

## Project Development Phase Model Performance Test

Date	18 November 2023
Project Name	TrafficTelligence: Advanced Traffic Volume Estimation With 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
1.	Metrics	<p><b>Regression Model:</b> Random Forest Regressor</p> <p>MAE - 507.9025692355565, RMSE - 801.6894273058929</p> <p>R2 score: On Test - 0.8356571592510573 On Train - 0.9770921235220543</p>	<pre>In [12]: import sklearn.metrics as metrics from sklearn.metrics import mean_squared_error from sklearn.metrics import mean_absolute_error print('R square score on train set and test set are :', Rand.score(x_train, y_train), Rand.score(x_test, y_test)) print('Root mean squared error :', np.sqrt(mean_squared_error(y_test, Rand.predict(x_test)))) print('Mean absolute error :', mean_absolute_error(y_test, Rand.predict(x_test)))  R square score on train set and test set are : 0.9770921235220543 0.8356571592510573 Root mean squared error : 801.6894273058929 Mean absolute error : 507.9025692355565</pre>
2.	Tune the Model	<p><b>Hyperparameter Tuning:</b> Result of Hyperparameter tuning - {'max_depth': 23, 'n_estimators': 24}</p> <p>After Hyperparameter Tuning: R square score: On Train - 0.964255906132786 On Test - 0.8284691833318581 Root mean squared error: 819.0338269811183 Mean absolute error: 516.6675220665472</p> <p>After PCA: R square score: On Train - 0.9718652757585765 On Test - 0.8032429906444858 Root mean squared error: 877.1944347759498 Mean absolute error: 590.8631417902708</p> <p>Validation Method - Train – Test split</p>	<pre>HRF = RandomForestRegressor(max_depth= 23, n_estimators= 24, random_state= 1231) HRF.fit(x_train, y_train)  - RandomForestRegressor RandomForestRegressor(max_depth=23, n_estimators=24, random_state=1231)  print('R square score on train set and test set are :', HRF.score(x_train, y_train), HRF.score(x_test, y_test)) print('Root mean squared error :', np.sqrt(mean_squared_error(y_test, HRF.predict(x_test)))) print('Mean absolute error :', mean_absolute_error(y_test, HRF.predict(x_test)))  R square score on train set and test set are : 0.964255906132786 0.8284691833318581 Root mean squared error : 819.0338269811183 Mean absolute error : 516.6675220665472  RF_PCA = RandomForestRegressor() RF_PCA.fit(PCA_X_train, y_train)  - RandomForestRegressor RandomForestRegressor()  print('R square score on train set and test set are :', RF_PCA.score(PCA_X_train, y_train), RF_PCA.score(PCA_X_test, y_test)) print('Root mean squared error :', np.sqrt(mean_squared_error(y_test, RF_PCA.predict(PCA_X_test)))) print('Mean absolute error :', mean_absolute_error(y_test, RF_PCA.predict(PCA_X_test)))  R square score on train set and test set are : 0.9718652757585765 0.8032429906444858 Root mean squared error : 877.1944347759498 Mean absolute error : 590.8631417902708</pre>