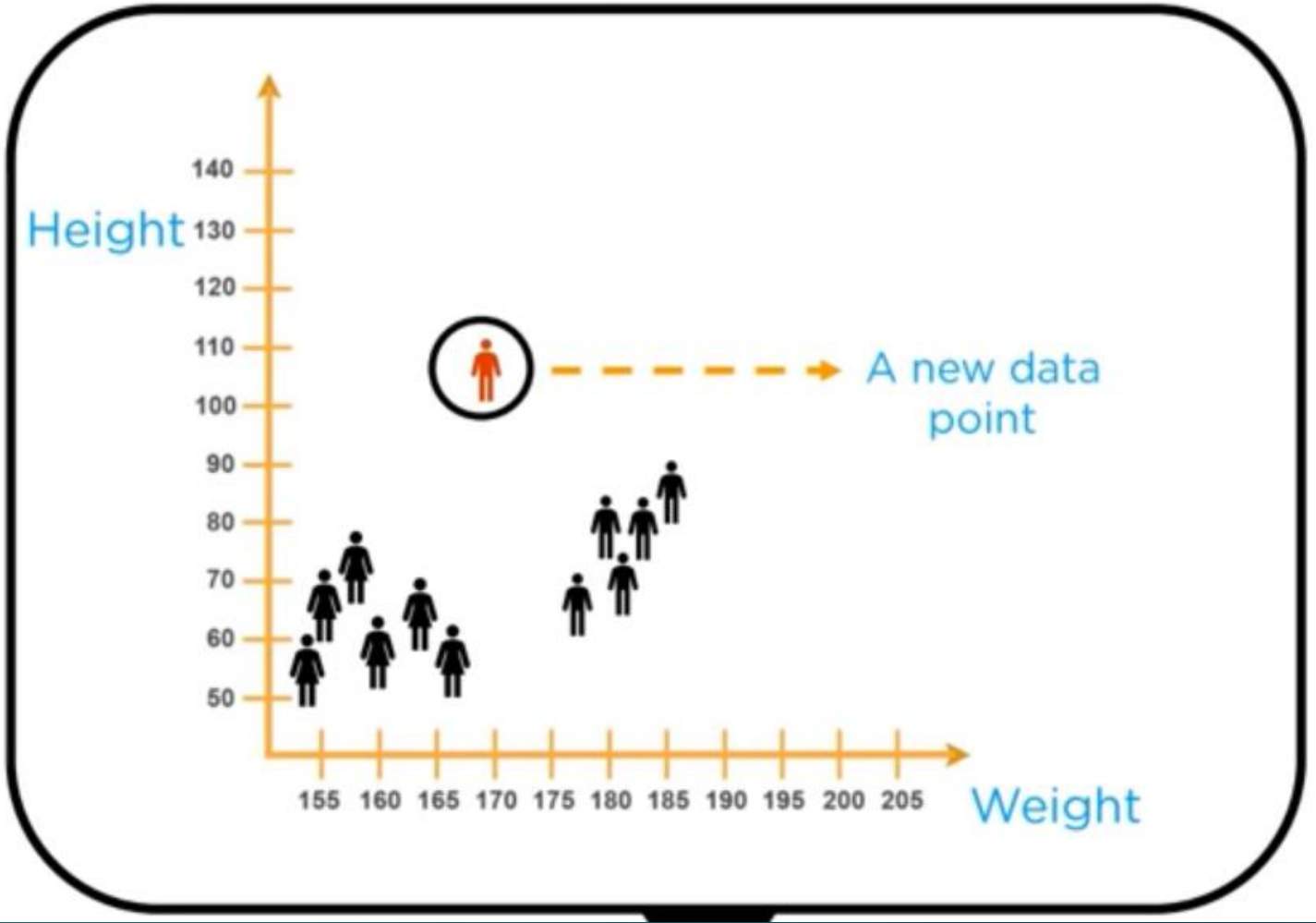
Height	Weight
174	65
174	88
175	75
180	65
185	80

