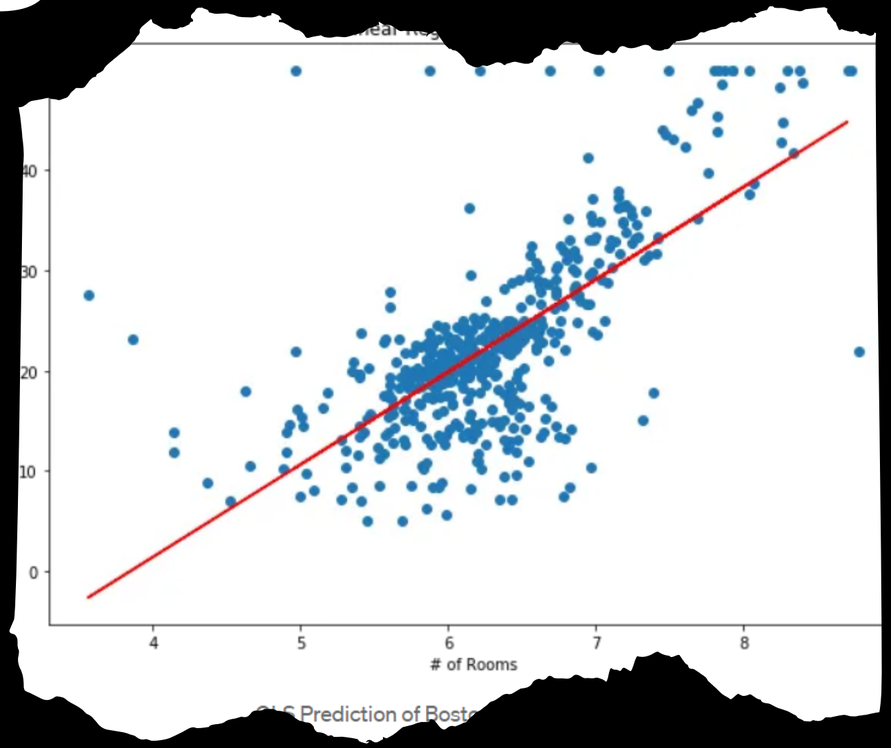
SUPORT VECTOR - REGRESSION

MACHINE LEARNING ALGORITHMS

Supor Vector Regression

Support Vector Regression (SVR) is a type of machine learning algorithm used for regression analysis. The goal of SVR is to find a function that approximates the relationship between the input variables and a continuous target variable, while minimizing the prediction error

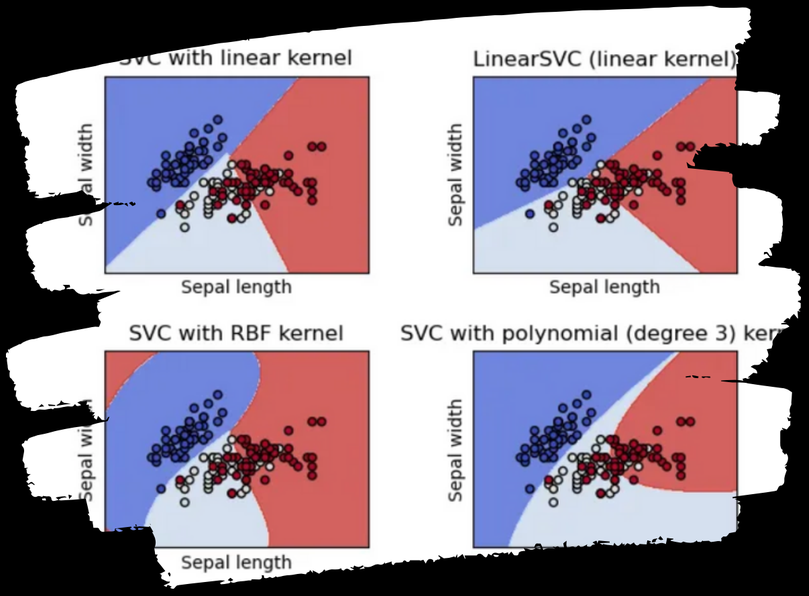


Standard Linear Regression

Hyperparameters in SVR

Hyperplane:

Hyperplanes are decision boundaries that is used to predict the continuous output. The data points on either side of the hyperplane that are closest to the hyperplane are called Support Vectors.



Kernel:

A kernel is a set of mathematical functions that takes data as input and transform it into the required form.

Hyperplane Idea.

