Project Development Phase
Model Performance Test

Date	27 october 2023
Team ID	PNT2022TMID592627
Project Name	**Project- Diabetes Prediction Using Machine Learning**
Maximum Marks	10 Marks

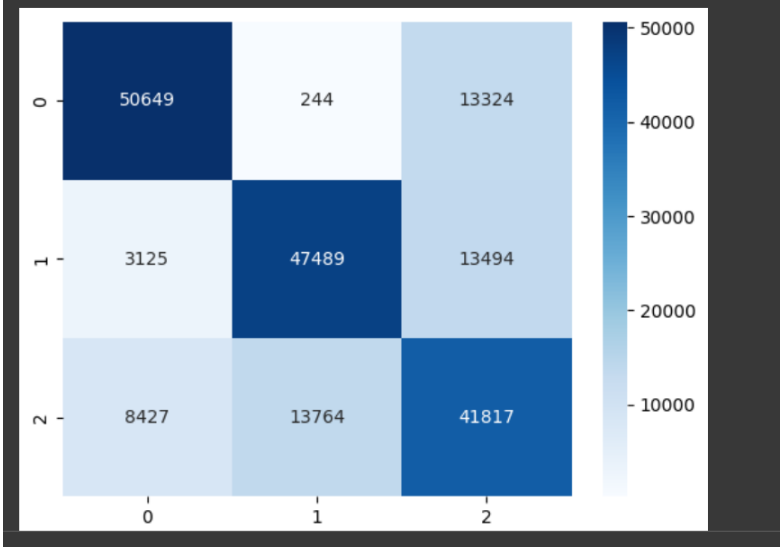
Model Performance Testing:

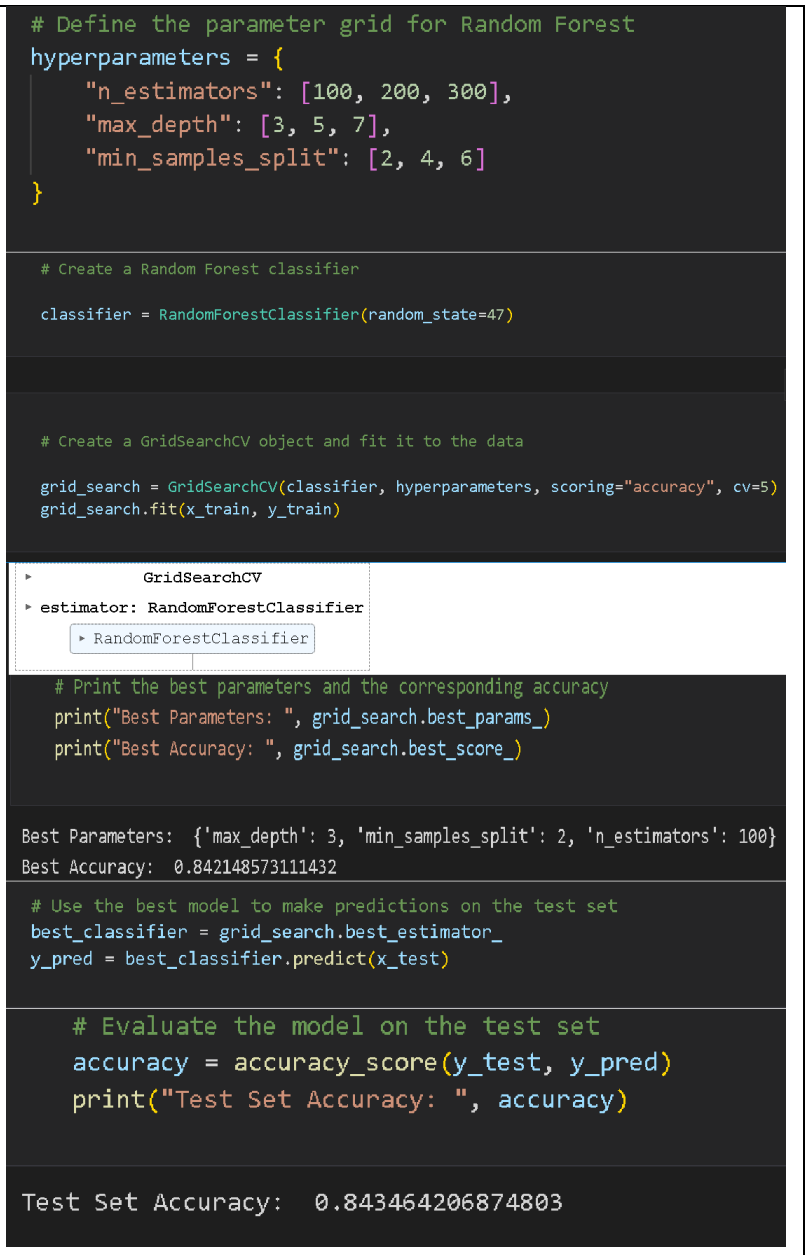
Project team shall fill the following information in model performance testing template.

S.No.	Parameter	Values	Screenshot (Random Forest Model)

1.	Metrics	**Regression Model:**
		MAE - , MSE - , RMSE - , R2 score -
		
		Classification Model:
		Confusion Matrix - , Accuracy Score- & Classification Report -
			Classification Model:
			`print("Test accuracy", accuracy_score(y_test,y_pred5))`
			`print("Train accuracy", accuracy_score(y_train_smote,y_pred5_train))`
			
			Test accuracy 0.7060469883317565
			Train accuracy 0.725540102237643
			
			`print(classification_report(y_test,y_pred5))`
			
			precision recall f1-score support
			
			0.0 0.93 0.73 0.82 42794
			1.0 0.03 0.09 0.04 897
			2.0 0.31 0.65 0.42 7045
			
			accuracy 0.71 50736
			macro avg 0.42 0.49 0.43 50736
			weighted avg 0.83 0.71 0.75 50736

```
from sklearn.metrics import confusion_matrix, classification_report
cm5 = confusion_matrix(y_test,y_pred5)
sns.heatmap(cm5, annot=True, fmt='d', cmap='Blues', cbar=True)
plt.show()
```



2.	Tune the Model	Hyperparameter Tuning - Validation Method -	

```
# Define the parameter grid for Random Forest
hyperparameters = {
    "n_estimators": [100, 200, 300],
    "max_depth": [3, 5, 7],
    "min_samples_split": [2, 4, 6]
}
```

```
# Create a Random Forest classifier

classifier = RandomForestClassifier(random_state=47)
```

```
# Create a GridSearchCV object and fit it to the data

grid_search = GridSearchCV(classifier, hyperparameters, scoring="accuracy", cv=5)
grid_search.fit(x_train, y_train)
```

```
▸ GridSearchCV
▸ estimator: RandomForestClassifier
    ▸ RandomForestClassifier
```

```
# Print the best parameters and the corresponding accuracy
print("Best Parameters: ", grid_search.best_params_)
print("Best Accuracy: ", grid_search.best_score_)
```

```
Best Parameters:  {'max_depth': 3, 'min_samples_split': 2, 'n_estimators': 100}
Best Accuracy:  0.842148573111432
```

```
# Use the best model to make predictions on the test set
best_classifier = grid_search.best_estimator_
y_pred = best_classifier.predict(x_test)
```

```
# Evaluate the model on the test set
accuracy = accuracy_score(y_test, y_pred)
print("Test Set Accuracy: ", accuracy)
```

```
Test Set Accuracy:  0.843464206874803
```