Sample data set

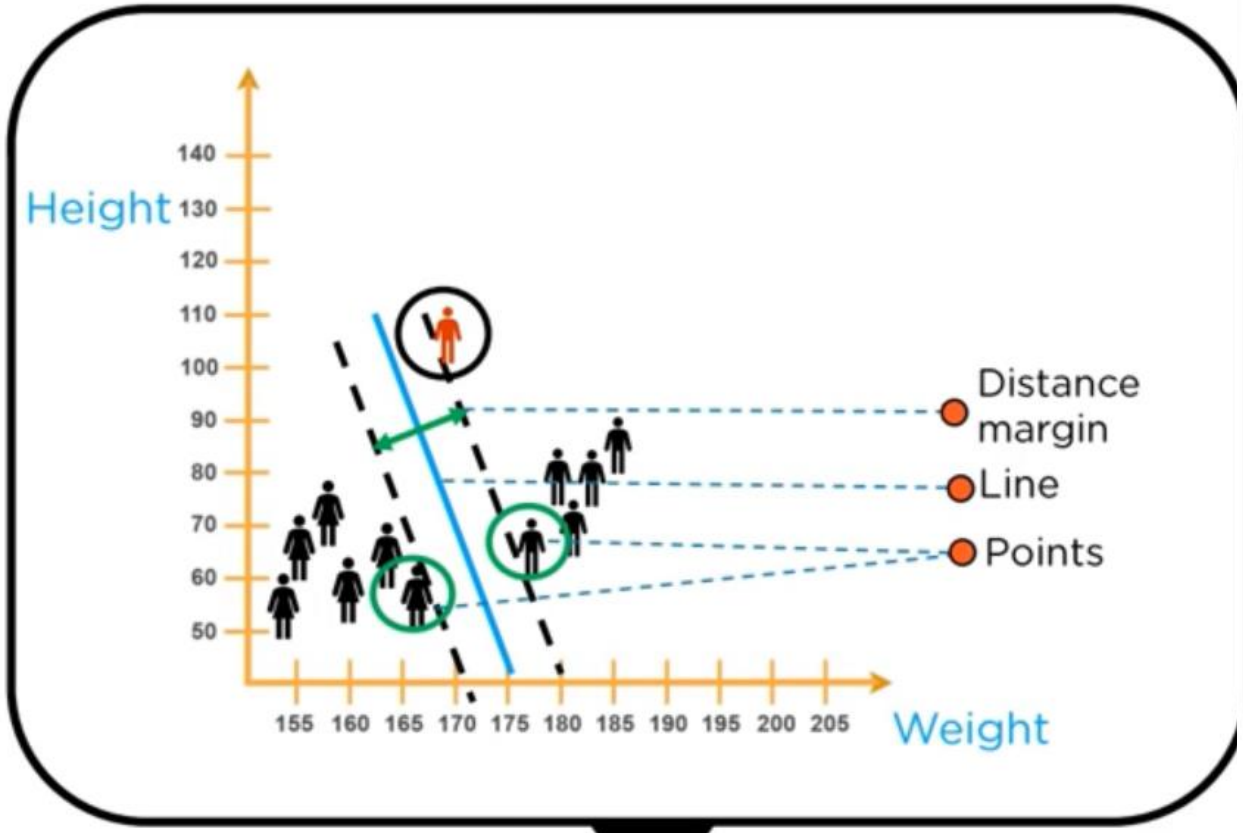
Male

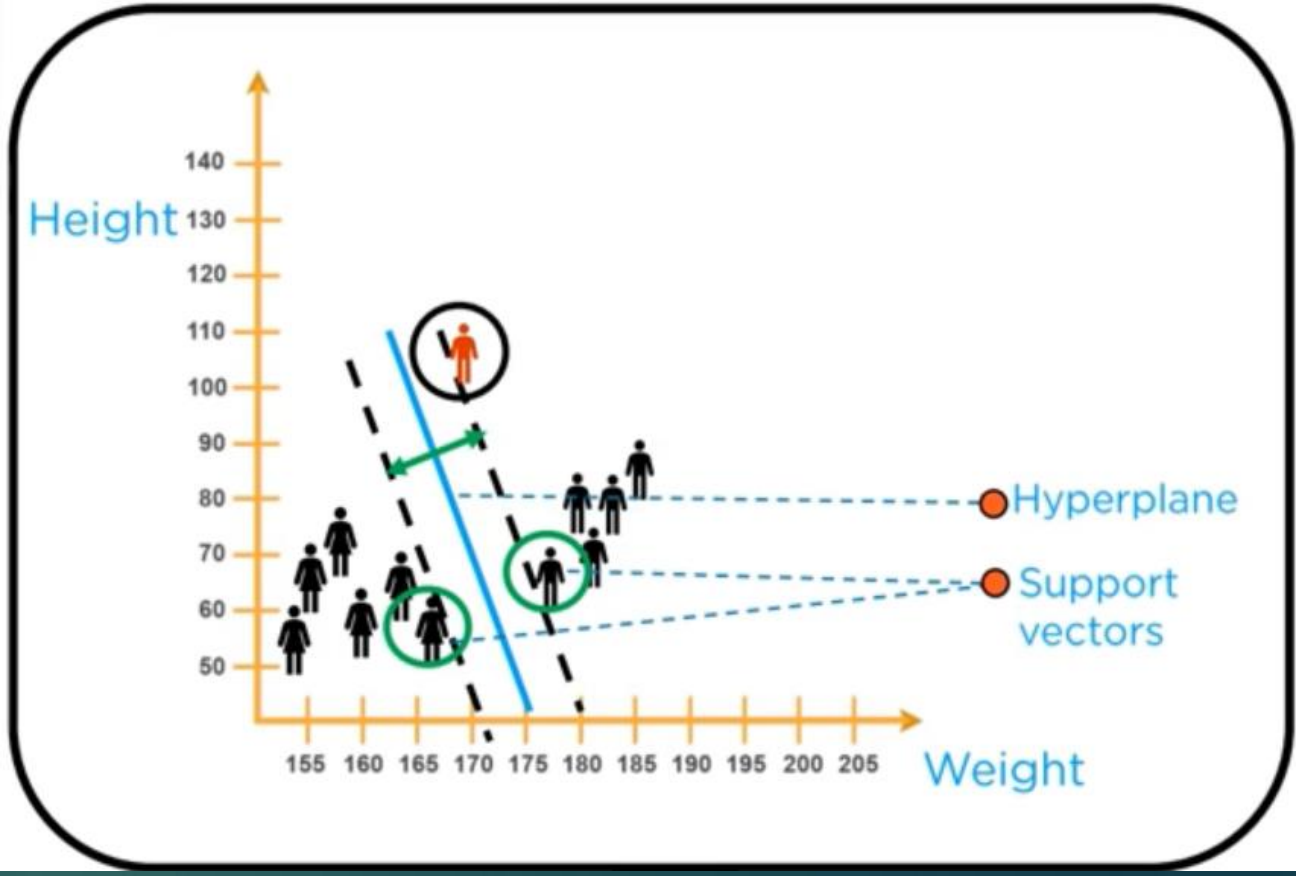
Height	Weight
179	90
180	80
183	80
187	85
182	72


