PROBLEM STATEMENT:

Apply appropriate ML algorithm on a dataset collected in a cosmetics shop showing details of customers to predict customer response for special offer.

LIABRARY:

SVM, NumPy, Pandas, Matplotlib, etc.

Theory:

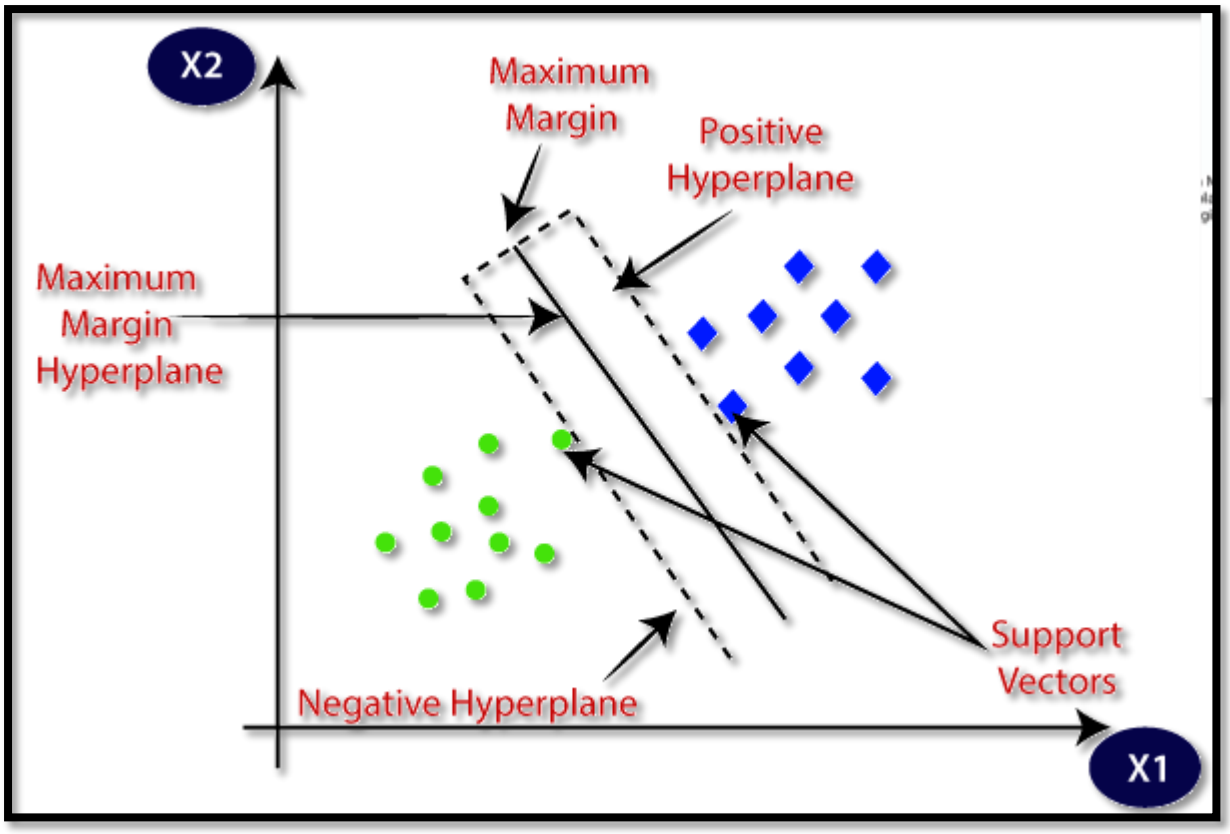
Support Vector Machine or SVM is one of the most popular Supervised Learning algorithms, which is used for Classification as well as Regression problems. However, primarily, it is used for Classification problems in Machine Learning.

The goal of the SVM algorithm is to create the best line or decision boundary that can segregate n-dimensional space into classes so that we can easily put the new data point in the correct category in the future. This best decision boundary is called a hyperplane.

SVM chooses the extreme points/vectors that help in creating the hyperplane. These extreme cases are called as support vectors, and hence algorithm is termed as Support Vector Machine.

Example: SVM can be understood with the example that we have used in the KNN classifier. Suppose we see a strange cat that also has some features of dogs, so if we want a model that can accurately identify whether it is a cat or dog, so such a model can be created by using the SVM algorithm. We will first train our model with lots of images of cats and dogs so that it can learn about different features of cats and dogs, and then we test it with this strange creature. So as support vector creates a decision boundary between these two data (cat and dog) and choose extreme cases (support vectors), it will see the extreme case of cat and dog. On the basis of the support vectors, it will classify it as a cat.

Diagram:



CONCLUSION:

The SVM algorithm, with its ability to handle both linear and non-linear data, offers a robust solution for classification problems. By finding an optimal hyperplane that maximizes the margin between different classes, SVM effectively separates data points, leading to accurate predictions. Its versatility in handling high-dimensional data and ability to handle complex decision boundaries make it suitable for a wide range of applications, including image classification, text categorization, and medical diagnosis. However, SVM's performance can be sensitive to the choice of hyperparameters such as the kernel type and regularization parameter, requiring careful tuning for optimal results. Overall, SVM stands as a valuable tool in the machine learning toolkit, offering a balance between predictive performance and computational efficiency.