Machine Learning Algorithm

- Supervised
  - Decision tree induction (DTI)
  - Support Vector machine (SVM)
  - Artificial neural network (ANN)
- Unsupervised
  - Hidden Markov Models (HMM)
  - Genetic Algorithm (GA)
  - Simulated Annealing (SA)

Support Vector Machine

Support Vector Machine is a supervised learning method, which is used to solve classification as well as regression problem.

SVM algorithm

- Support Vector classification
  - Use ... datasets ... discrete
  - eg: Email spam detection
- Support Vector regression
  - ... continuous
  - eg: market trends

Support Vector Machine

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1. Support Vector Machine

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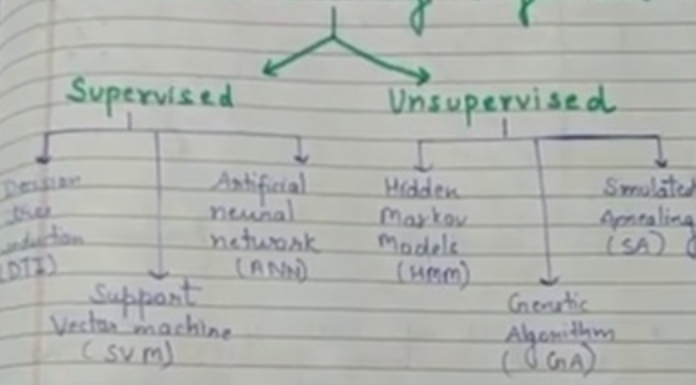
- SVM algorithm
  - Support Vector Classification
    - eg: Email spam detection
  - Support Vector regression
    - eg: market trends

Support Vector Machine

Machine Learning Algorithm



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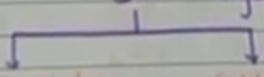


Support Vector classification

↓

Used to classify dataset's discrete

eg:- Email Spam detection

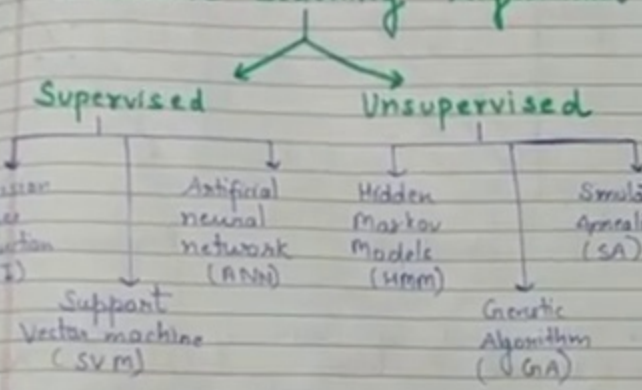
Support Vector regression

↓

Used to predict continuous values

eg:- market trends

Machine Learning Algorithm



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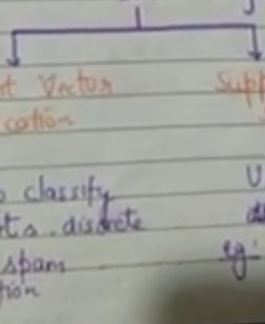
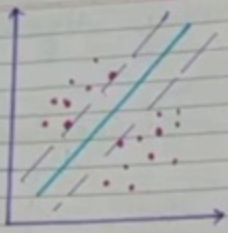
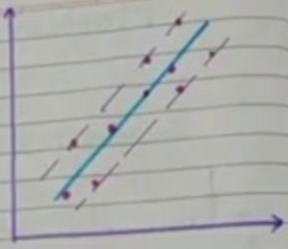