Height
140
130
120
110
100
90
80
70
60
50
155 160 165 170 175 180 185 190 195 200 205

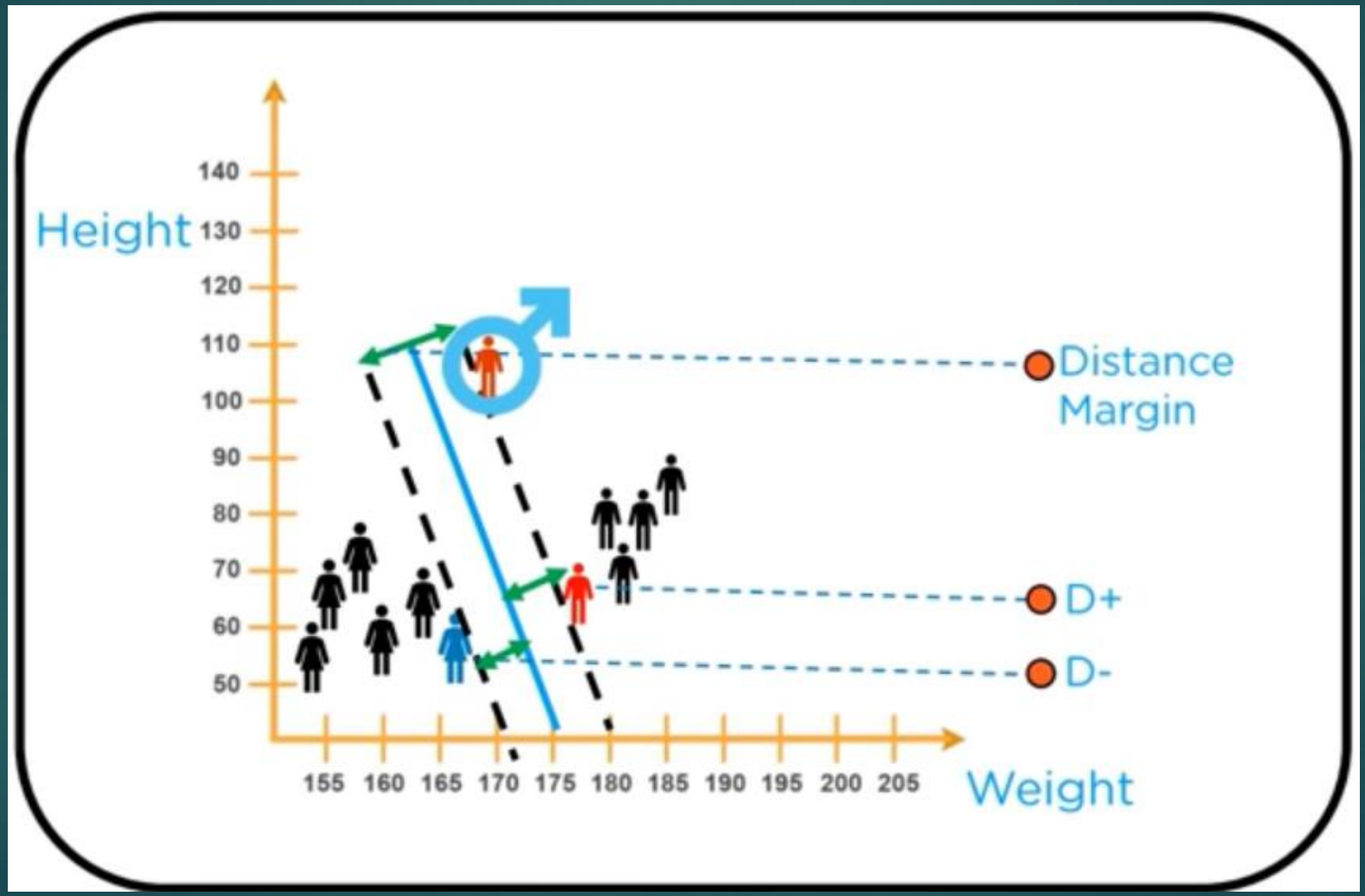

Height
140
130
120
110
100
90
80
70
60
50
A new data point
155 160 165 170 175 180 185 190 195 200 205
Weight

