

Model Development Phase Template

Date	26 June 2025
Team ID	LTVIP2025TMID41281
Project Title	TrafficTelligence: Advanced Traffic Volume Estimation with Machine Learning
Maximum Marks	4 Marks

Initial Model Training Code, Model Validation and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model validation and evaluation report will include classification reports, accuracy, and confusion matrices for multiple models, presented through respective screenshots.

Initial Model Training Code:

Model 1(Random Forest Regressor)

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x_scaled, y_value, test_size=0.2)

from sklearn.ensemble import RandomForestRegressor
regressor = RandomForestRegressor(n_estimators = 100, max_depth = 9, random_state = 0)
model=regressor.fit(x_train,y_train)
y_pred=model.predict(x_test)

from sklearn.metrics import mean_squared_log_error, r2_score
r2_score(y_pred, y_test)
```

Mode 2 (SVR)

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x_scaled, y_value, test_size=0.2)

from sklearn.svm import SVR
regressor = SVR(kernel = "rbf")
model=regressor.fit(x_train,y_train)

y_pred=model.predict(x_test)
from sklearn.metrics import r2_score
r2_score(y_pred, y_test)
```

Model 3 (Polynomial Regression)

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x_poly, y_value, test_size=0.2)

from sklearn.linear_model import LinearRegression
model=LinearRegression()
model.fit(x_train, y_train)

y_pred=model.predict(x_test)
from sklearn.metrics import mean_squared_log_error, r2_score
r2_score(y_pred, y_test)
```

Model 4 (XG Boost)

```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x_scaled, y_value, test_size=0.2)

import xgboost as xgb
model=xgb.XGBRegressor()
model.fit(x_train, y_train)

y_pred=model.predict(x_test)
from sklearn.metrics import mean_squared_log_error, r2_score
r2_score(y_pred, y_test)
```

Model Validation and Evaluation Report:

Random Forest Regressor	<pre>from sklearn.metrics import mean_squared_error, r2_score, mean_absolute_error print("Mean Square Error: ", mean_squared_error(y_test, y_pred)) print("Mean Absolute Error: ", mean_absolute_error(y_test, y_pred)) print("R-square Score: ", r2_score(y_test, y_pred))</pre> <p>Mean Square Error: 198008.8816750678 Mean Absolute Error: 280.9588373446771 R-square Score: 0.9277791335225944</p>	92%	Not Applicable
Support Vector Regressor	<pre>from sklearn.metrics import mean_squared_error, r2_score, mean_absolute_error print("Mean Square Error: ", mean_squared_error(y_test, y_pred)) print("Mean Absolute Error: ", mean_absolute_error(y_test, y_pred)) print("R-square Score: ", r2_score(y_test, y_pred))</pre> <p>Mean Square Error: 2104039.9111552383 Mean Absolute Error: 1256.7067758496808 R-square Score: 0.23504232546490522</p>	23%	Not Applicable

Model	Regression Report	R2 Score	Confusion Matrix
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Polynomial Regression	<pre>from sklearn.metrics import mean_squared_error, r2_score, mean_absolute_error print("Mean Square Error: ", mean_squared_error(y_test, y_pred)) print("Mean Absolute Error: ", mean_absolute_error(y_test, y_pred)) print("R-square Score: ", r2_score(y_test, y_pred))</pre> <p>Mean Square Error: 646496.8829842781 Mean Absolute Error: 588.6552844192978 R-square Score: 0.7605639174654056</p>	76%	Not Applicable
XG Boost	<pre>from sklearn.metrics import mean_squared_error, r2_score, mean_absolute_error print("Mean Square Error: ", mean_squared_error(y_test, y_pred)) print("Mean Absolute Error: ", mean_absolute_error(y_test, y_pred)) print("R-square Score: ", r2_score(y_test, y_pred))</pre> <p>Mean Square Error: 120958.54825379612 Mean Absolute Error: 228.5786688810355 R-square Score: 0.9563201748182905</p>	95%	Not Applicable