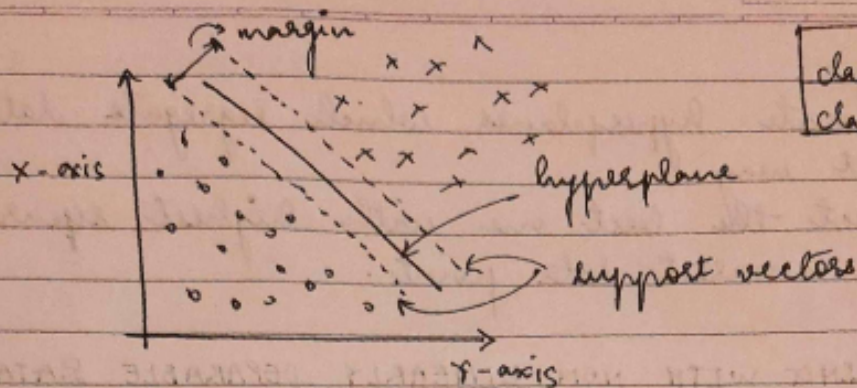ASSIGNMENT-9

TITLE : SUPPORT VECTOR MACHINES

AIM : Implement SVM for performing classificati
and find its accuracy on given data in
Python.

THEORY :

• SUPPORT VECTOR MACHINES :

- SVM offers very high precision compared to
other classifiers like logistic regression & decision
trees.

- It is known for its kernel method to handle
non-linear input spaces. It is used in a
variety of applications such as face detection,
email classification, intrusion detection, etc.

- Generally, SVM is considered to be a
classification approach. However, it can be
employed in both types of classification &
regression problems.

- It works by constructing a hyperplane in
multidimensional space to separate the
different classes such as.

- SVM generates optimal hyperplane in an iterative
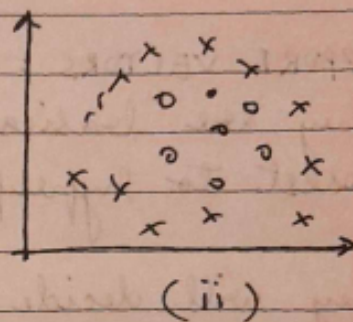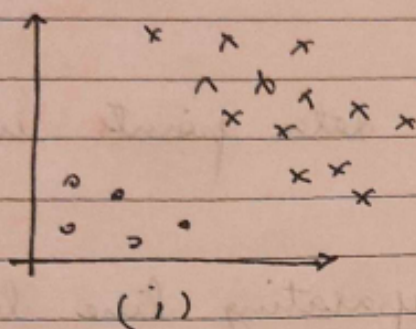manner, which is then used to minimise
errors

class X → x
class Y → o

- SUPPORT VECTORS :
- They are basically the data points which are closest to hyperplane.

- They will decide the separating line by calculating margins. These points are more relevant to construction of the classifier.

- HYPERPLANE :
  Decision plane which separates a set of objects having different class membership.

- MARGINS :
- Separation b/w the 2 lines in the closest class points. Calculated as the perpendicular distance from line to support vectors.

- Larger margin is better.

- SVM PROCESS :
- Separates the dataset in best possible ways.

- Objective is to select the best possible hyperplan with max. possible margin b/w support vectors

Steps :
i. Generate hyperplanes which segregate data in best way.
ii. Select the best one with highest separation from nearest data point.

- DEALING WITH NON-LINEARLY SEPARABLE DATA :

(i)   (ii)

Data in (i) is linearly separable, but not (ii)

In such situations, svm uses kernel method to transform input space into multiple dimension data, which essentially changes data from (ii) into the same in (i)

Types of kernel :
    i. Linear
    ii. Polynomial

CONCLUSION:
Thus we learnt & implemented svms.