Support Vector Machines (SVM) is a type of supervised learning techniques that analyze data to make predictions.

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- Supervised Data: The data that indicate two set of features namely, indicator variables and predictive variable (class variable).
- Indicator variables are the set of variables that are used to forecast the predictive variable.

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Since support vector machines (SVM) is a type of supervised learning techniques, the information about class variable is prerequisite.

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SVM tries to separate the different types of classes using decision boundary.

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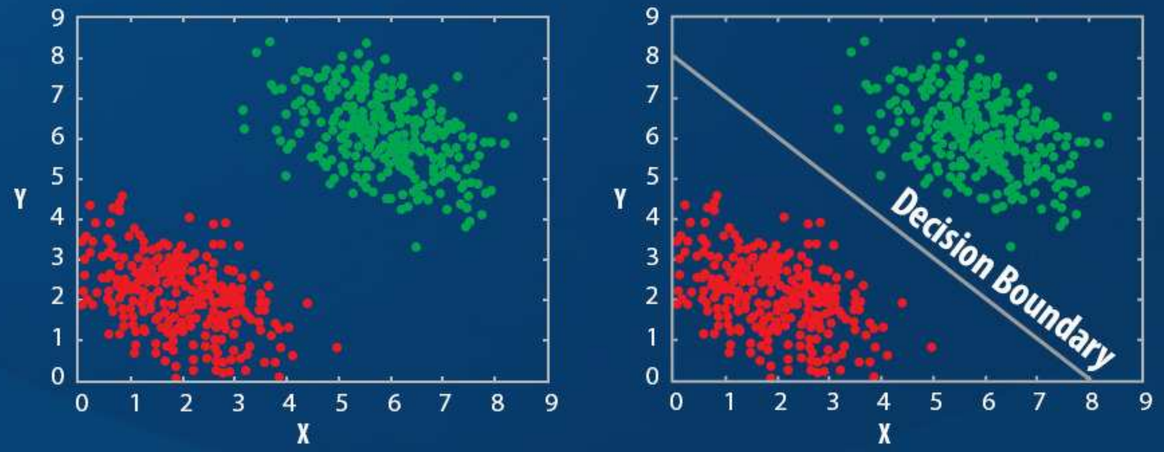
OBJECTIVE OF SUPPORT VECTOR MACHINES

- Support Vector Machines (SVM) is a kind of supervised technique used to make predictions.
- Let's understand SVM with a very simple example.

Example

Let us consider that we are given two sets of objects: Red and Green, and our data has two features: X and Y.

We want a classifier that, given a pair of (X,Y) coordinates, outputs if it is either Red or Green. We plot our already labeled training data on a plane:



- Based on the decision boundary learnt by the model, a new case is tested if its below decision boundary or above decision boundary.
- In case, data point is above decision boundary, the label is Green class whereas, in another case, it is treated as belonging to Red class.

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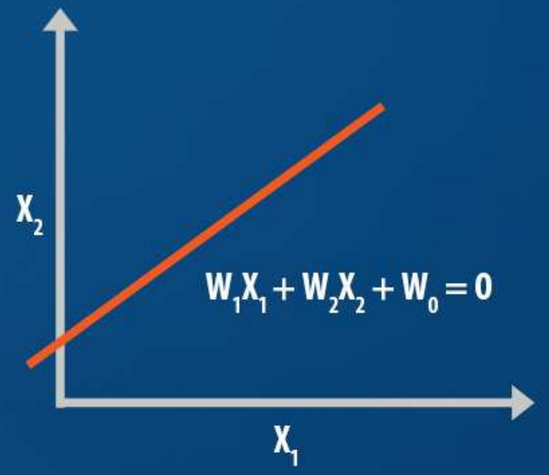
SUPPORT VECTOR MACHINES - BASIC TERMINOLOGY AND MATHEMATICS I

