Machine Learning Algorithm

Supervised ────────── Unsupervised

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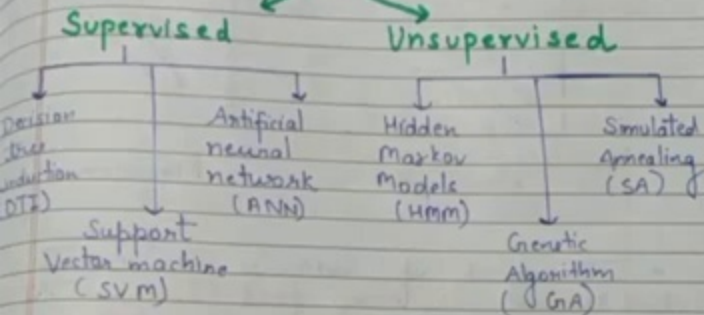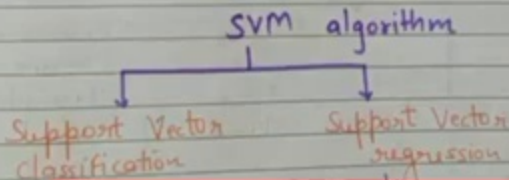
- Hidden Markov Models (HMM)
- Simulated Annealing (SA)
- Genetic Algorithm (GA)

Support Vector Machine

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

SVM algorithm

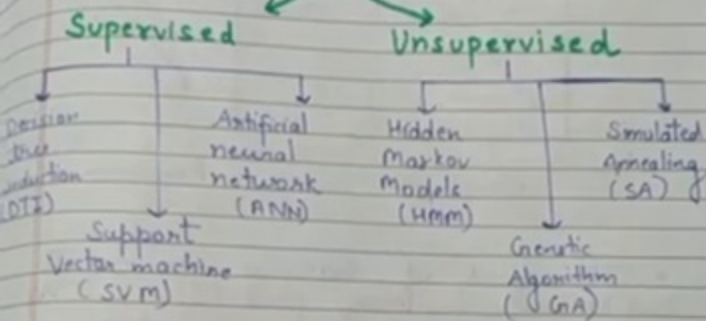Support Vector classification ────────── Support Vector regression

Use datasets discrete ... continuous

eg: Email spam detection

eg: market trends

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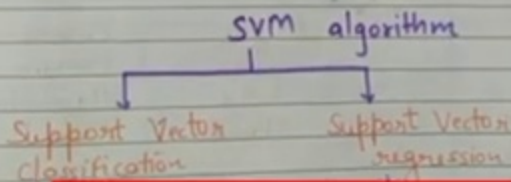
Support Vector Machine

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SVM algorithm

- Support Vector classification
- Support Vector regression

Support Vector Machine

Use datasets, discrete
eg: Email spans detection

continious
eg: market trends

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1 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
  - Support Vector regression

Us... datasets...

eg:- Email spans detection

Continuos

eg: market trends

Support Vector Machine

Machine Learning Algorithm

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1. Support Vector Machine

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-

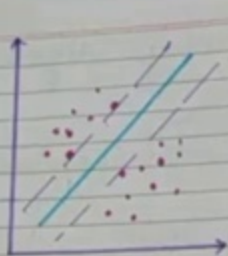### SVM algorithm

Support Vector classification
↓
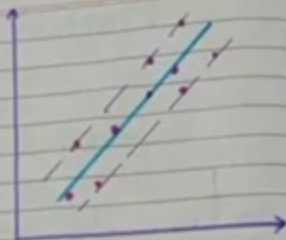Used to classify datasets discrete
eg: Email spams detection

Support Vector regression
↓
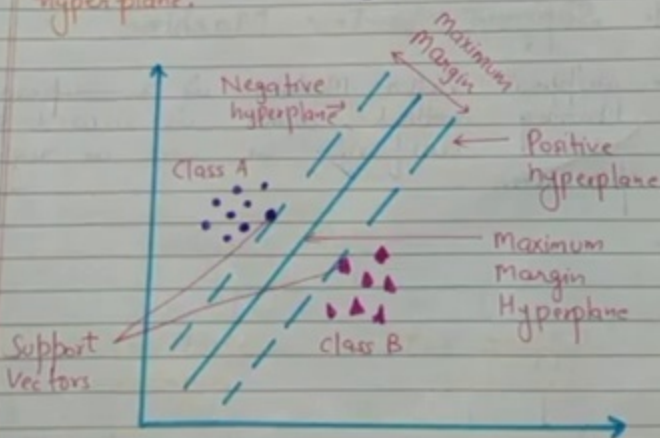Used to predict continuous discrete values
eg: market trends

