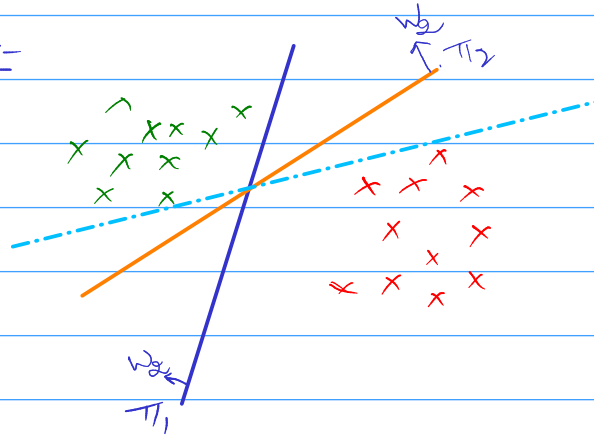


Support Vector Machine: (SVM)

Both Classification and Regression

Geometric Intuition:-

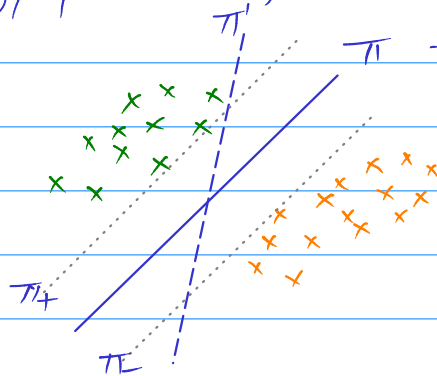
- Separates +ve pts from -ve points as widely as possible.



Many planes / Hyperplanes separate the two classes.

points that are close to hyperplane have less probability of belonging to a class that hyperplane classifies that pts. that are further to the hyperplane.

π_+ , π_- touch the 1st point in their respective class.



π - Separates points as farthest as possible than π'

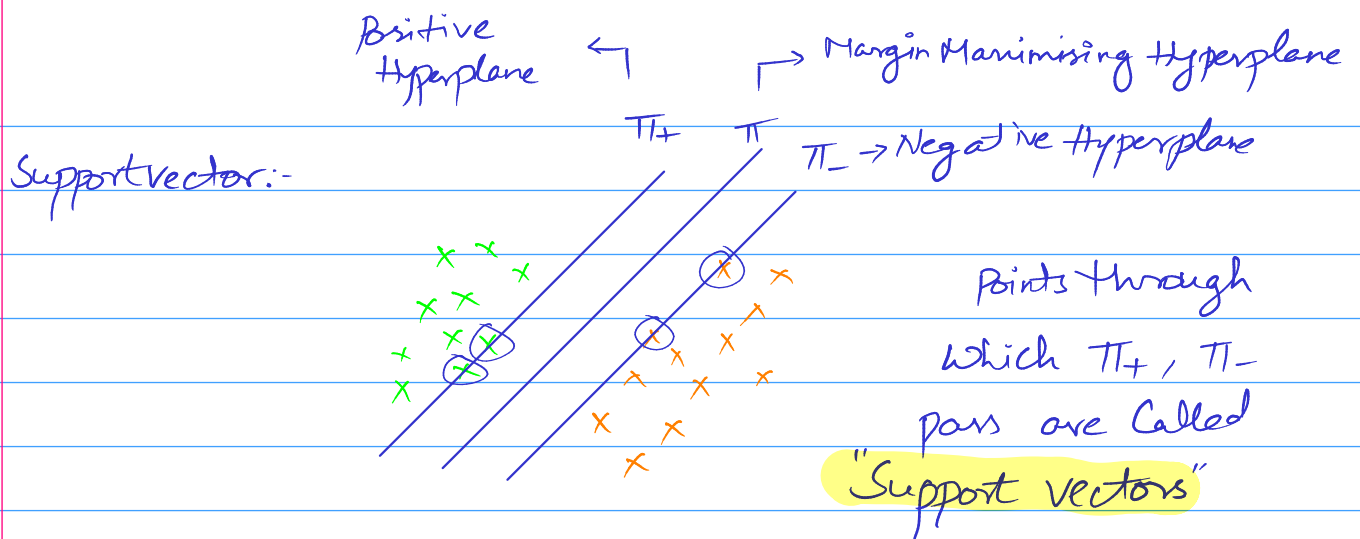
π - margin maximising hyperplane.

Let π_+ be a plane \parallel to π
 π_- be a plane \parallel to π

$\text{dist}(\pi_+, \pi_-) = d$, is constant
↳ Margin

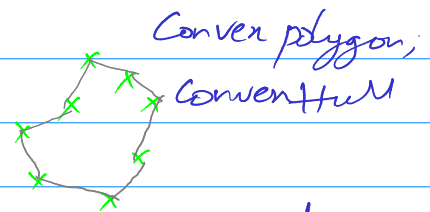
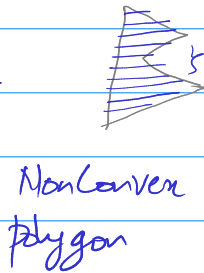
SVM: Tries to minimise the margin

Margin \uparrow ; Generalization accuracy \uparrow
↳ Accuracy on unseen data; New data



Alternative Geometric Intuition of SVM:-

- ① Draw a Convex Hull for +ve points & -ve points separately.



Smallest polygon so that all points lie inside or on the polygon.

- ② Draw shortest line connecting both the hulls.
- ③ Bisect the line; the Hyperplane Bisecting the line will be the Margin maximising plane

