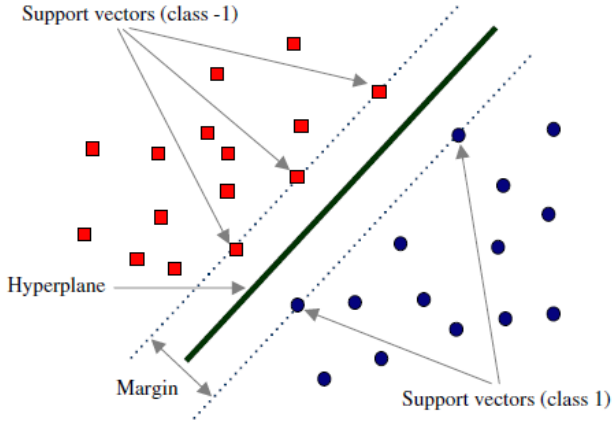
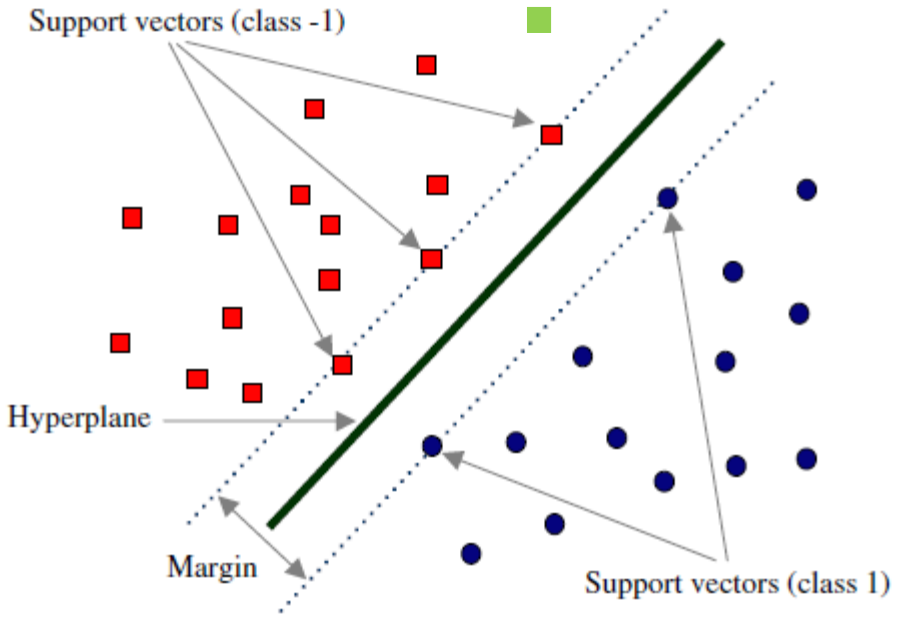
Siddhardhan

