Model Development Phase Template

Date	11-07-2024
Team ID	739955
Project Title	SMOKE DETECTION USING IOT DATASET
Maximum Marks	4 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include classification reports, accuracy, and confusion matrices for multiple models, presented through respective screenshots.

Initial Model Training Code:

Model Building

```
[ ]  from sklearn.tree import DecisionTreeClassifier
     from sklearn.metrics import accuracy_score,classification_report
     clf = DecisionTreeClassifier()
```

```
     # Train the classifier on the training data
     clf.fit(x_train, y_train)

     # Make predictions on the testing data
     y_pred = clf.predict(x_test)

     # Evaluate the classifier
     report = classification_report(y_test, y_pred)
     print("Classification Report:\n", report)
```

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

           0       1.00      1.00      1.00      3605
           1       1.00      1.00      1.00      8921

    accuracy                           1.00     12526
   macro avg       1.00      1.00      1.00     12526
weighted avg       1.00      1.00      1.00     12526
```

```
[ ] from sklearn.linear_model import LogisticRegression
    from sklearn.metrics import accuracy_score,classification_report
```

```
#Initializing the model
model_lr = LogisticRegression()
model_lr.fit(x_train,y_train)
lr_pred_test=model_lr.predict(x_test)
lr_pred_train=model_lr.predict(x_train)
test_acc_lr=accuracy_score(y_test,lr_pred_test)
train_acc_lr=accuracy_score(y_train,lr_pred_train)
print('Logistic Regression test accuracy: ',test_acc_lr)
print(classification_report(y_test,lr_pred_test))
```

```
Logistic Regression test accuracy:  0.9691840970780776
              precision    recall  f1-score   support

           0       0.94      0.95      0.95      3605
           1       0.98      0.98      0.98      8921

    accuracy                           0.97     12526
   macro avg       0.96      0.96      0.96     12526
weighted avg       0.97      0.97      0.97     12526
```

KNN classifier

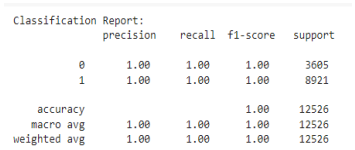
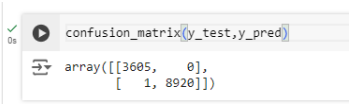
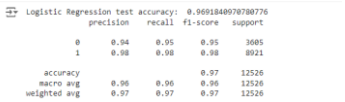
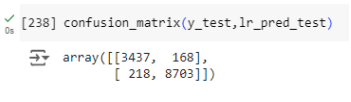
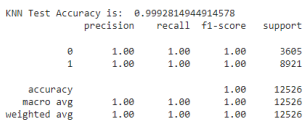
```
from sklearn.neighbors import KNeighborsClassifier
knn=KNeighborsClassifier()
knn.fit(x_train,y_train)
knn_pred_test=knn.predict(x_test)
knn_pred_train=knn.predict(x_train)
test_acc_knn=accuracy_score(y_test,knn_pred_test)
train_acc_knn=accuracy_score(y_train,knn_pred_train)
print('KNN Test Accuracy is: ',test_acc_knn)
print(classification_report(y_test,knn_pred_test))
```

```
KNN Test Accuracy is:  0.9992814944914578
              precision    recall  f1-score   support

           0       1.00      1.00      1.00      3605
           1       1.00      1.00      1.00      8921

    accuracy                           1.00     12526
   macro avg       1.00      1.00      1.00     12526
weighted avg       1.00      1.00      1.00     12526
```

Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
Decision tree classifier		0.99	
Logistic Regression		0.96	
K-Nearest Neighbors		0.99