Introduction to Line, Plane and Hyperplane

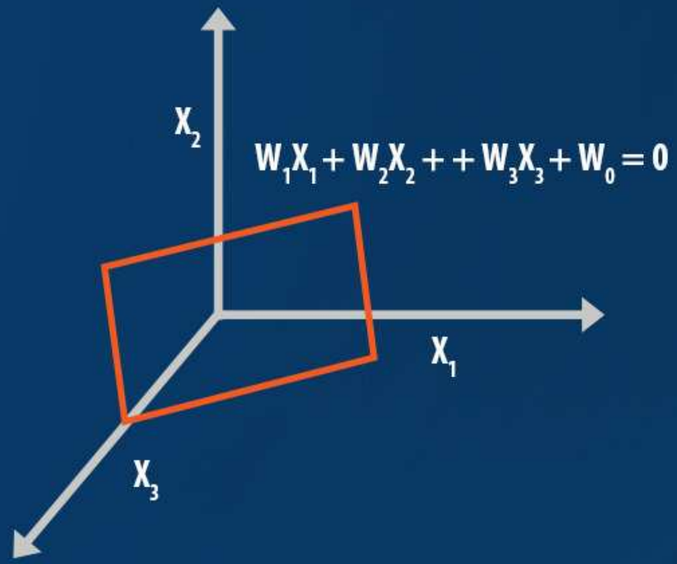
1. Line

Line divides area in 2 parts only in 2-dimensional



2. Plane

Plane divides area in 3-dimensional.



3. Hyperplane

Hyperplane divides area in high dimensional architecture.

$$W_0 + W_1X_1 + W_2X_2 + \ldots\ldots + W_nX_n = 0$$

$$W_0 + \sum_{i=1}^{n} W_iX_i = 0$$

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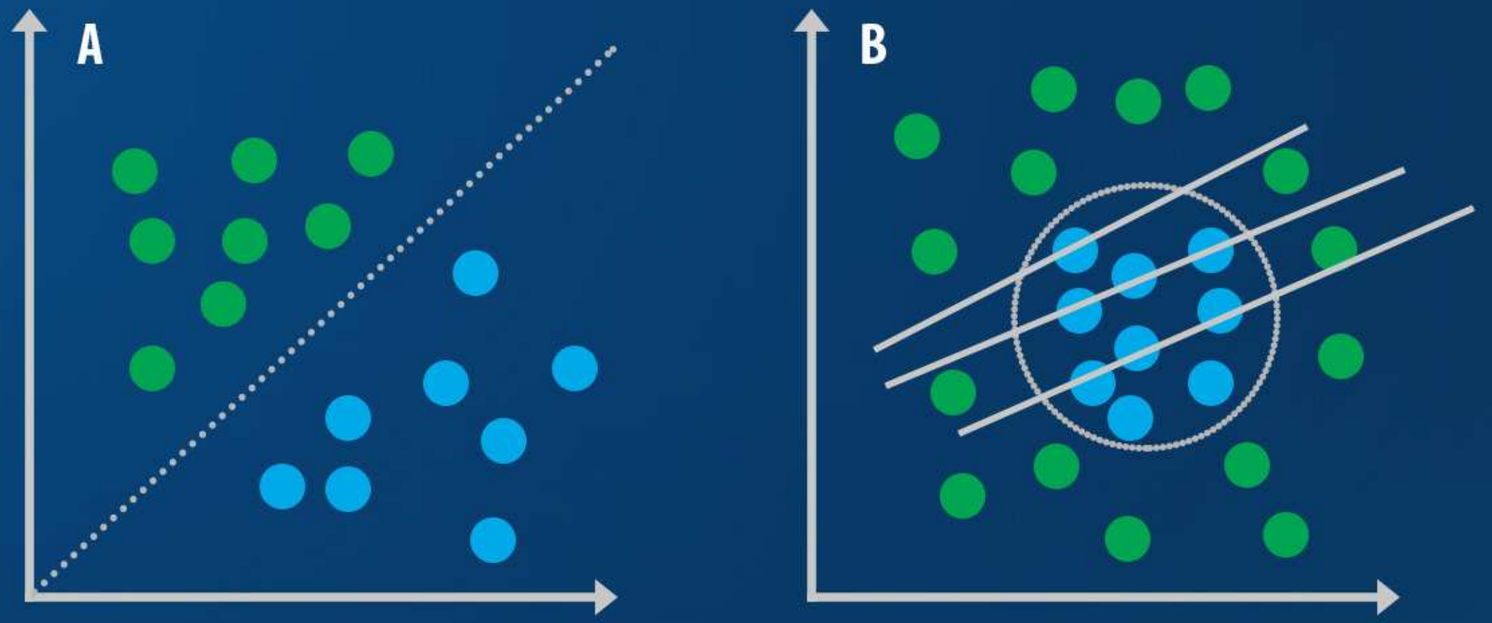
SUPPORT VECTOR MACHINES - BASIC TERMINOLOGY AND MATHEMATICS II

Linear and Non-Linear separable Problems:



Here, Figure A is an example of linearly separable problem whereas, Figure B is a Non-Linear separable problem.

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