Assuming that the equation of the hyperplane is as follows:

- **Y = wx+b (equation of hyperplane)**

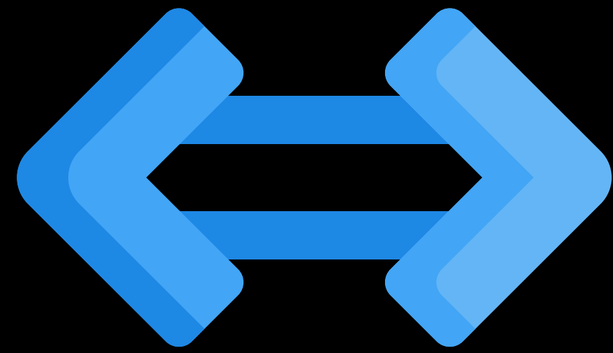
Then the equations of decision boundary become:

- **wx+b= +a**

- **wx+b= -a**

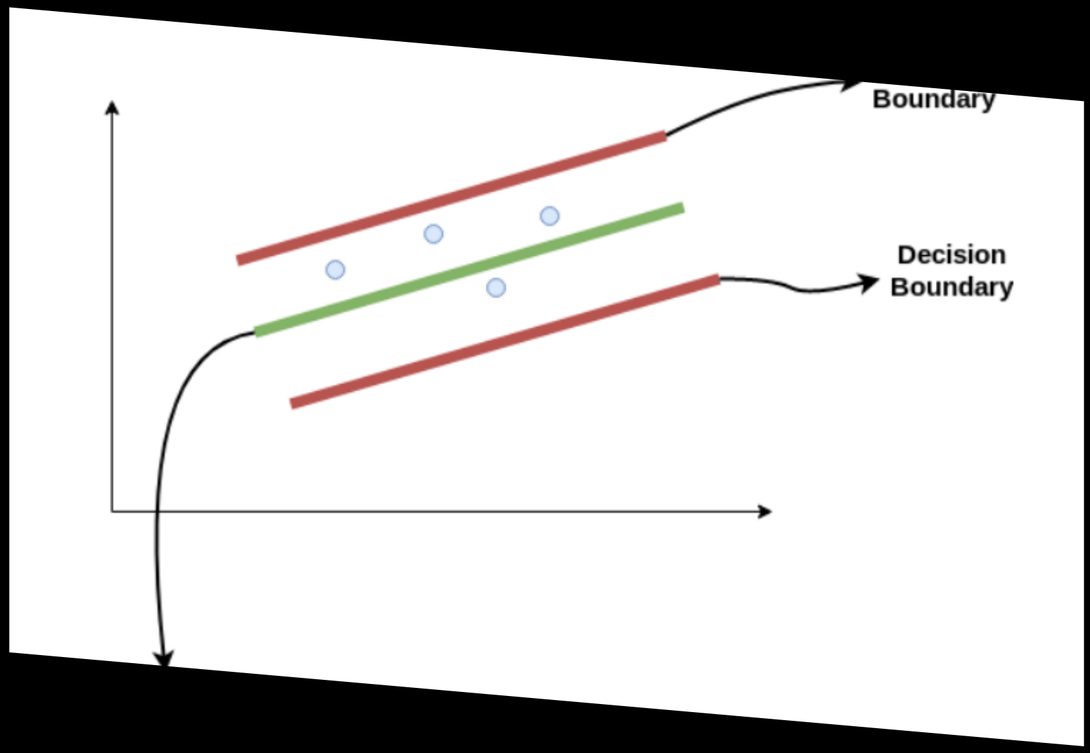
Thus, any hyperplane that satisfies our SVR should satisfy**:**

- **-a < Y- wx+b < +a**



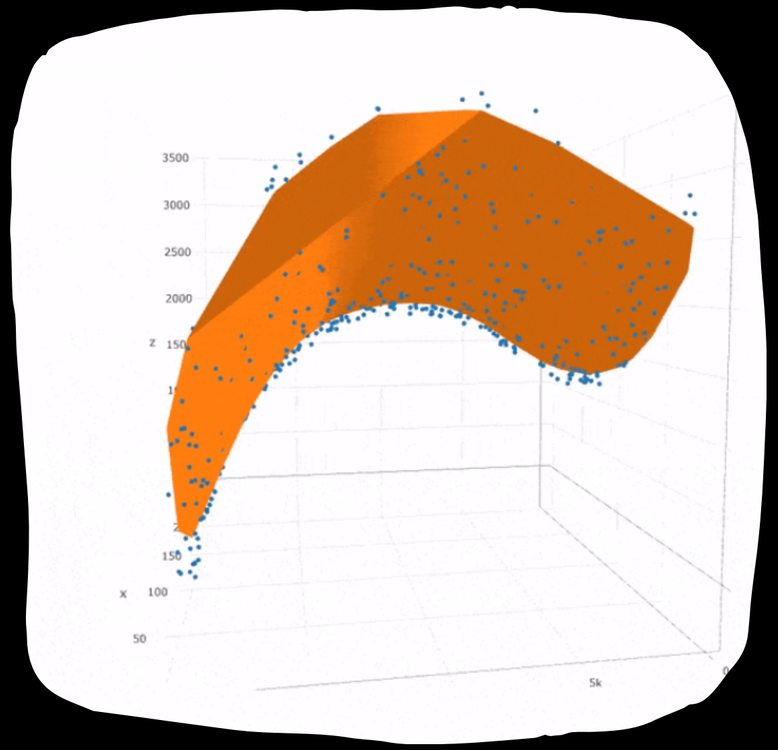
The Idea Behind Support Vector Regression

Consider these two red lines as the decision boundary and the green line as the hyperplane. Our objective, when we are moving on with SVR, is to basically consider the points that are within the decision boundary line. Our best fit line is the hyperplane that has a maximum number of points.