Optimal hyper plane



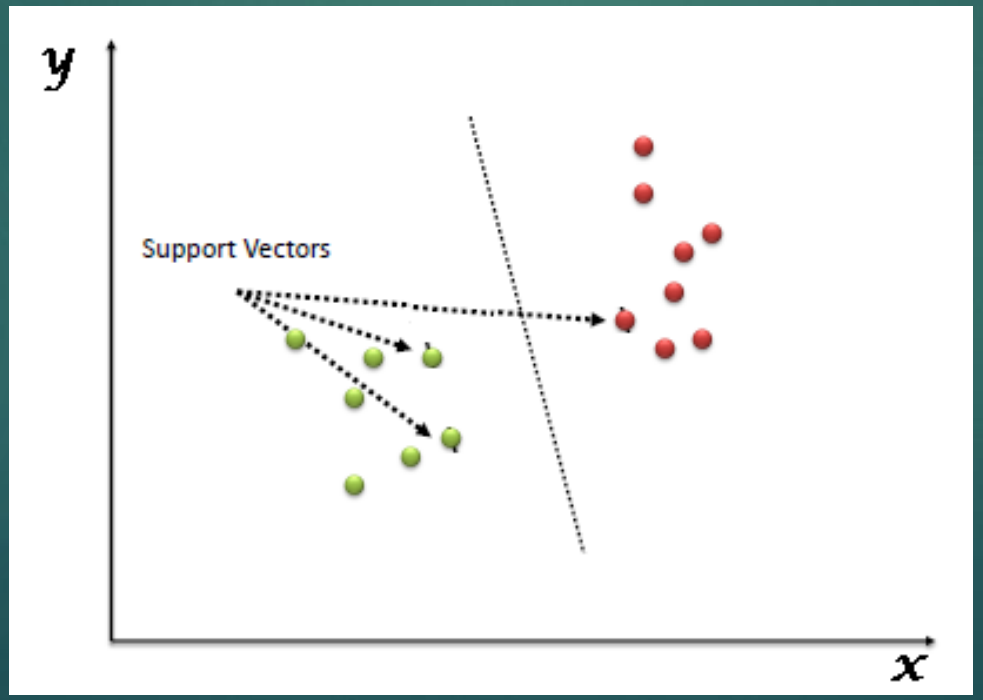


Predict the New Data Item

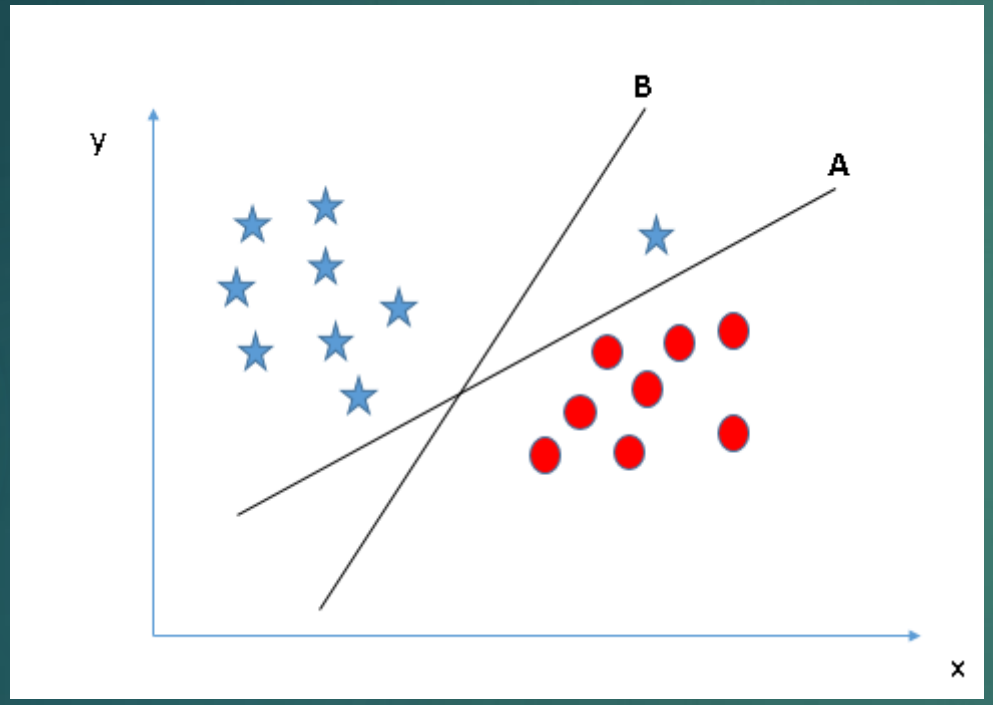


Support Vector Machine

- "Support Vector Machine" (SVM) is a supervised machine learning algorithm which can be used for both classification or regression challenges
- perform classification by finding the **hyper-plane** that differentiate the two classes very well

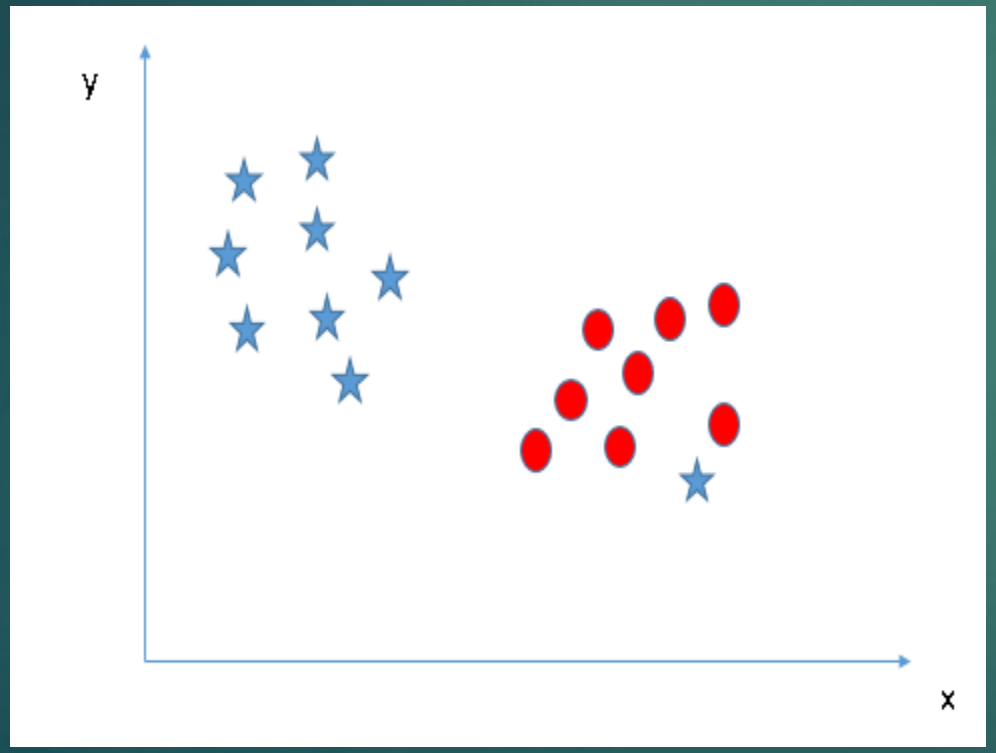


Identify the right hyper-plane (Scenario-3)