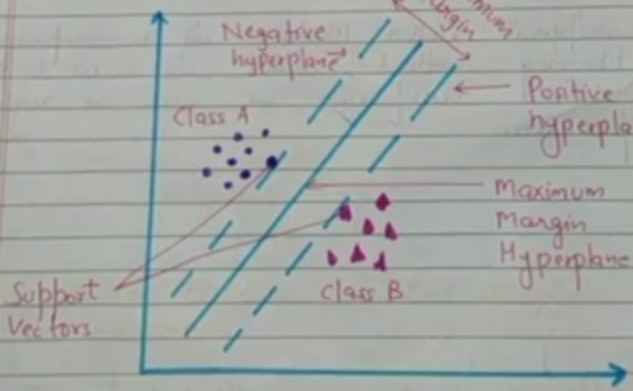


Classification

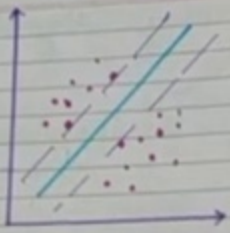


Regression

- The goal of SVM is to create a decision boundary / best line. This best decision boundary is known as hyperplane.



Class A and Class B → These are two datasets that are classified using decision boundary.



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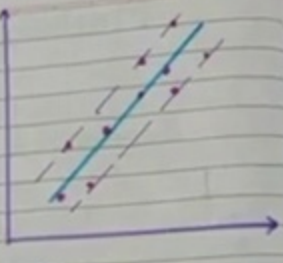

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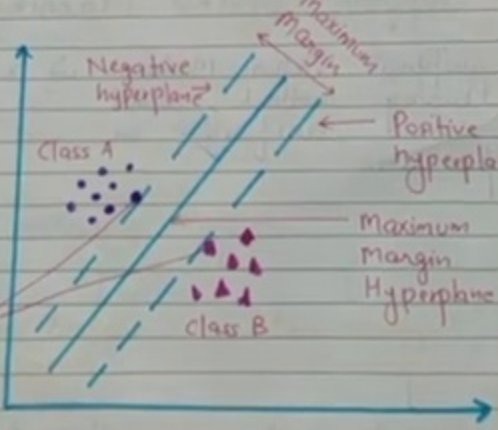

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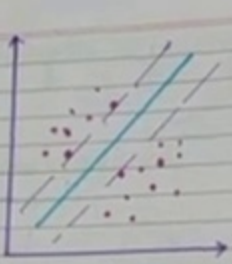

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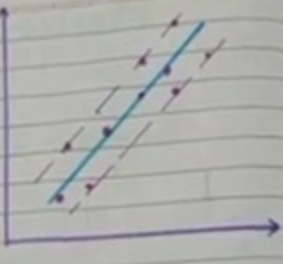

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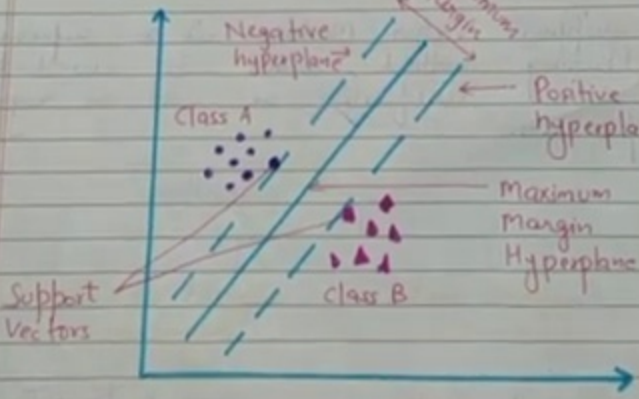

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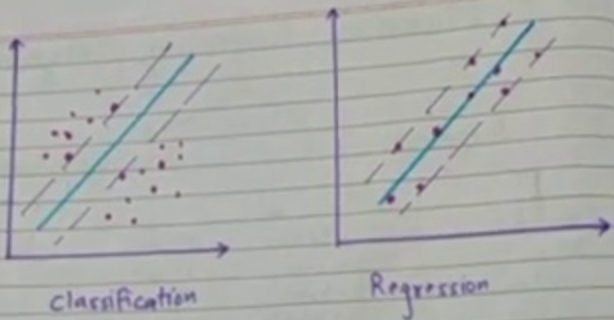

