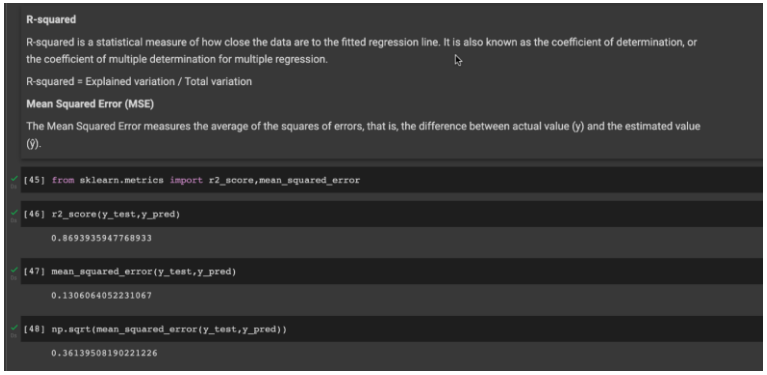
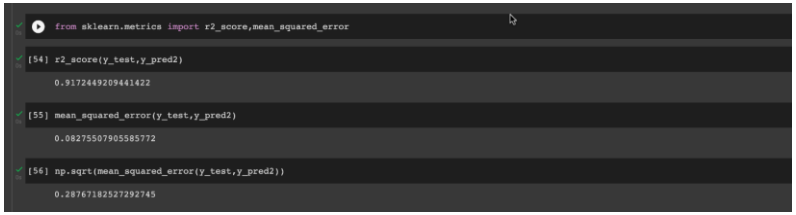
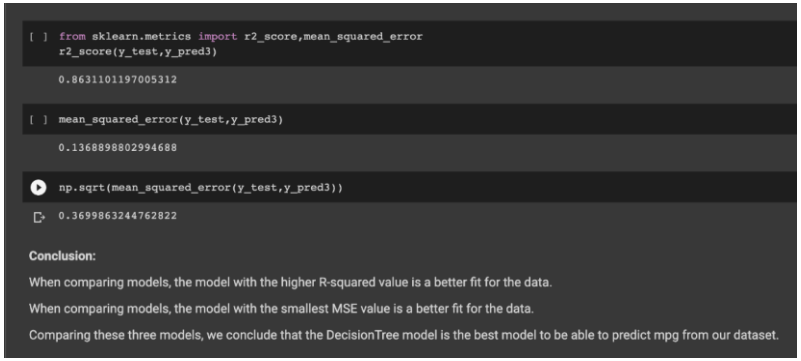
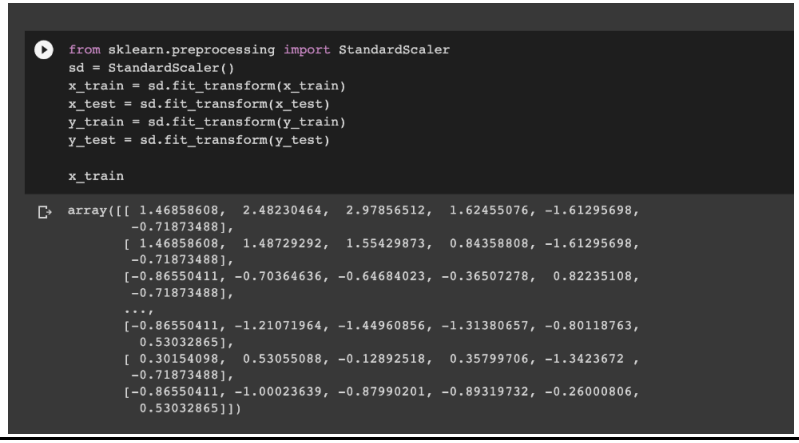
Project Development Phase
Model Performance Test

Date	14 November 2022
Team ID	PNT2022TMID41512
Project Name	Project - Machine Learning based Vehicle Performance Analyser
Maximum Marks	10 Marks

Model Performance Testing:

Project team shall fill the following information in the 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 -	Decision tree regressor 

			Random forest regressor  Linear regression 
2.	Tune the Model	Hyperparameter Tuning - Validation Method -	

```
from sklearn.metrics import r2_score,mean_squared_error
```

```
[54] r2_score(y_test,y_pred2)
```

```
0.9172449209441422
```

```
[55] mean_squared_error(y_test,y_pred2)
```

```
0.08275507905585772
```

```
[56] np.sqrt(mean_squared_error(y_test,y_pred2))
```

```
0.28767182527292745
```

```
[ ] from sklearn.metrics import r2_score,mean_squared_error
    r2_score(y_test,y_pred3)
```

```
0.8631101197005312
```

```
[ ] mean_squared_error(y_test,y_pred3)
```

```
0.1368898802994688
```

```
np.sqrt(mean_squared_error(y_test,y_pred3))
```

```
0.3699863244762822
```

Conclusion:

When comparing models, the model with the higher R-squared value is a better fit for the data.

When comparing models, the model with the smallest MSE value is a better fit for the data.

Comparing these three models, we conclude that the DecisionTree model is the best model to be able to predict mpg from our dataset.

```
from sklearn.preprocessing import StandardScaler
sd = StandardScaler()
x_train = sd.fit_transform(x_train)
x_test = sd.fit_transform(x_test)
y_train = sd.fit_transform(y_train)
y_test = sd.fit_transform(y_test)

x_train
```

```
array([[ 1.46858608,  2.48230464,  2.97856512,  1.62455076, -1.61295698,
        -0.71873488],
       [ 1.46858608,  1.48729292,  1.55429873,  0.84358808, -1.61295698,
        -0.71873488],
       [-0.86550411, -0.70364636, -0.64684023, -0.36507278,  0.82235108,
        -0.71873488],
       ...,
       [-0.86550411, -1.21071964, -1.44960856, -1.31380657, -0.80118763,
         0.53032865],
       [ 0.30154098,  0.53055088, -0.12892518,  0.35799706, -1.3423672 ,
        -0.71873488],
       [-0.86550411, -1.00023639, -0.87990201, -0.89319732, -0.26000806,
         0.53032865]])
```