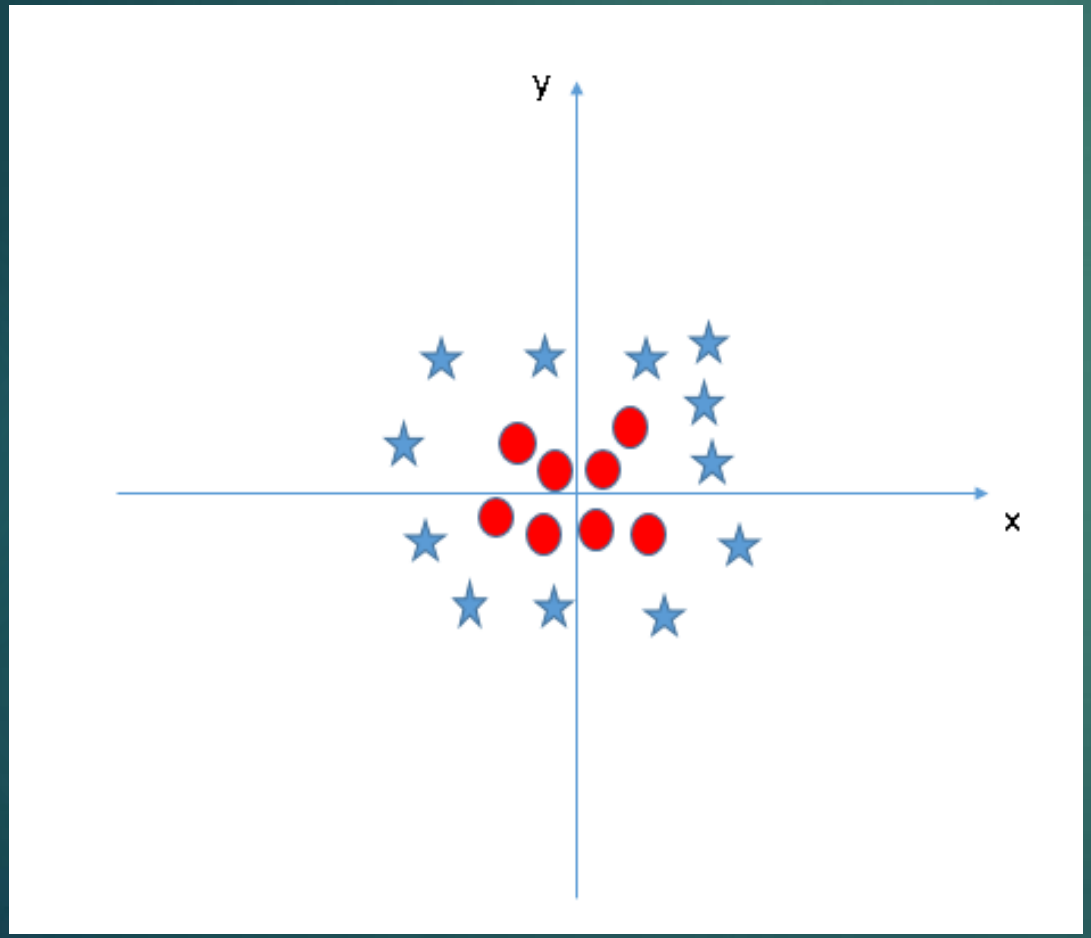
- Some of you may have selected the hyper-plane **B** as it has higher margin compared to **A**

Can we classify two classes (Scenario-4)