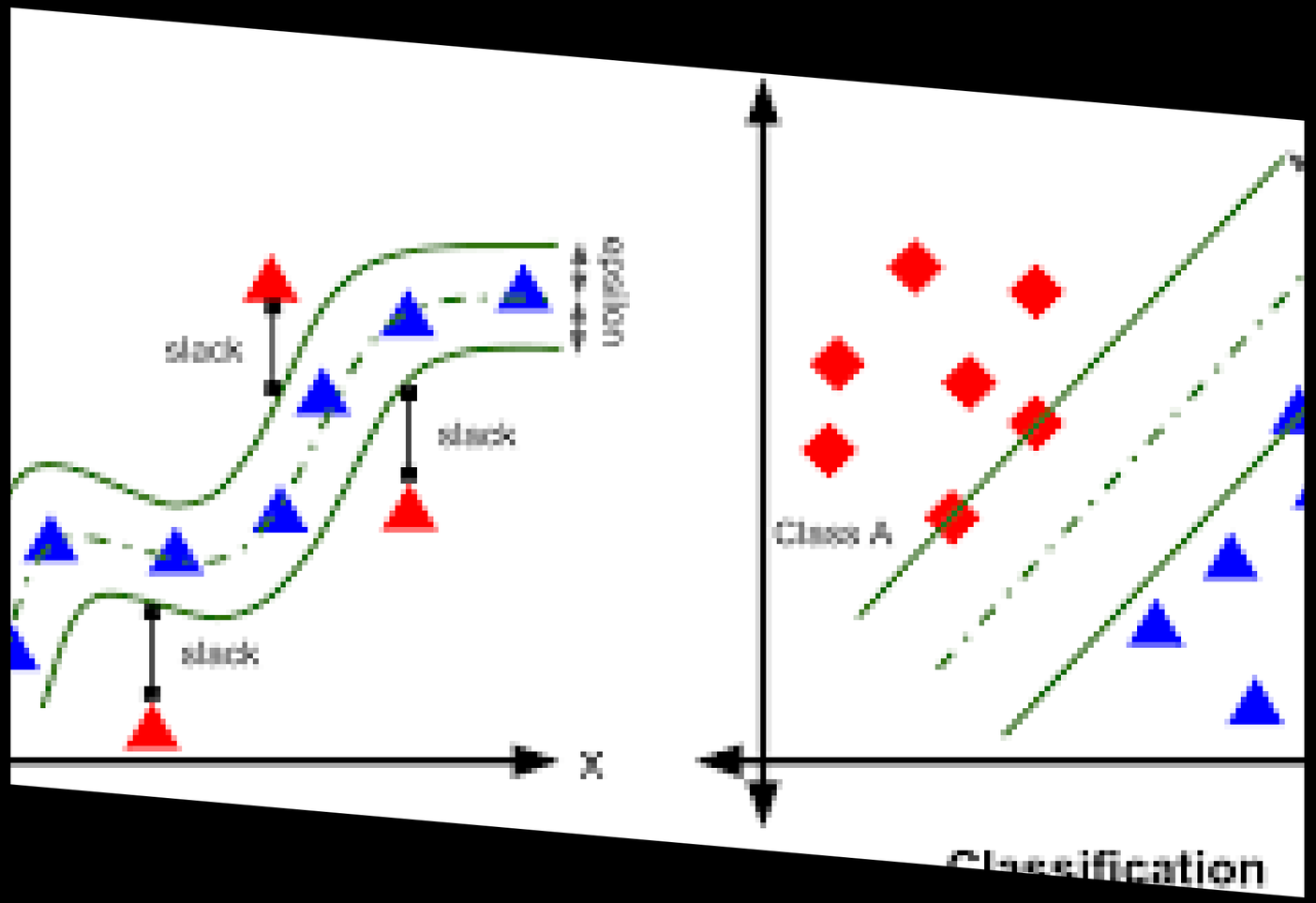


Important Ideas

- **The threshold value is the distance between the hyperplane and boundary line.**
- **The most widely used kernels include Linear, Non-Linear, Polynomial, Radial Basis Function (RBF) and Sigmoid. By default, RBF is used as the kernel**



Main difference with SVM



Implementing Support Vector Regression (SVR) in Python