Support Vector Machine (SVM) - Kernels



Support Vector Machine Classifier

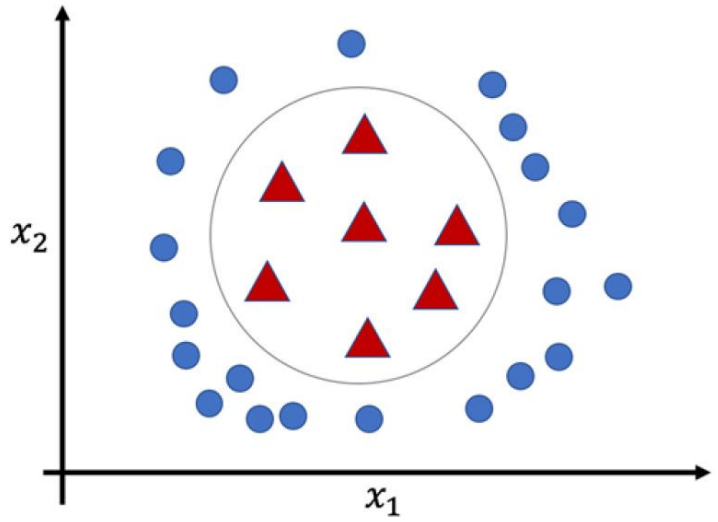


- Hyperplane
- Support Vectors
- Margin
- Linearly separable data

SVM Kernel

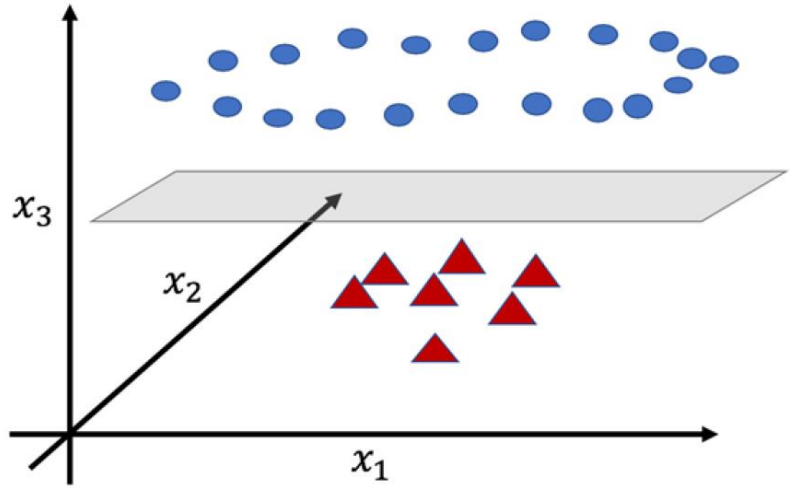
SVM Kernel :

Kernel Function generally transforms the training set of data so that a non-linear decision surface can be transformed to a linear equation in a higher number of dimension spaces.
It returns the inner product between two points in a standard feature dimension.



