

Practical No. 10

Aim : To implement & evaluate the support vector machine (SVM) classification algorithm on a dataset using python.

Input : 1) Dataset (Iris)
2) Target : species of flower.

Output : i) Accuracy
ii) Classification Report.

Theory :

What is SVM ?

Support vector machine (SVM) is a powerful supervised machine learning primarily used for classification tasks, though it can also be used for regression. It separates classes in the feature space with the maximum margin.

How does it work

1) SVM constructs a hyperplane in a high-dimensional space which can be used for classification.

2. The hyperplane is chosen in such a way - that this margin is maximized.
3. The nearest data points from each class that influence the hyperplane are called support

Type of SVM:

1. Linear SVM: Used when data is linearly separable.
2. Non-linear SVM: when data is not linearly separable in higher-dimensional space, where it becomes linearly separable.

Kernels in SVM:

1. Linear kernel - Good for linearly separable data.
2. Polynomial kernel - Useful for curved boundaries.
3. RBF / Gaussian kernel - Default choice, works well in most cases.
4. Sigmoid kernel - Similar to neural networks.

SVM Terminology:

1. Hyperplane: decision boundary that separates different classes.
2. Support Vectors: Data points that are closest to the hyperplane.
3. margin: Distance between the support vectors & the hyperplane.

Algorithm :

[Step 1] : Start

[Step 2] : Import dataset & required libraries

[Step 3] : Split dataset into training & testing sets.

[Step 4] : choose an appropriate kernel

[Step 5] : predict using test data.

[Step 6] : Evaluate performance using accuracy & classification metrics.

Conclusion :

The support vector machine (SVM) algorithm was successfully implemented using the Iris dataset.

It classified the flower species with 100% accuracy using the RBF kernel.

flow chart :

