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BATCH : B
COURSE : Data Analytics Lab
EXPERIMENT : 8

AIM : To Understand Support Vector Machine algorithm through building SVM algorithm in Python

PROBLEM STATEMENT :

1. Support Vector Machines In this lab, we'll use the SVC module from the sklearn.svm package to demonstrate the support vector classifier and the SVM
2. 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. Here we demonstrate the use of this function on a two-dimensional example so that we can plot the resulting decision boundary. Let's start by generating a set of observations, which belong to two classes.
3. The sklearn.grid_search module includes a function GridSearchCV() to perform cross- validation. In order to use this function, we pass in relevant information about the set of models that are under consideration. The following command indicates that we want to perform 10-fold cross-validation to compare SVMs with a linear kernel, using a range of values of the cost param-eter.

4. Support Vector Machine: Kernel Method
    a. In order to fit an SVM using a non-linear kernel, we once again use the SVC() function. However, now we use a different value of the parameter kernel. To fit an SVM with a polynomial kernel we use kernel =”poly”, and to fit an SVM with a radial kernel we use kernel = ”rbf”. In the former case we also use the degree argument to specify a degree for the polynomial kernel, and in the latter case we use gamma to specify a value of γ for the radial basis kernel.

   Let’s generate some data with a non-linear class boundary
5. Draw ROC curve and Analyze the result

CODE & OUTPUT:
https://colab.research.google.com/drive/1YE8U5UQFcFFPnYCbjnT4yiw4Uu9uPFyX?usp=sharing

CONCLUSION :
All the explanations and inferences have been precisely written in the Google Collab Notebook itself.