SVM in 2 dimensions

Kernel

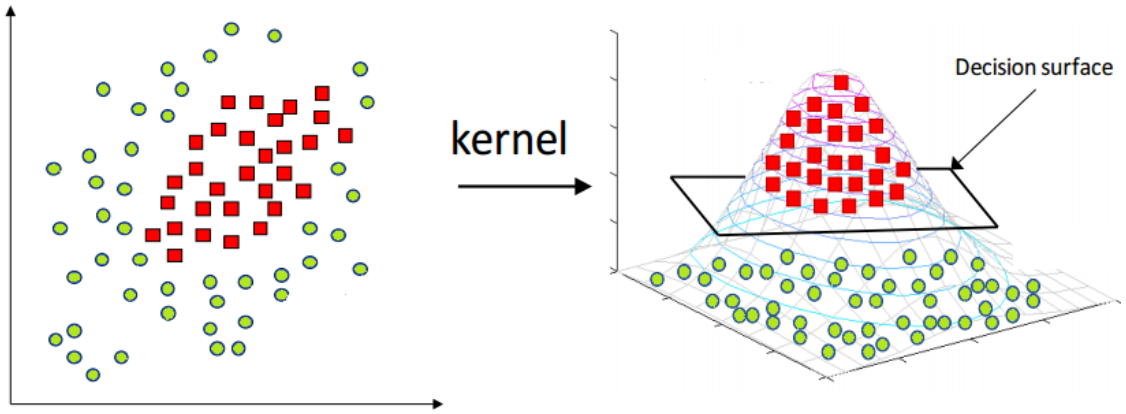


SVM in 3 dimensions

SVM Kernels

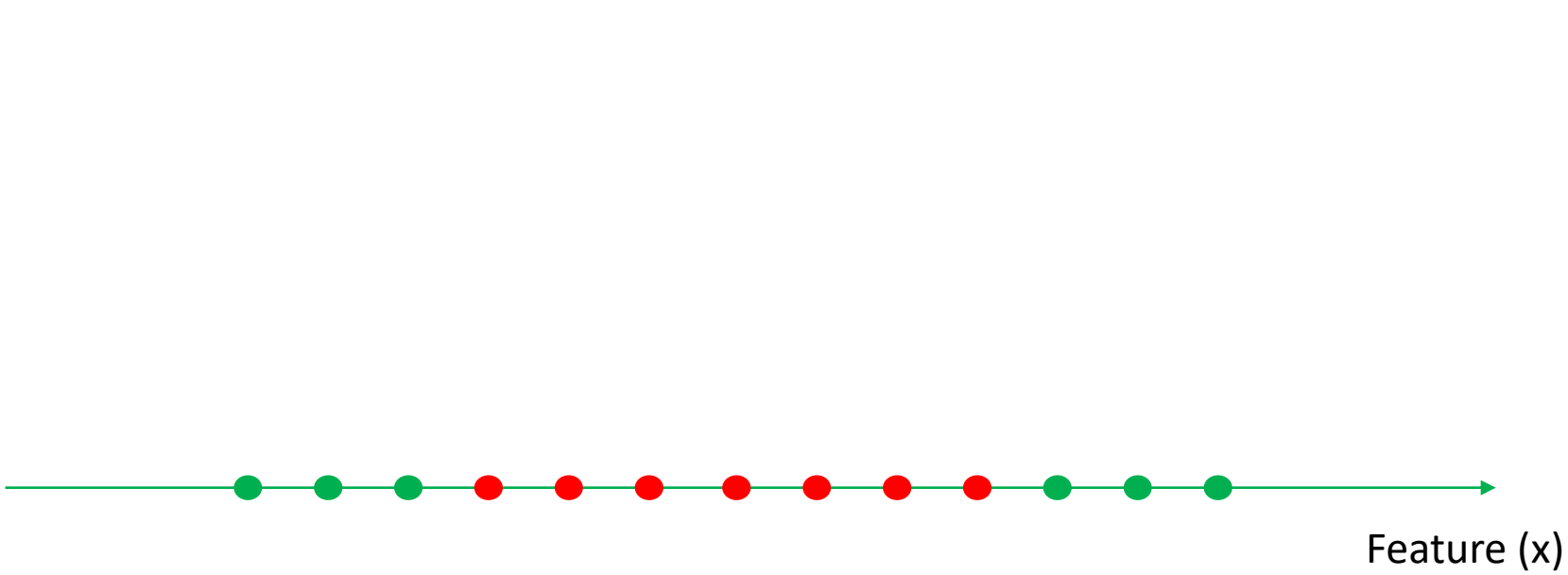
Types of SVM Kernels :