Machine Learning Algorithm

```
                    Machine Learning Algorithm
                              |
                   _____|_____
                  /                       \
            Supervised                Unsupervised
         _____|_____          _____|_____
        /   |       |    \       /   |       |    \
  Decision  |  Artificial  Hidden   |   Simulate
  tree      |  neural      Markov   |   Annealing
  induction |  network     Models   |   (SA)
  (DTI)     |  (ANN)       (HMM)    |
         Support                 Genetic
         Vector machine          Algorithm
         (SVM)                   (GA)
```

1. 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          Support Vector
  classification          regression
         |                     |
  Used to classify       Used to predict continu-
  datasets. discrete     discrete values
  eg: Email spans        eg: market trends
  detection
```

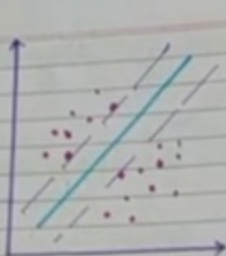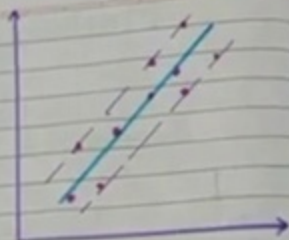Classification   Regression

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

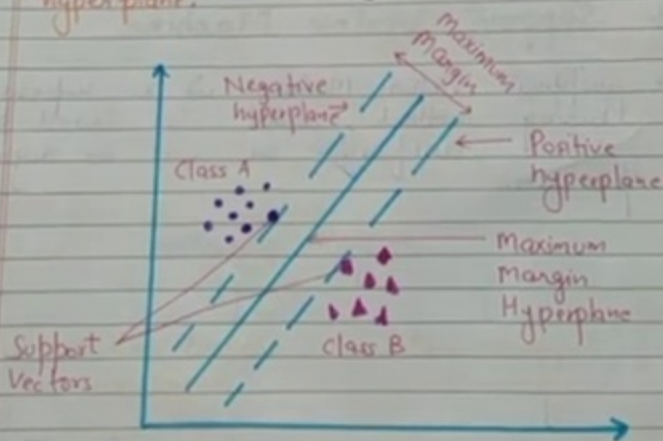Class A and Class B → These are two datasets that are classified using decision boundary.
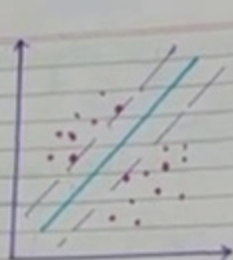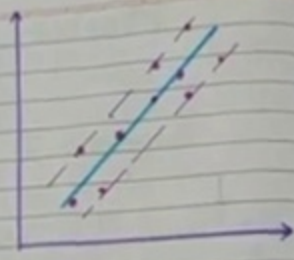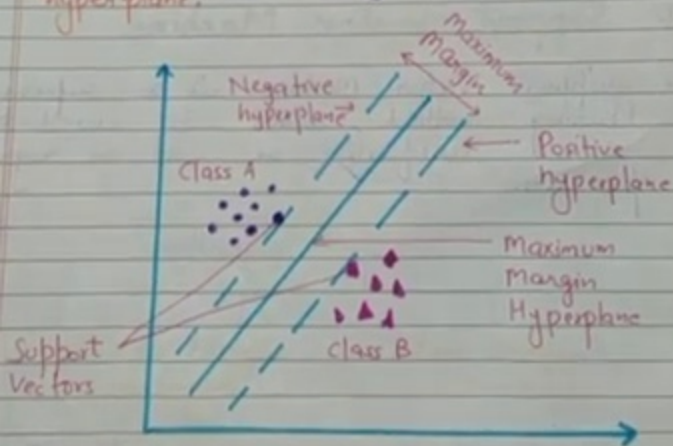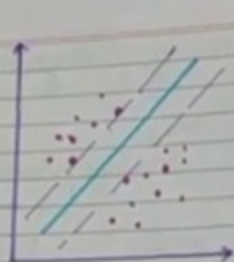
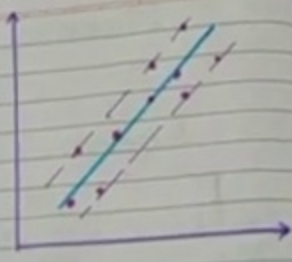classification   Regression

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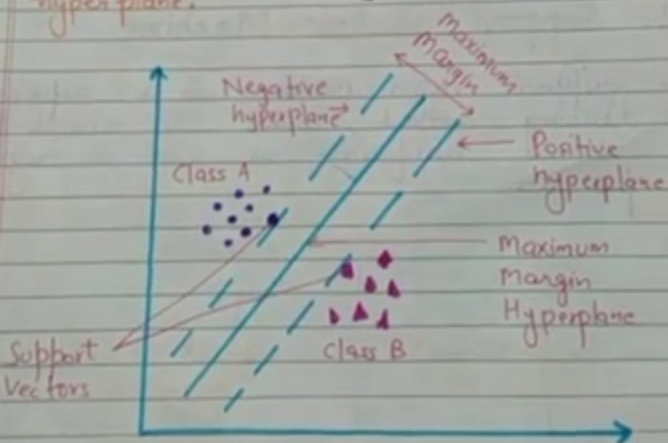
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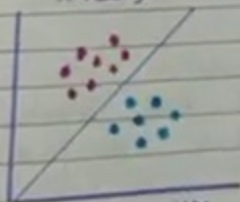

