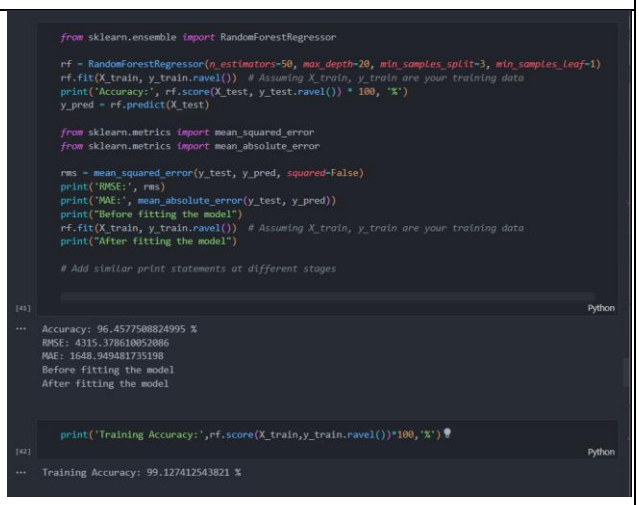
Project Development Phase
Model Performance Test

Date	20-11-2023
Team ID	TEAM-591736
Project Name	Walmart store sales forecasting
Maximum Marks	10 Marks

Model Performance Testing:

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

S.No.	Parameter	Values	Screenshot
1.	Metrics	**Regression Model:** MAE - , MSE - , RMSE - , R2 score - **Classification Model:** Confusion Matrix - , Accuray Score- & Classification Report -	 

2.	Tune the Model	Hyperparameter Tuning - Validation Method -	

```python
# Generate forecast
forecast = model_auto_arima.predict(n_periods=len(test_data))
forecast = pd.DataFrame(forecast, index=test_data.index, columns=['Predictions'])

# Plotting
plt.figure(figsize=(20, 6))
plt.title('Prediction of Weekly Sales using Auto ARIMA model', fontsize=20)
plt.plot(train_data, label='Train')
plt.plot(test_data, label='Test')
plt.plot(forecast, label='Prediction using ARIMA Model')
plt.legend(loc='best')
plt.xlabel('Date', fontsize=14)
plt.ylabel('Weekly Sales', fontsize=14)
plt.show()

# Calculate metrics
predictions = forecast['Predictions']
mse = mean_squared_error(test_data, predictions)
rmse = np.sqrt(mse)
mae = mean_absolute_error(test_data, predictions)

print('Mean Squared Error (MSE) of Auto ARIMA:', mse)
print('Root Mean Squared Error (RMSE) of Auto ARIMA:', rmse)
print('Mean Absolute Deviation (MAE) of Auto ARIMA:', mae)
```

```
ARIMA(0,0,0)(0,0,0)[1] intercept   : AIC=397.842, Time=0.02 sec
ARIMA(0,0,1)(0,0,0)[1] intercept   : AIC=399.420, Time=0.09 sec
ARIMA(0,0,2)(0,0,0)[1] intercept   : AIC=inf, Time=0.18 sec
ARIMA(0,0,3)(0,0,0)[1] intercept   : AIC=inf, Time=0.20 sec
ARIMA(0,0,4)(0,0,0)[1] intercept   : AIC=399.645, Time=0.25 sec
ARIMA(0,0,5)(0,0,0)[1] intercept   : AIC=inf, Time=0.41 sec
ARIMA(1,0,0)(0,0,0)[1] intercept   : AIC=399.658, Time=0.03 sec
ARIMA(1,0,1)(0,0,0)[1] intercept   : AIC=401.559, Time=0.06 sec
ARIMA(1,0,2)(0,0,0)[1] intercept   : AIC=404.248, Time=0.09 sec
ARIMA(1,0,3)(0,0,0)[1] intercept   : AIC=400.338, Time=0.13 sec
ARIMA(1,0,4)(0,0,0)[1] intercept   : AIC=inf, Time=0.30 sec
ARIMA(2,0,0)(0,0,0)[1] intercept   : AIC=399.687, Time=0.10 sec
ARIMA(2,0,1)(0,0,0)[1] intercept   : AIC=403.287, Time=0.20 sec
ARIMA(2,0,2)(0,0,0)[1] intercept   : AIC=404.649, Time=0.33 sec
ARIMA(2,0,3)(0,0,0)[1] intercept   : AIC=402.435, Time=0.41 sec
ARIMA(3,0,0)(0,0,0)[1] intercept   : AIC=400.869, Time=0.29 sec
```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ARIMA(2,0,0)(0,0,0)[1] intercept   : AIC=399.687, Time=0.10 sec
ARIMA(2,0,1)(0,0,0)[1] intercept   : AIC=403.287, Time=0.20 sec
ARIMA(2,0,2)(0,0,0)[1] intercept   : AIC=404.649, Time=0.33 sec
ARIMA(2,0,3)(0,0,0)[1] intercept   : AIC=402.435, Time=0.41 sec
ARIMA(3,0,0)(0,0,0)[1] intercept   : AIC=400.869, Time=0.29 sec
```


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ARIMA(3,0,1)(0,0,0)[1] intercept   : AIC=403.022, Time=0.22 sec
ARIMA(3,0,2)(0,0,0)[1] intercept   : AIC=405.264, Time=0.33 sec
ARIMA(4,0,0)(0,0,0)[1] intercept   : AIC=402.820, Time=0.17 sec
ARIMA(4,0,1)(0,0,0)[1] intercept   : AIC=405.025, Time=0.41 sec
ARIMA(5,0,0)(0,0,0)[1] intercept   : AIC=404.311, Time=0.18 sec

Best model:  ARIMA(0,0,0)(0,0,0)[1] intercept
Total fit time: 4.405 seconds
```

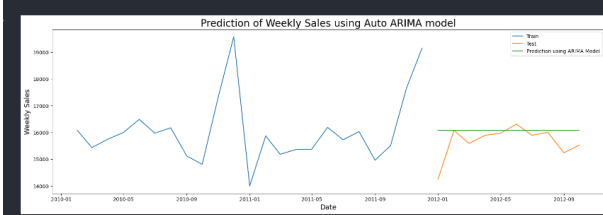


```
Mean Squared Error (MSE) of Auto ARIMA: 468477.9539606969
Root Mean Squared Error (RMSE) of Auto ARIMA: 684.4544937106461
Mean Absolute Deviation (MAE) of Auto ARIMA: 446.8196095294599
```