

Project Development Phase Model Performance Test

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Model Performance Testing:

Project team shall fill the following information in model performance testing template.

S. No	Parameter	Values
1.	Metrics	Classification Model: Confusion Matrix - , Accuracy Score- & Classification Report -
2.	Tune the Model	Hyperparameter Tuning

Classification Model:

Confusion Matrix - , Accuracy Score- & Classification
Report -

```
In [35]: dtc=DecisionTreeClassifier()
dtc.fit(X_train,y_train)

y_test_predict2=dtc.predict(X_test)
test_accuracy=accuracy_score(y_test,y_test_predict2)
test_accuracy
```

Out[35]: 0.988

```
In [36]: y_train_predict2=dtc.predict(X_train)
train_accuracy=accuracy_score(y_train,y_train_predict2)
train_accuracy
```

Out[36]: 1.0

```
In [39]: pd.crosstab(y_test,y_test_predict2)
```

```
Out[39]:
```

	col_0	Fraud	No Fraud
isFraud			
Fraud	1	2	
No Fraud	4	493	

```
In [40]: print(classification_report(y_test,y_test_predict2))
```

	precision	recall	f1-score	support
Fraud	0.20	0.33	0.25	3
No Fraud	1.00	0.99	0.99	497
accuracy			0.99	500
macro avg	0.60	0.66	0.62	500
weighted avg	0.99	0.99	0.99	500

Confusion Matrix

```
In [51]: cm = confusion_matrix(y_test, y_test_predict2)
print("Confusion Matrix:")
print(cm)
```

Confusion Matrix:

```
[[ 1  2]
 [ 4 493]]
```

Hyperparameter Tuning

```
In [52]: from sklearn.model_selection import GridSearchCV
from sklearn.neighbors import KNeighborsClassifier

# Define the hyperparameters and their possible values for tuning
param_grid = {
    'n_neighbors': [3, 5, 7, 9],
    'metric': ['euclidean', 'manhattan', 'minkowski']
}

# Create the KNeighborsClassifier model
k_classifier = KNeighborsClassifier()

# Perform Grid Search with cross-validation
grid_search = GridSearchCV(estimator=k_classifier, param_grid=param_grid, scoring='accuracy', cv=5)
grid_search.fit(X_train, y_train)

# Get the best hyperparameters
best_params = grid_search.best_params_
print("Best Hyperparameters:", best_params)
```

Best Hyperparameters: {'metric': 'euclidean', 'n_neighbors': 3}