```python
# Predict
y_pred_lr = lr.predict(X_test)
y_pred_nb = nb.predict(X_test)
y_pred_pac = pac.predict(X_test)

# Print accuracy
print("Logistic Regression Accuracy:", accuracy_score(y_test, y_pred_lr))
print("Naive Bayes Accuracy:", accuracy_score(y_test, y_pred_nb))
print("Passive Aggressive Classifier Accuracy:", accuracy_score(y_test, y_pr
```

```
Logistic Regression Accuracy: 0.85
Naive Bayes Accuracy: 0.85
Passive Aggressive Classifier Accuracy: 0.975
```

```
Requirement already satisfied: joblib in /usr/local/lib/python3.11/dist-packages (1.4.2
Accuracy: 0.975
Classification Report:
              precision    recall  f1-score   support

           0       1.00      0.83      0.91         6
           1       0.97      1.00      0.99        34

    accuracy                           0.97        40
   macro avg       0.99      0.92      0.95        40
weighted avg       0.98      0.97      0.97        40
```

```
Training features shape: (160, 4)
Testing features shape: (40, 4)

First 5 rows of scaled training features:
 [[0.29885057 0.45454545 0.37777778 0.02000543]
 [0.14942529 0.27272727 0.28888889 0.76339171]
 [0.04597701 0.36363636 0.28888889 0.88717693]
 [0.02298851 0.         0.37777778 0.82673615]
 [0.06896552 0.         0.22222222 0.9560158 ]]

First 5 training labels:
 [1 1 1 1 1]
```
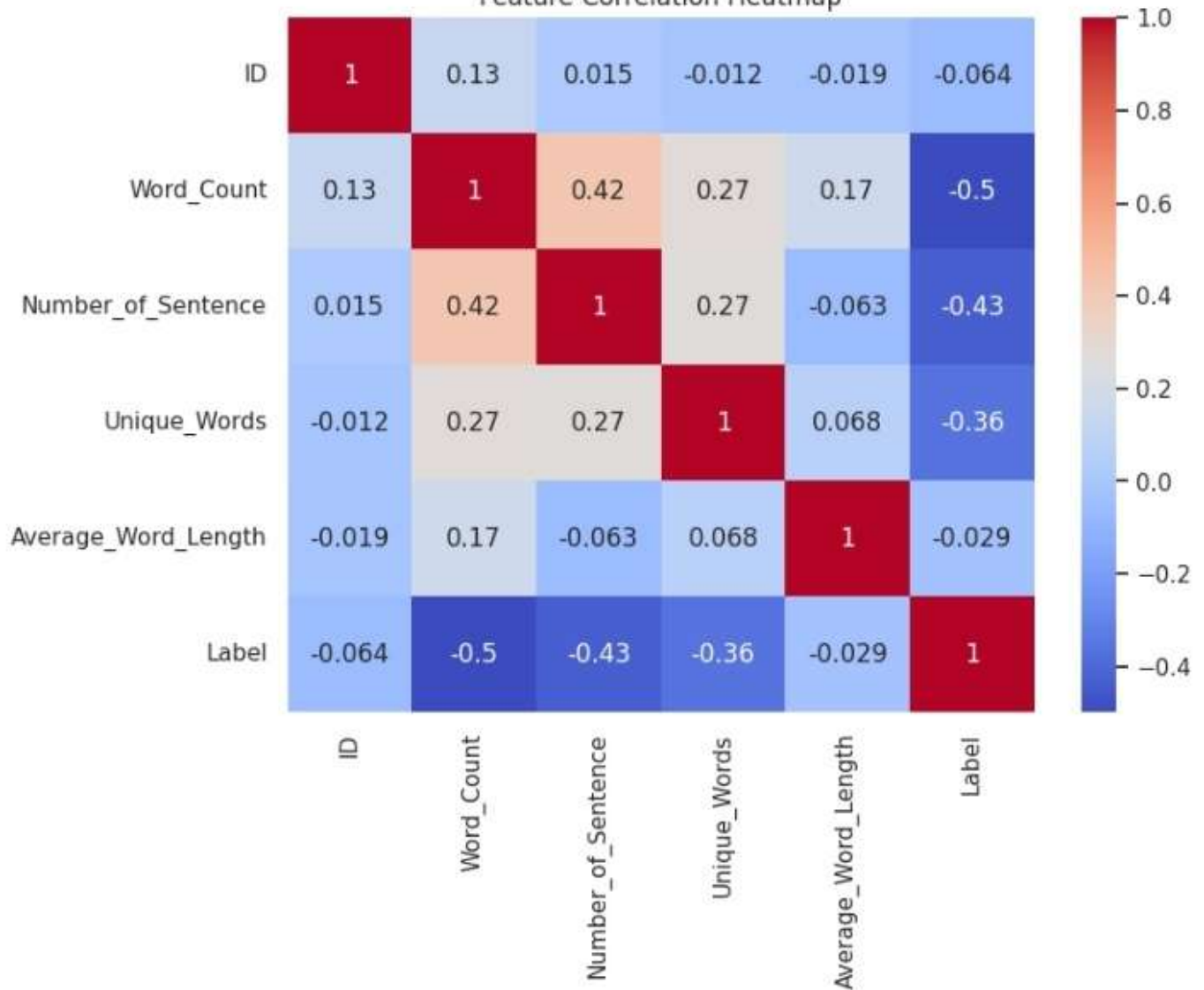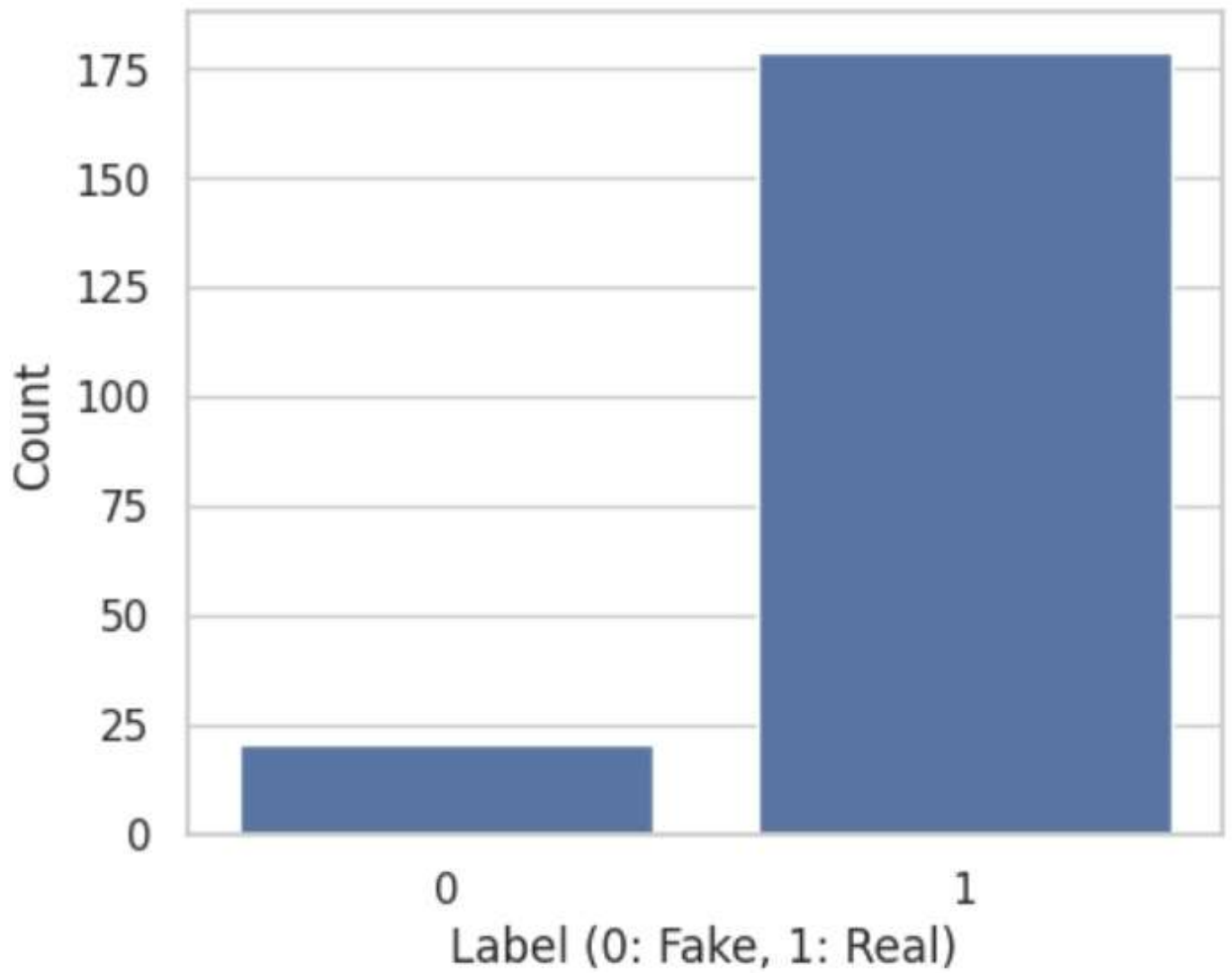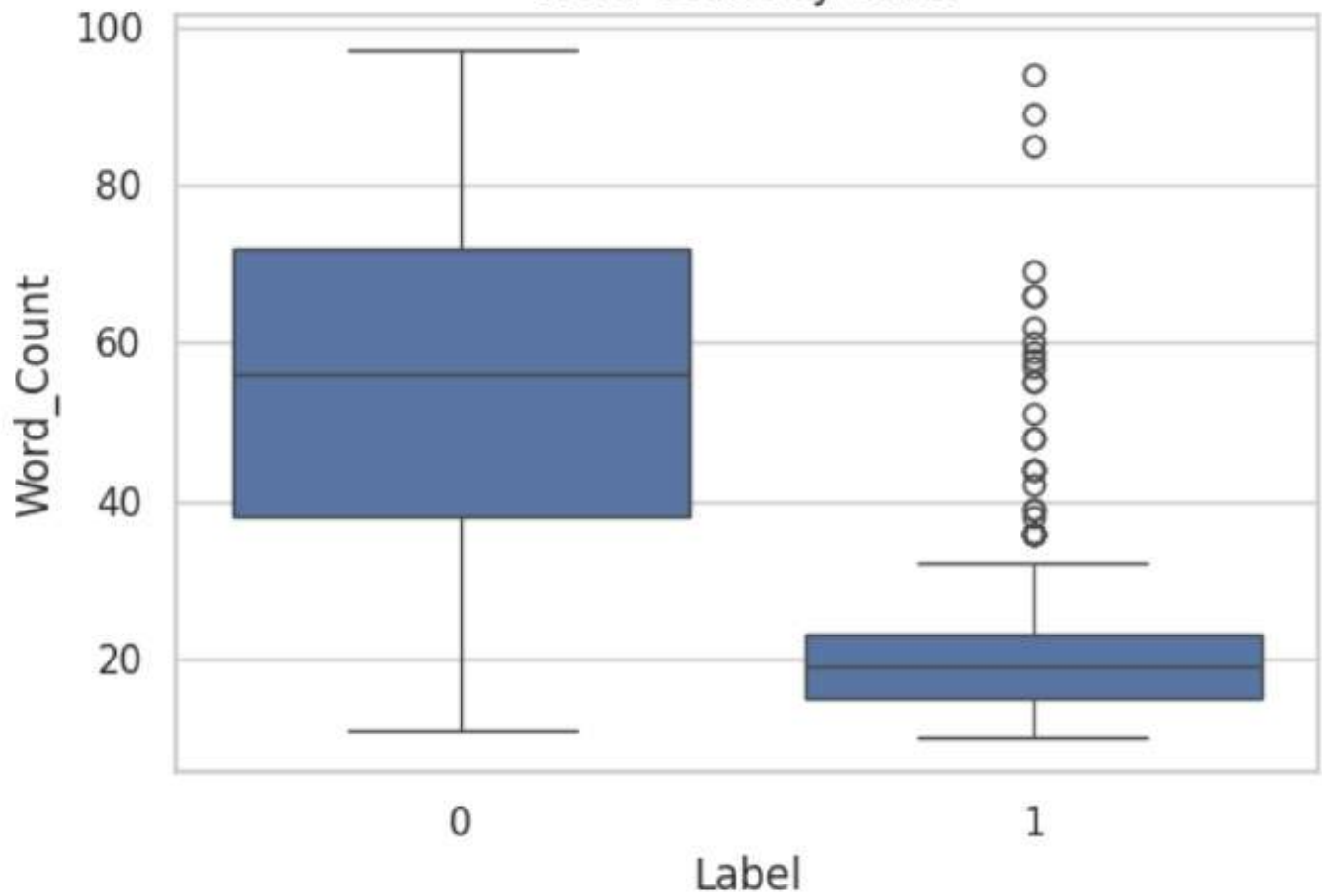
Distribution of Average Word Length
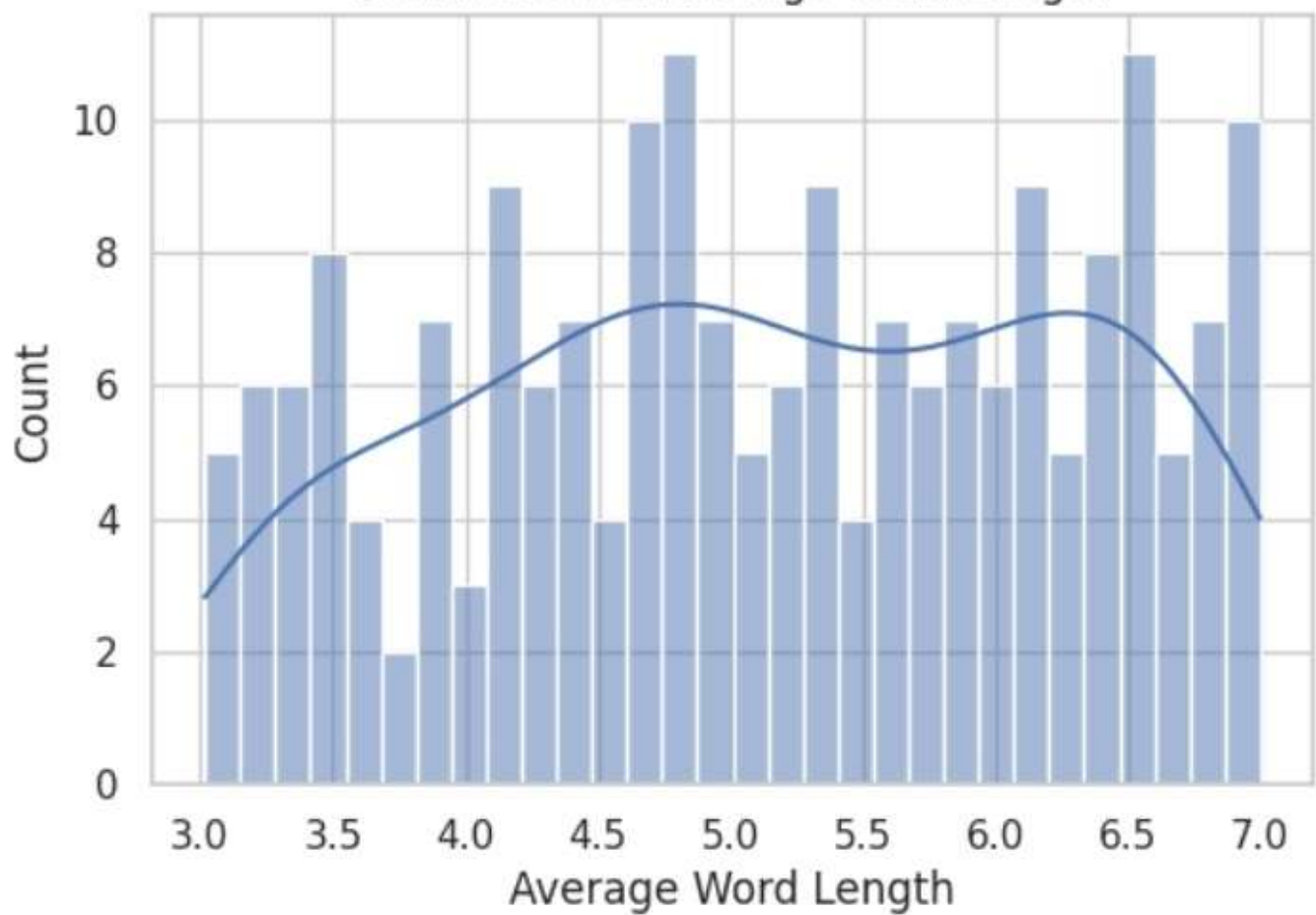
Feature Correlation Heatmap

Class Distribution (Fake vs Real)

Word Count by Label

```
Saving Fake_News_Dataset.csv to Fake_News_Dataset (1).csv
Initial shape: (200, 6)
Columns: ['ID', 'Word_Count', 'Number_of_Sentence', 'Unique_Words', 'Average_Word_Lengt