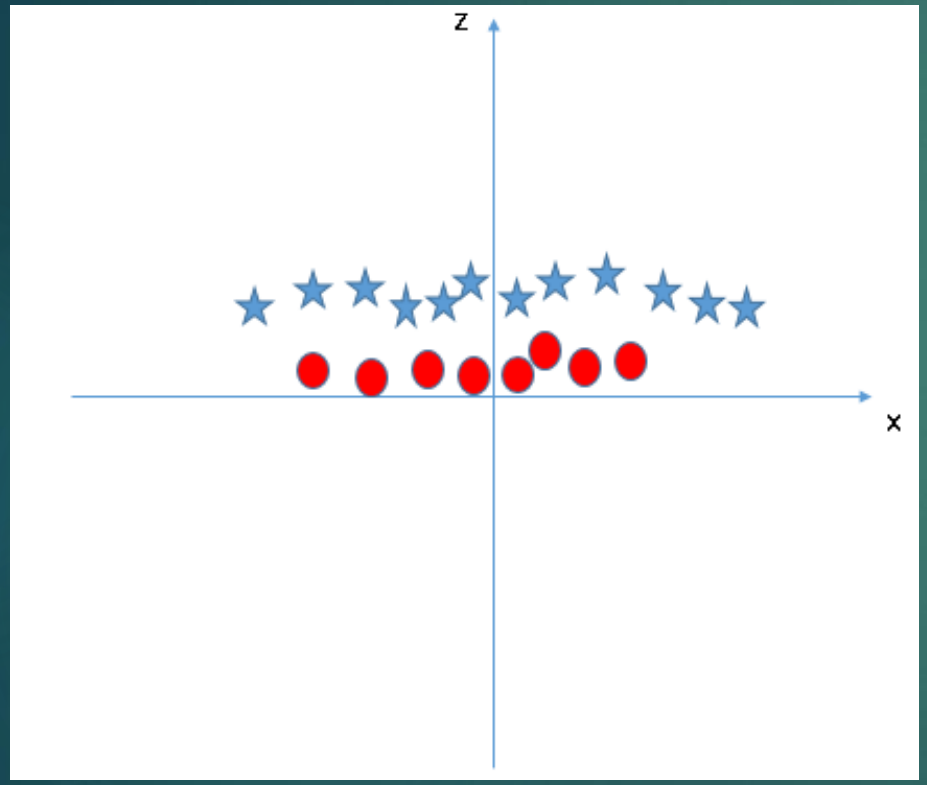
- outlier for star class

Find the hyper-plane to segregate to classes (Scenario-5)

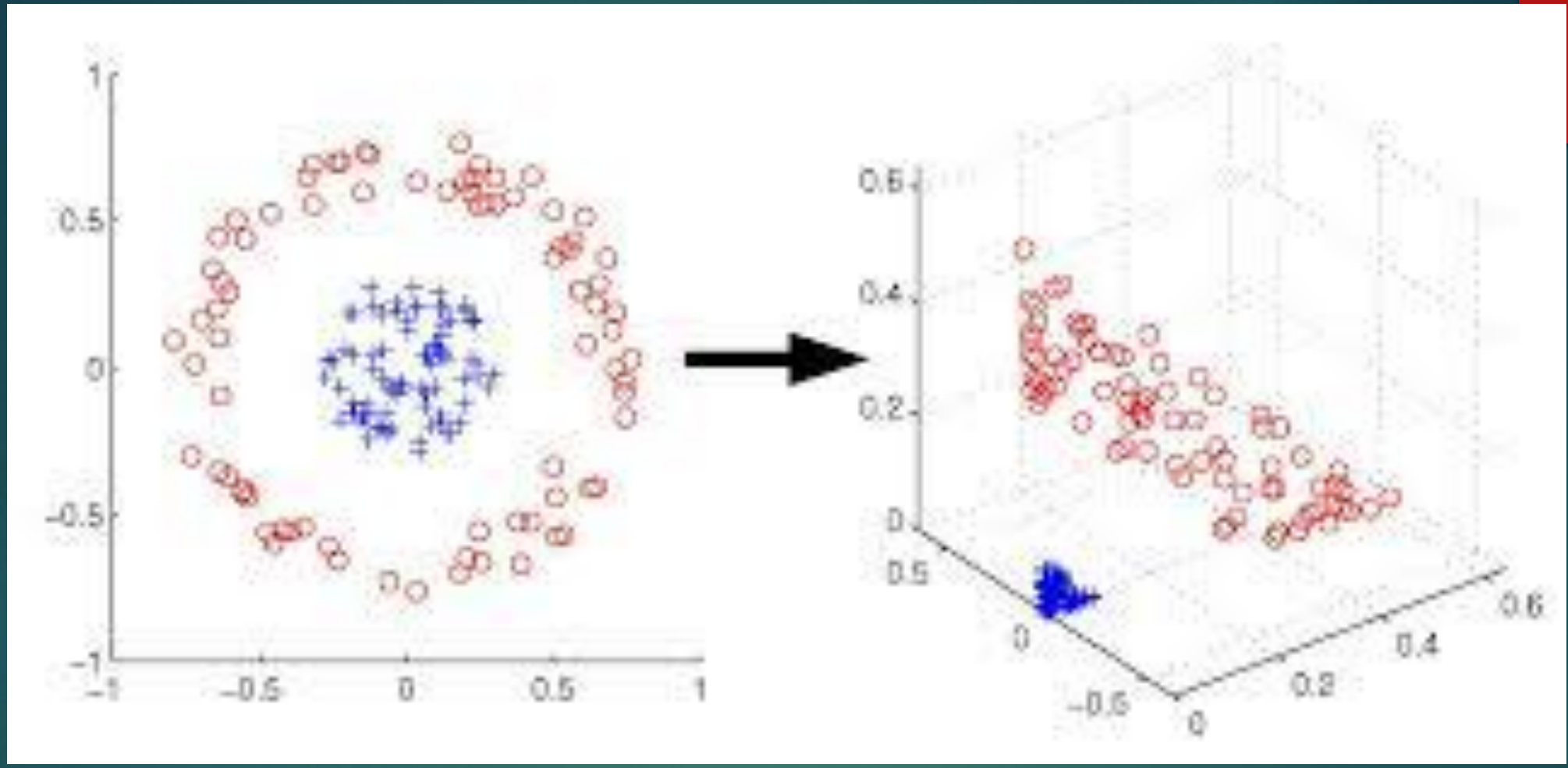


- SVM can solve this problem. Easily! It solves this problem by introducing additional feature.

