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AIM: Understanding Support Vector Machine algorithm through building SVM algorithm in Python

Problem Statement:

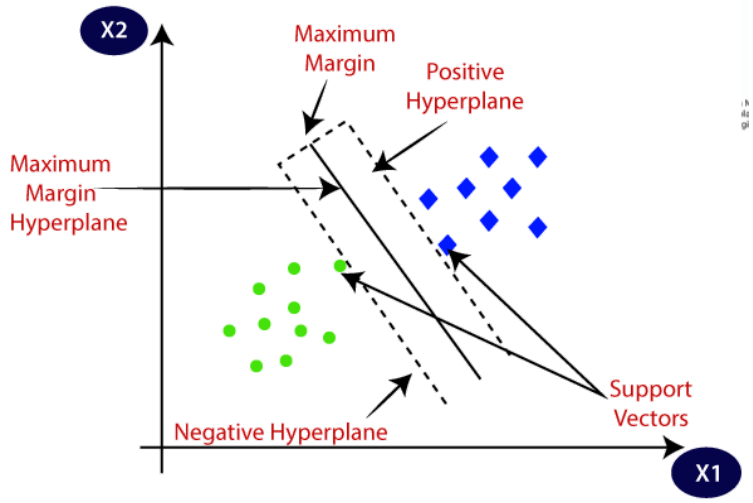
Implement SVC and SVM by randomly creating linear and nonlinear dataset and using the appropriate function.

Support vector machines

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 support vectors, and hence the algorithm is termed as Support Vector Machine. Consider the below diagram in which there are two different categories that are classified using a decision boundary or hyperplane:



Support vector Classifier

The SVC() function can be used to fit a support vector classifier when the argument kernel = ”linear” is used. This function uses a slightly different formulation of the equations we saw in lecture to build the support vector classifier. The c argument allows us to specify the cost of a violation to the margin. When the c argument is small, then the margins will be wide and many support vectors

will be on the margin or will violate the margin. When the c argument is large, then the margins will be narrow and there will be few support vectors on the margin or violating the margin.
We can use the SVC() function to fit the support vector classifier for a given value of the cost parameter.

Code & Output:
https://colab.research.google.com/drive/1Wp-WYGjoD0xahzF8c2I4Ib1HzYiZrGm7?usp=sharing

Conclusion:
All conclusions and final results have been added into the colab notebook mentioned in the above link.