APR Report

This is my submission of assignment 1 using breast cancer dataset for cancer classification. I used logistic regression and support vector for classification. Also, I tried using Linear Discriminant Analysis for dimensional reduction and its effect on accuracy.

Code for Logistic regression:-

```python
from sklearn.linear_model import LogisticRegression
model1 = LogisticRegression(multi_class="multinomial",solver="lbfgs",max_iter=500)
model1.fit(X_train_scaled,y_train)
```

Accuracy for logistic regression without using LDA:-

```
0.9824561403508771
              precision    recall  f1-score   support

           0       0.97      0.98      0.98        63
           1       0.99      0.98      0.99       108

    accuracy                           0.98       171
   macro avg       0.98      0.98      0.98       171
weighted avg       0.98      0.98      0.98       171
```

Code for SVC:-

```python
from sklearn.svm import SVC
model2 = SVC(kernel='rbf',decision_function_shape='ovr')
model2.fit(X_train_scaled,y_train)
```

Accuracy for SVC:-

```
0.9766081871345029
              precision    recall  f1-score   support

           0       0.97      0.97      0.97        63
           1       0.98      0.98      0.98       108

    accuracy                           0.98       171
   macro avg       0.97      0.97      0.97       171
weighted avg       0.98      0.98      0.98       171
```

Code for LDA:-

```
#Use LDA
from sklearn.discriminant_analysis import LinearDiscriminantAnalysis as LDA
lda = LDA(n_components=1)
X_train_lda = lda.fit_transform(X_train_scaled, y_train)
X_test_lda = lda.transform(X_test_scaled)
```

Accuracy of Logistic regression using LDA:-

```
0.9590643274853801
              precision    recall  f1-score   support

           0       0.94      0.95      0.94        63
           1       0.97      0.96      0.97       108

    accuracy                           0.96       171
   macro avg       0.95      0.96      0.96       171
weighted avg       0.96      0.96      0.96       171
```

Accuracy of SVC using LDA:-

```
0.9590643274853801
              precision    recall  f1-score   support

           0       0.94      0.95      0.94        63
           1       0.97      0.96      0.97       108

    accuracy                           0.96       171
   macro avg       0.95      0.96      0.96       171
weighted avg       0.96      0.96      0.96       171
```

Report by:-

Name: Sripati Surya Teja

Roll number : 2201CS71