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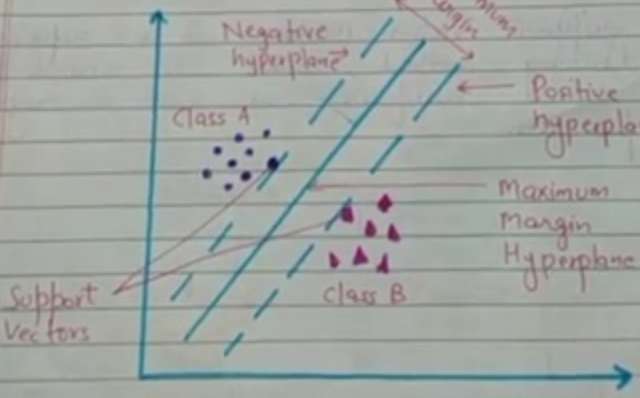


Class A and Class B → These are two dataset's that are classified using decision boundary.

ii) Support Vectors - SVM chooses the extreme points or ~~topper~~ that helps in creating the hyperplane. These extreme points are called as support vectors.

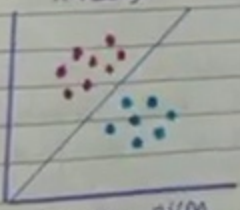
iii) Hyperplane - There can be multiple decision boundaries to segregate classes but we need to find best decision boundary that helps to classify data. This best boundary is known as hyperplane.

iv) Margin - Distance between negative and positive hyperplane

Applications → Text classification
Face Detection
Image classification

Types of SVM

Linear
Separated data linearly



Linear SVM

Non-Linear
Data can't be separated by

Non Linear SVM

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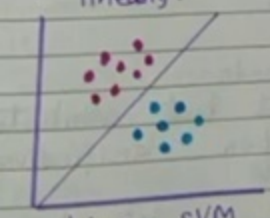

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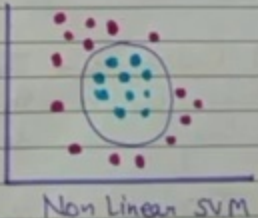

Non Linear SVM

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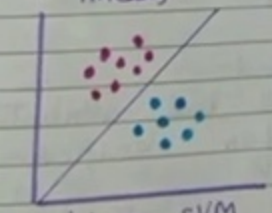

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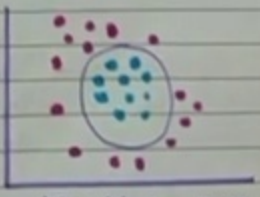

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3) Support Vectors:- SVM chooses the extreme points or ~~topping~~ that helps in creating the hyperplane. These extreme points are called as support vectors.

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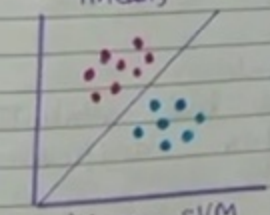

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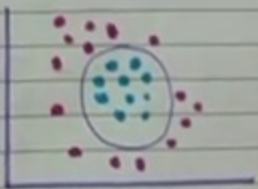

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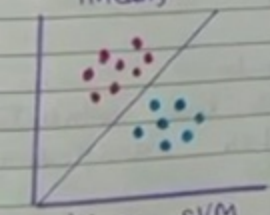

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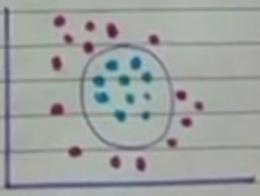

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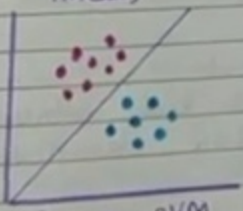

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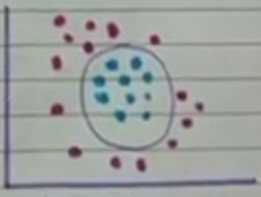

Non Linear SVM