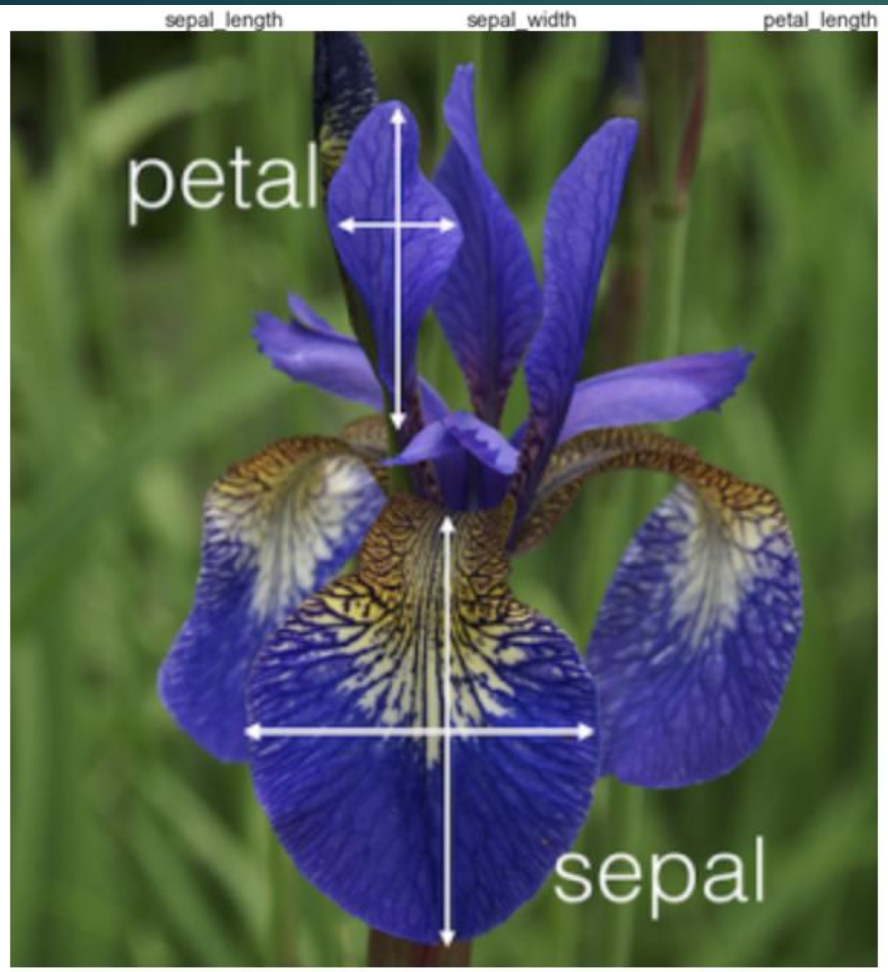
kernel trick.

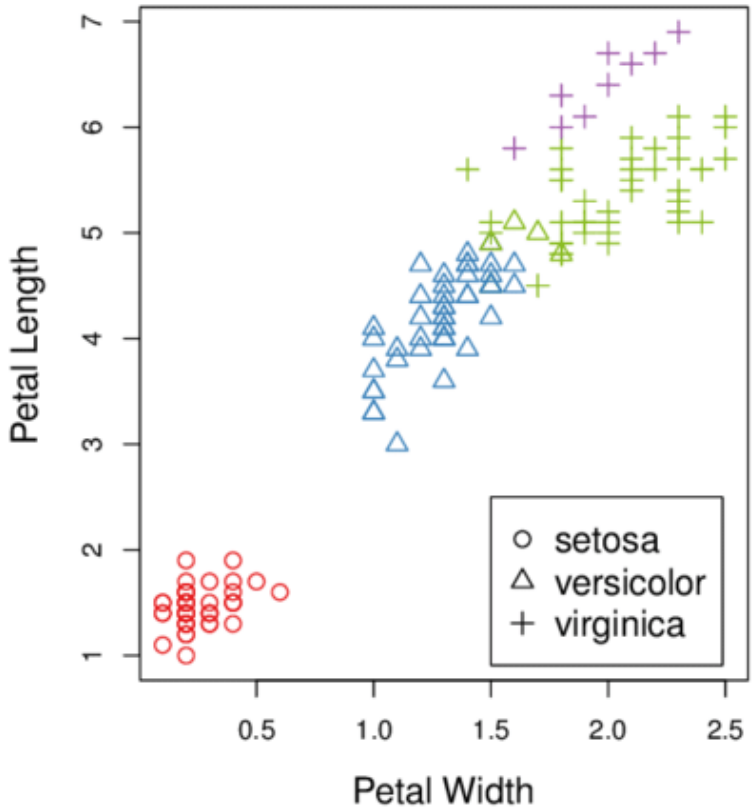


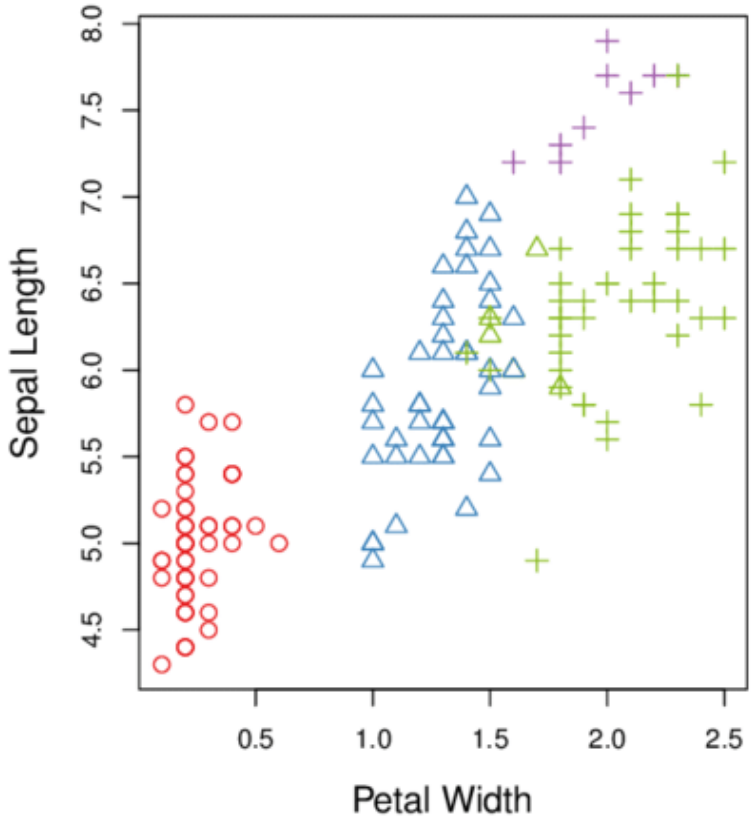
- Here, we will add a new feature z=x^2+y^2.
- All values for z would be positive always because z is the squared sum of both x and y
- In the original plot, red circles appear close to the origin of x and y axes, leading to lower value of z and star relatively away from the origin result to higher value of z.

