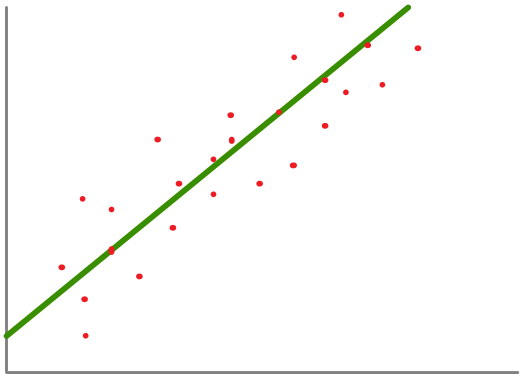
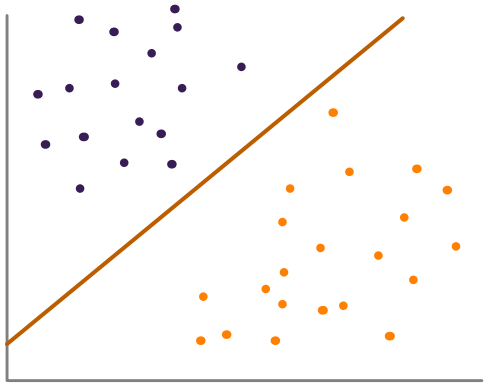
Support vector machine

05 May 2022 11:20

It is applicable to both classification and regression techniques



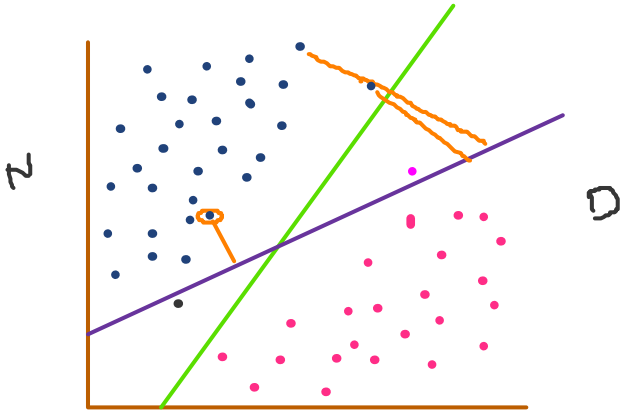
Linear Regression

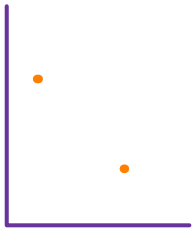


Linear Classifier

SVM is best in terms of making such linear Classifiers

1. Plane
2. Hyper Plane
3. Decision boundary
4. Maximal Margin Classifier
5. Support vector Classifier
6. Non-linear Classifier





Euclidian distance is for point to point

I have to calculate the distance between point to plane

Using perpendicular distance we can calculate the d value between point to plane.

How the distance is calculated from point to plane?

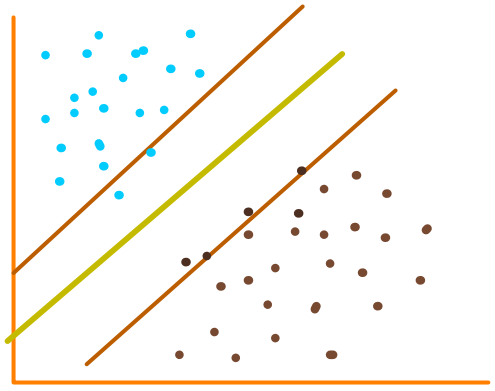
$$d = \pm\left(\frac{ax_1 + by_1 + c}{\sqrt{a^2 + b^2}}\right)$$

Here (x_1, y_1) is the point and

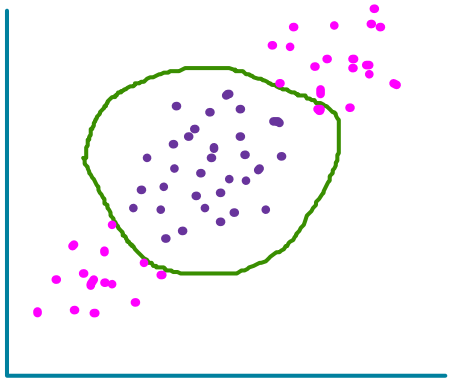
$ax+by+c = 0$ is the equation of the line

$$B0 + B1x1 + B2x2$$

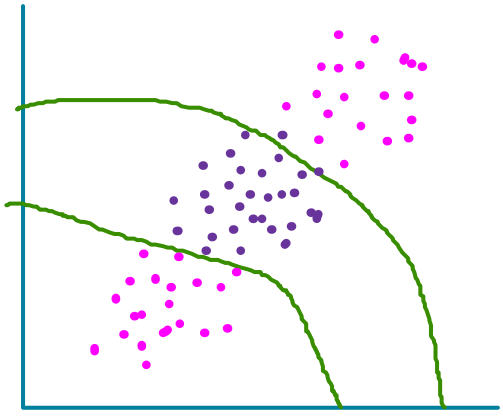
I will insert a cost parameter, C = 1



We are trying to construct a maximal margin distance plane with the support of some vectors. Which will be called as **Support vector classifier**



Radial Basis function



Polynomial

From the dataset we will construct a new dimensions from the existing dataset

With the help of some kernal functions we can transform the data in to the higher dimensions.

RBF
Radial Basis function

$$K(x_i, x_{i'}) = \exp(-\gamma \sum_{j=1}^{p} (x_{ij} - x_{i'j})^2).$$

Polynomial Function

$$K(x_i, x_{i'}) = (1 + \sum_{j=1}^{p} x_{ij} x_{i'j})^d.$$

C, gamma is going to be our tuning parameters whereas for poly C, d are tuning parameters

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