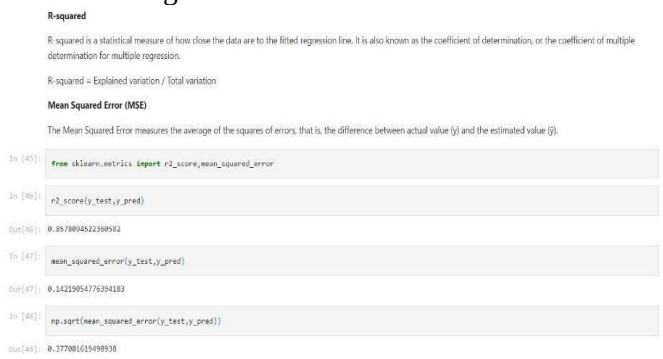
Project Development Phase
Model Performance Test

Date	19 November 2022
Team ID	PNT2022TMID27752
Project Name	Machine Learning Based Vehicle Performance Analyzer
Maximum Marks	10 Marks

PERFORMANCE METRICS

S. No.	PARAMETER	VALUES	SCREENSHOT
1.	Metrics	**Regression Model:** MAE- ,MSE,RMSE-,R2 score- **Classification Model:** Confusion Matrix, Accuray Score- & Classification Report -	Decision tree regression 

Random Forest Regressor

```
In [49]: from sklearn.ensemble import RandomForestRegressor

In [50]: x11 = dataset.iloc[:,1:8].values
         y11 = dataset.iloc[:,0].values

In [51]: from sklearn.model_selection import train_test_split
         x_train1, x_test1, y_train1, y_test1 = train_test_split(x11,y11,test_size=0.2,random_state=0)

In [52]: rf= RandomForestRegressor(n_estimators=30,random_state=0)
         rf.fit(x_train1,y_train1)

Out[52]: RandomForestRegressor(n_estimators=30, random_state=0)

In [53]: y1_pred=rf.predict(x_test1)
         y1_pred

Out[53]: array([14.3       , 24.34333333, 14.18333333, 20.16666667, 18.43333333,
                30.21666667, 34.96      , 21.3       , 15.35666667, 26.22333333,
                16.01333333, 36.5       , 18.95666667, 27.12333333, 16.47666667,
                32.54333333, 27.09333333, 27.17      , 16.86666667, 34.64333333,
                15.88333333, 23.3       , 23.48333333, 20.71666667, 32.22      ,
                27.23333333, 34.40666667, 30.03      , 31.76333333, 15.93333333,
                19.07666667, 33.32333333, 18.55      , 22.66      , 20.35666667,
                24.2       , 18.92      , 16.40666667, 35.24      , 12.3       ,
                13.4       , 15.4       , 27.89666667, 32.61333333, 29.86666667,
                22.1       , 19.83      , 14.8       , 22.11333333, 29.86666667,
                34.04      , 25.36666667, 16.34      , 27.4       , 15.4       ,
                12.36666667, 18.56666667, 25.32666667, 31.76333333, 16.24      ,
                18.87      , 25.77666667, 18.86666667, 21.53333333, 13.26666667,
                15.11666667, 13.46666667, 17.26333333, 24.95666667, 14.        ,
                35.61333333, 13.3       , 23.01333333, 18.2       , 23.98333333,
                29.51666667, 27.1       , 30.97      , 29.67666667, 14.35      ])

In [54]: from sklearn.metrics import r2_score
         accuracy = r2_score(y_test1, y1_pred)
         accuracy

Out[54]: 0.8999792555413947
```

Mean Squared error

```
In [60]: from sklearn.metrics import r2_score,mean_squared_error

In [61]: r2_score(y_test,y_pred2)

Out[61]: -0.04347826086956519

In [62]: mean_squared_error(y_test,y_pred2)

Out[62]: 0.6

In [63]: np.sqrt(mean_squared_error(y_test,y_pred2))

Out[63]: 0.7745966692414834
```

Linear regression

```
In [44]: ax1 = sns.distplot(dataset['mpg'], hist=False, color="r", label="Actual Value")
         sns.distplot(y_pred, hist=False, color="b", label="Fitted Values" , ax=ax1)


         plt.title('Actual vs Fitted Values for mpg')
         plt.xlabel('mpg')
         plt.ylabel('Proportion of Cars')

         plt.show()
         plt.close()

C:\Users\Hax_1\anaconda3\lib\site-packages\seaborn\distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be removed in a f
uture version. Please adapt your code to use either `displot` (a figure-level function with similar flexibility) or `kdeplot` (an axes-level function f
or kernel density plots).
  warnings.warn(msg, FutureWarning)
C:\Users\Hax_1\anaconda3\lib\site-packages\seaborn\distributions.py:2619: FutureWarning: `distplot` is a deprecated function and will be removed in a f
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  warnings.warn(msg, FutureWarning)
```
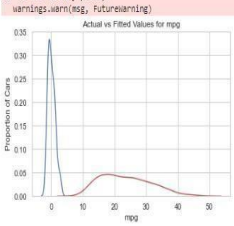



We can see that the fitted values are reasonably close to the actual values, since the two distributions overlap a bit. However, there is definitely some room for improvement.

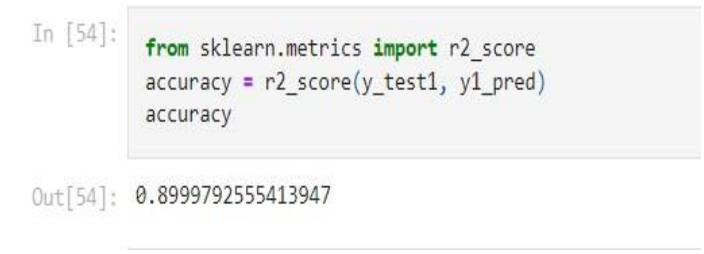
	Accuracy	Training accuracy- 0.899979255541394 7	

Figure 9.1 – Performance Metrics