12012019 – 12012052

WEEK 11 ML ASSIGNMENT

EXPLANATION

Accuracy of SVM with all possible kernels(linear , polynomial, rbf , sigmoid)

LINEAR POLYNOMIAL RBF SIGMOID

ACCURACY 0.73 0.73 0.72 0.58

Based on the provided accuracy values , the SVM with kernel linear and Polynomial have highest accuracy (0.73)

Here's a comparison of the two SVM models:

**SVM with Linear Kernel:**

Precision (Class 1): 0.74

Recall (Class 1): 0.82

F1-Score (Class 1): 0.78

**SVM with Polynomial Kernel:**

Precision (Class 1): 0.72

Recall (Class 1): 0.87

F1-Score (Class 1): 0.79

In this scenario, the SVM model with the polynomial kernel performs better in terms of recall for Class 1, indicating that it correctly identifies more positive instances. It also has a slightly higher F1-score, which is the harmonic mean of precision and recall. Consequently, based on the provided metrics, the SVM model with the polynomial kernel is the better-performing model.

LOGISTIC REGRESSION DECISION TREE KNN SVM(polynmial)

ACCURACY 0.72 0.65 0.67 0.73

Based on the provided accuracy values, the Support Vector Machine (SVM) appears to have the highest accuracy (0.73) among the models mentioned but accuracy is just one metric for evaluating model performance, and it may not always be the most appropriate measure, especially if the dataset is imbalanced or if other factors like precision, recall, or F1-score are more critical for the given problem.

Therefore, in terms of accuracy, the SVM seems to perform better than other models for the given dataset and problem.

Now, we have to compare the accuracy of SVM with other ensemble techniques.

RANDOM FOREST ADABOOST SVM

ACCURACY 0.66 0.73 0.73

SVM and Adaboost have the same accuracy of 73%. In order to explore further, we have to compare their precision, recall and F-score.

AdaBoost Classifier:

Precision (Class 1): 0.75

Recall (Class 1): 0.80

F1-Score (Class 1): 0.77

Accuracy: 0.73

SVM with Polynomial Kernel:

Precision (Class 1): 0.72

Recall (Class 1): 0.87

F1-Score (Class 1): 0.79

Accuracy: 0.73

In this case, the SVM model with the polynomial kernel performs slightly better in terms of recall for Class 1 (positive class) compared to the AdaBoost classifier. It correctly identifies 87% of positive instances, whereas the AdaBoost classifier identifies 80% of positive instances. Additionally, the F1-score for the positive class is higher for the SVM model with the polynomial kernel (0.79 vs. 0.77), indicating a better balance between precision and recall.