IML
Lab-9
Perceptron and SVM

Procedure to solve this Question:

1. First of all, to the given data I have performed data preprocessing such as handling of missing values and normalizing the data set using MinMaxScalar.Then split the data into train ,validation and test in ration 70:20:10.

2. Then using the sklearn library I have imported a perceptron model to classify the data and predict the accuracy.I have used a training set to train the data and test set to predict the accuracy. The accuracy comes out to be `98.4375 %`.

`Scatterplot for 2 parameter visualized in 2-D distinguished as 0 and 1.`
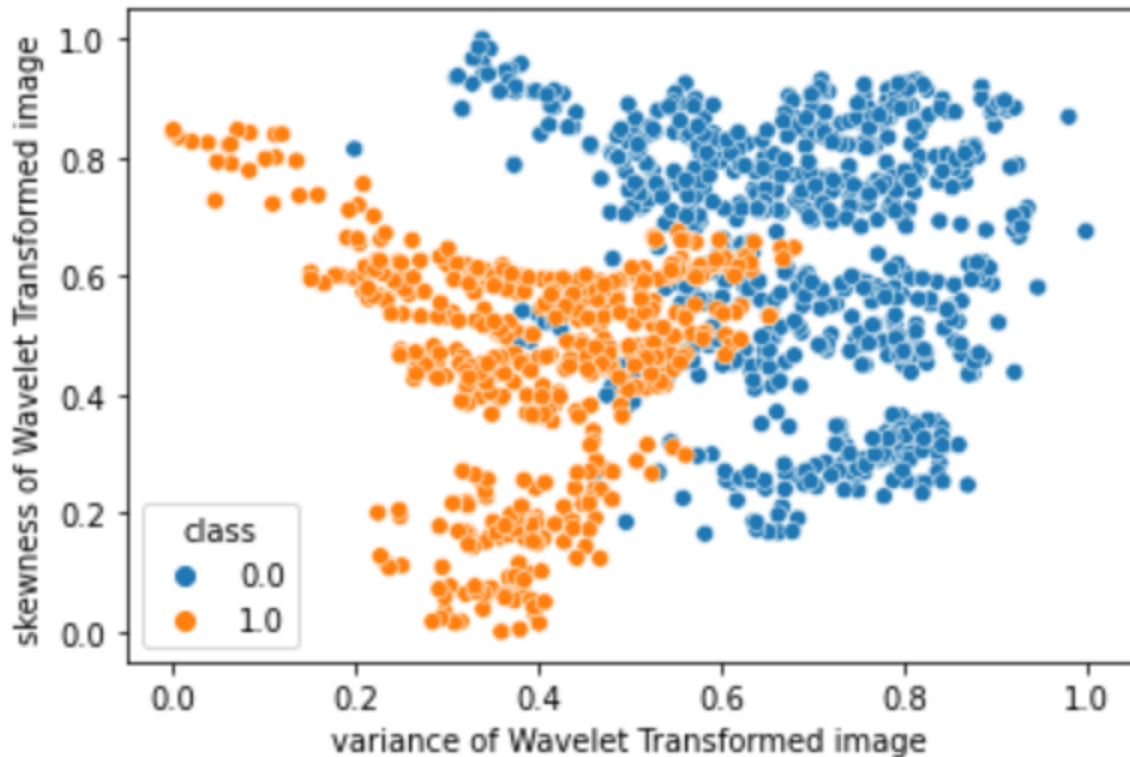
Then in the second part of the question it is asked to apply K-fold validation and predict the accuracy of the classifier and also find the no. of subsets .This method is best for training the model. For the set the best value of k comes out to be 8 when k is chosen from 2 to 9.For predicting this vlue I have taken the mean of every accuracy score for particular k value and the find out for which k it is maximum.

- Regularization is done in this question in order to reduce overfitting and underfitting of data as the data set is large.Alpha is regularization parameter generally used for perceptron model.

3. Then we have to implement a perceptron model form scratch and Ihave taken a finite no. of iteration for the process=1000 for training of the data. The main goal of the learning algorithm is to find vector **w** capable of absolutely separating Positive **P** (y = 1) and Negative **N**(y = 0) sets of data.I have taken several learning rates and for all the learning rate my prediction score comes out to be 98.4375%.

Problem 2-
In this part using the same dataset as in the above question we have to train the support vector machine (SVM) using training set data and find out the accuracy of the model. The accuracy comes out to be 1 in for all the degrees of SVM.This means SVM completely separate data marked as 0 and 1 from each other for all degree.

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