Negative hyperplane→

Maximum margin

← Positive hyperplane

Class A

Maximum Margin Hyperplane

Support Vectors

Class B

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

ii) Support Vectors :- SVM chooses the extreme points or toppen that helps in creating the hyperplane. These extreme of 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
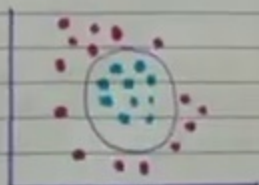face Detection
Image classification

Types of SVM

Linear
Separated data linearly.

Non-Linear
Data cant be separated by

Linear SVM

Non Linear SVM

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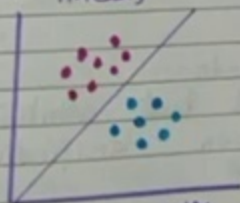
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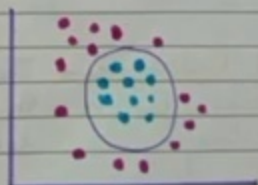Face Detection
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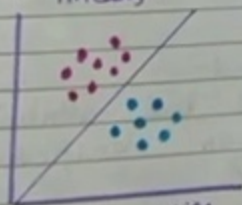
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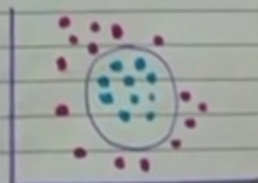**Applications** → Text classification
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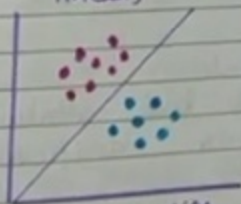
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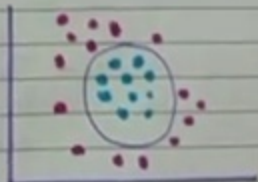Face Detection
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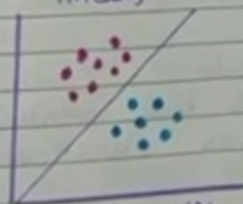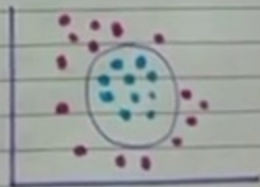
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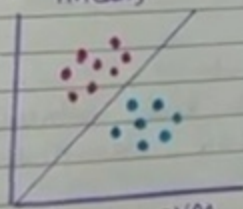
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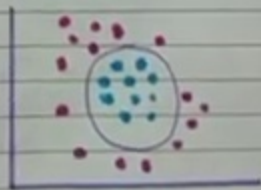Face Detection
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separated data | Data can't be separated by
linearly. |

Linear SVM | Non Linear SVM