1. Linear
2. Polynomial
3. Radial Basis Function (rbf)
4. Sigmoid



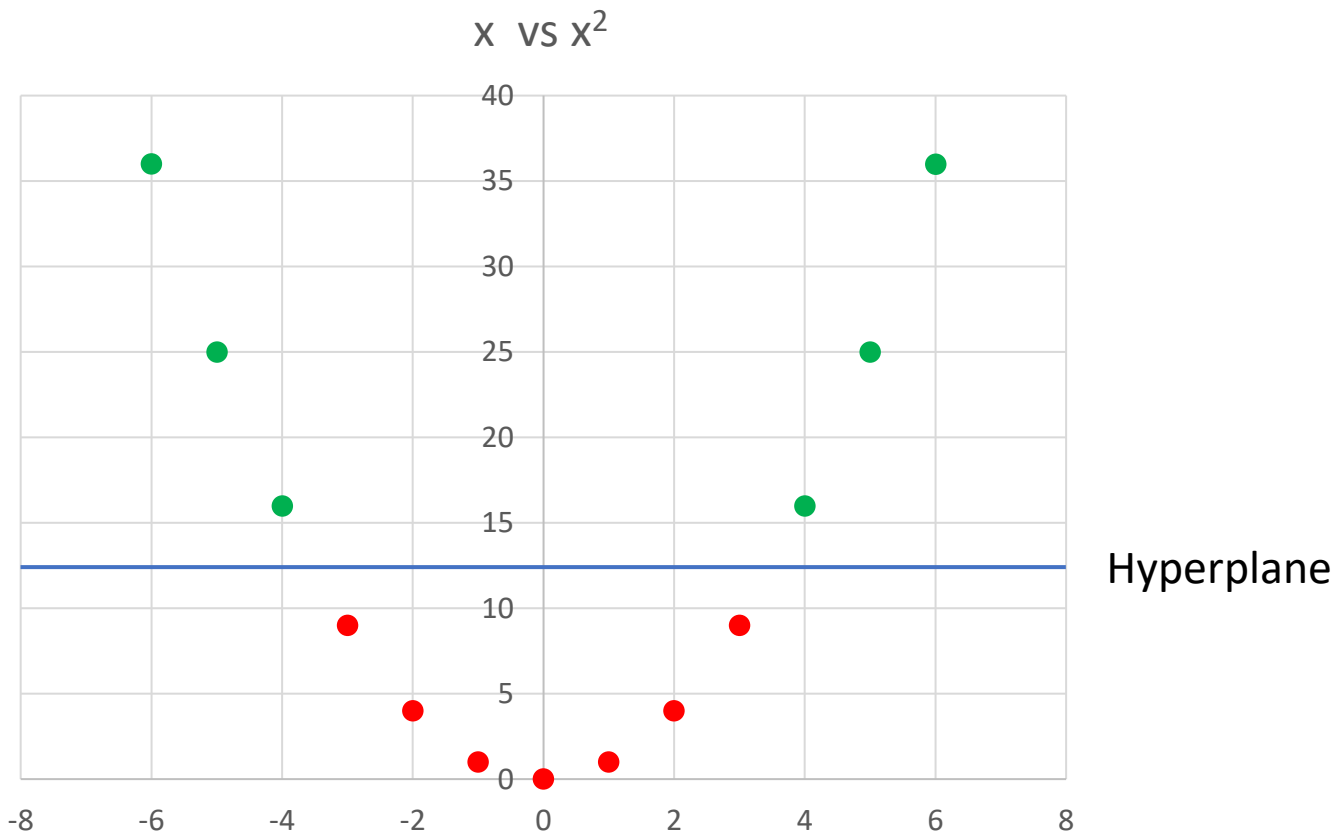
SVM Kernels

Feature (x)	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6



SVM Kernels

Feature (x)	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
x^2	36	25	16	9	4	1	0	1	4	9	16	25	36



Types of SVM Kernels

1. Linear Kernel :

$$K(x_1, x_2) = x_1^T x_2$$

2. Polynomial Kernel:

$$K(x_1, x_2) = (x_1^T x_2 + r)^d$$

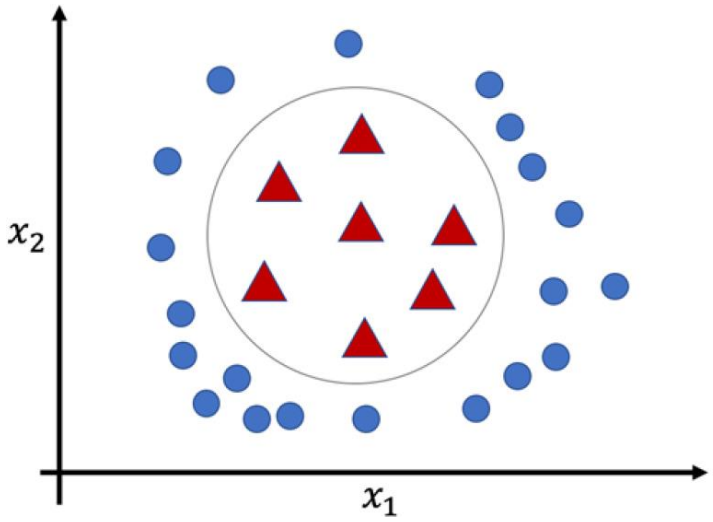
3. Radial Basis Function (rbf) Kernel :

$$K(x_1, x_2) = \exp(-\gamma . ||x_1 - x_2||^2)$$

4. Sigmoid Kernel :

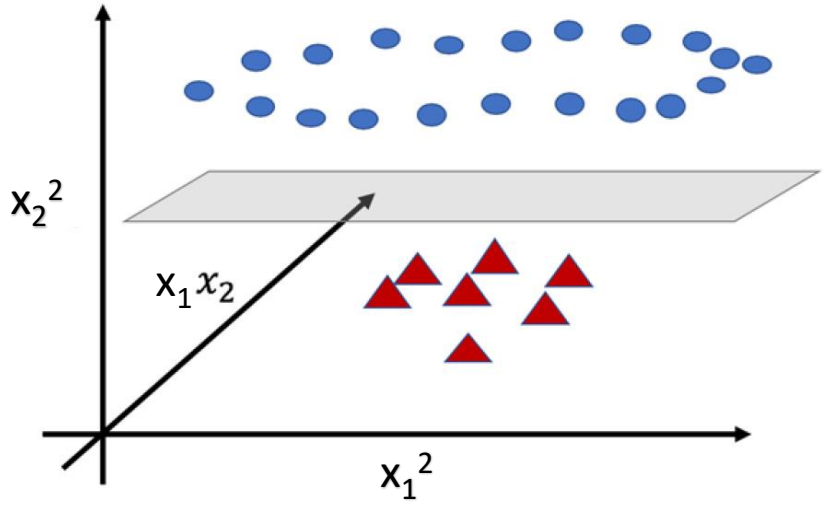
$$K(x_1, x_2) = \tanh(\gamma . x_1^T x_2 + r)$$

Support Vector Machine Classifier



SVM in 2 dimensions

Kernel



SVM in 3 dimensions