Shape after removing duplicates: (200, 6)
Shape after removing nulls: (200, 6)
Preprocessed data saved as 'preprocessed_fake_news.csv'
```
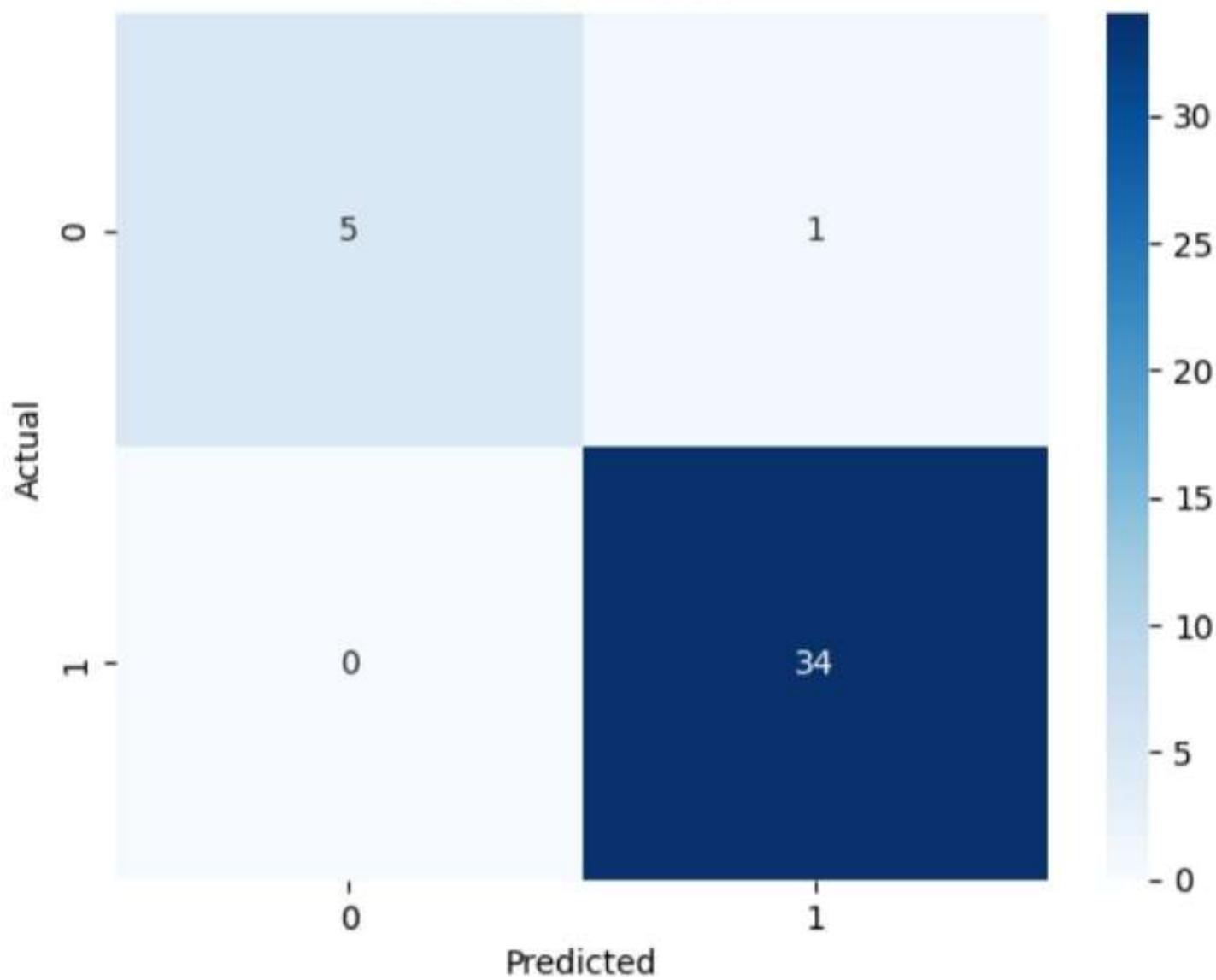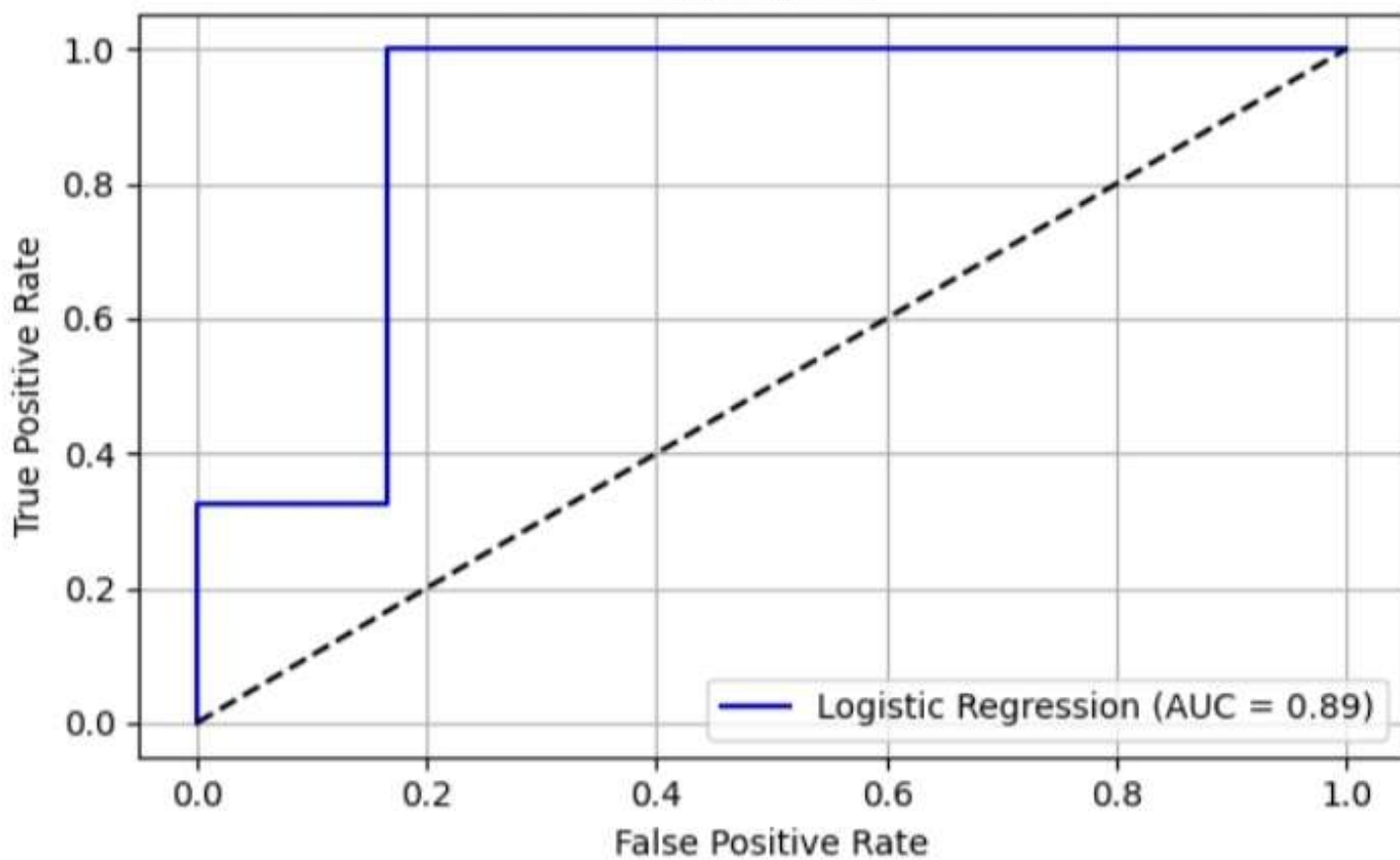
Confusion Matrix

ROC Curve

```
Confusion Matrix - Logistic Regression:
 [[ 0  6]
 [ 0 34]]

Classification Report - Logistic Regression:
              precision    recall  f1-score   support

           0       0.00      0.00      0.00         6
           1       0.85      1.00      0.92        34

    accuracy                           0.85        40
   macro avg       0.42      0.50      0.46        40
weighted avg       0.72      0.85      0.78        40


Confusion Matrix - Naive Bayes:
 [[ 0  6]
 [ 0 34]]
```

```
Classification Report - Naive Bayes:
              precision    recall  f1-score   support

           0       0.00      0.00      0.00         6
           1       0.85      1.00      0.92        34

    accuracy                           0.85        40
   macro avg       0.42      0.50      0.46        40
weighted avg       0.72      0.85      0.78        40


Confusion Matrix - Passive Aggressive:
 [[ 5  1]
 [ 0 34]]
```

```
Confusion Matrix - Passive Aggressive:
 [[ 5  1]
 [ 0 34]]

Classification Report - Passive Aggressive:
              precision    recall  f1-score   support

           0       1.00      0.83      0.91         6
           1       0.97      1.00      0.99        34

    accuracy                           0.97        40
   macro avg       0.99      0.92      0.95        40
weighted avg       0.98      0.97      0.97        40
```

ROC Curve

Legend:
- Logistic Regression (AUC = 0.96)
- Naive Bayes (AUC = 0.94)
- Random Guess