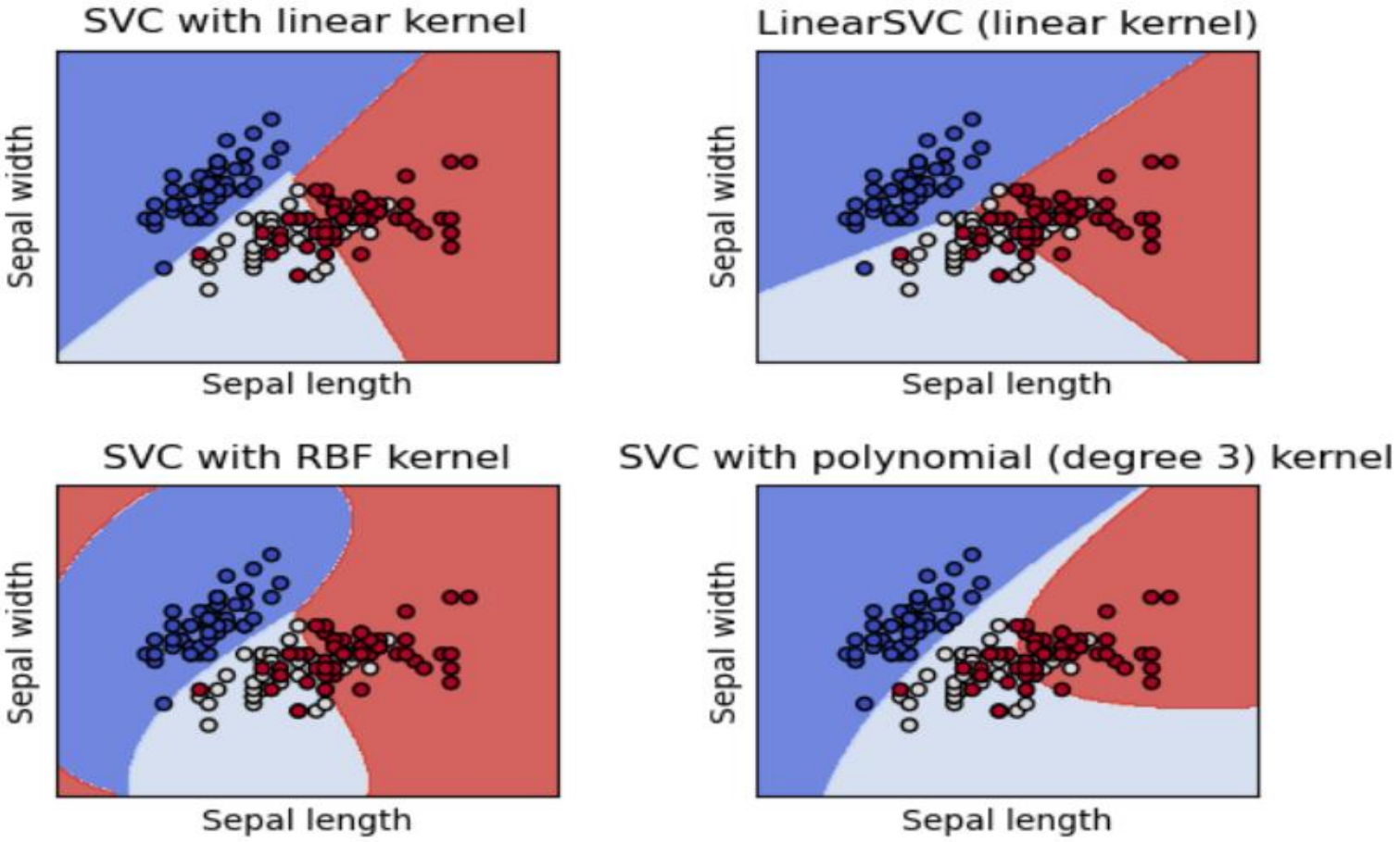


- a “kernel” is usually used to refer to the kernel trick, **a method of using a linear classifier to solve a non-linear problem**. It entails transforming linearly inseparable data to linearly separable ones.


sepal_length
sepal_width
petal_length
petal
sepal


Petal Length
Petal Width
setosa
versicolor
virginica
1
2
3
4
5
6
7
0.5
1.0
1.5
2.0
2.5


Sepal Length
Petal Width
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
0.5
1.0
1.5
2.0
2.5



- **Kernel Function** is a method used to take data as input and transform it into the required form of processing data.