Model Development Phase Template

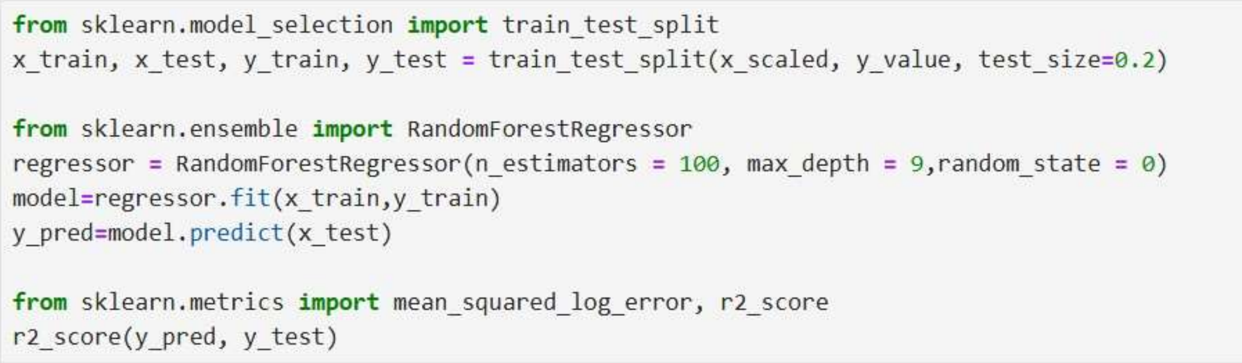
Date	26 June 2025
Team ID	LTVIP2025TMID43963
Project Title	TrafficTelligence: Advanced Traffic Volume Estimation with Machine Learning
Maximum Marks	4 Marks

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.

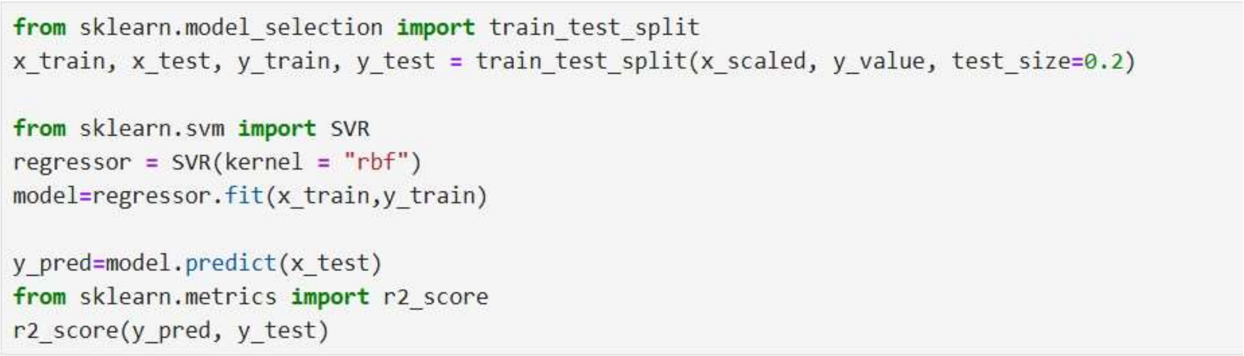
Initial Model Training Code:

Model 1(Random Forest Regressor)



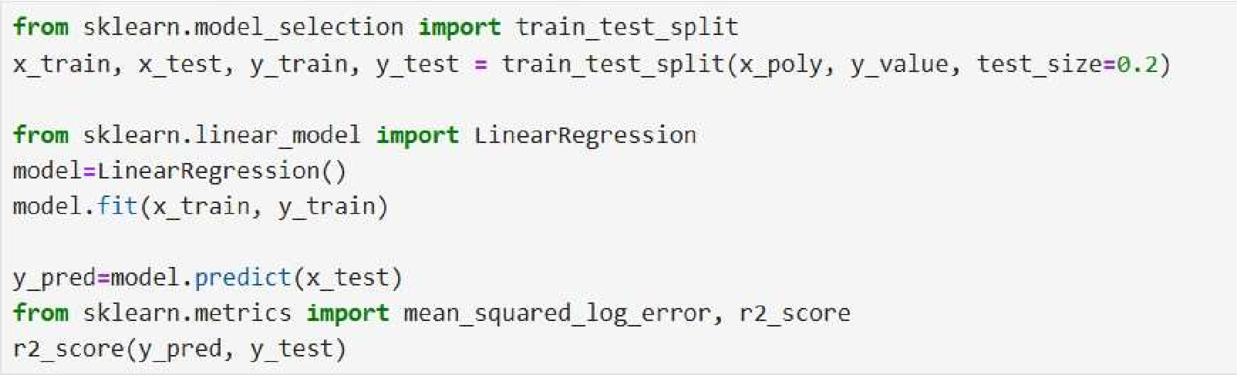
```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x_scaled, y_value, test_size=0.2)

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)



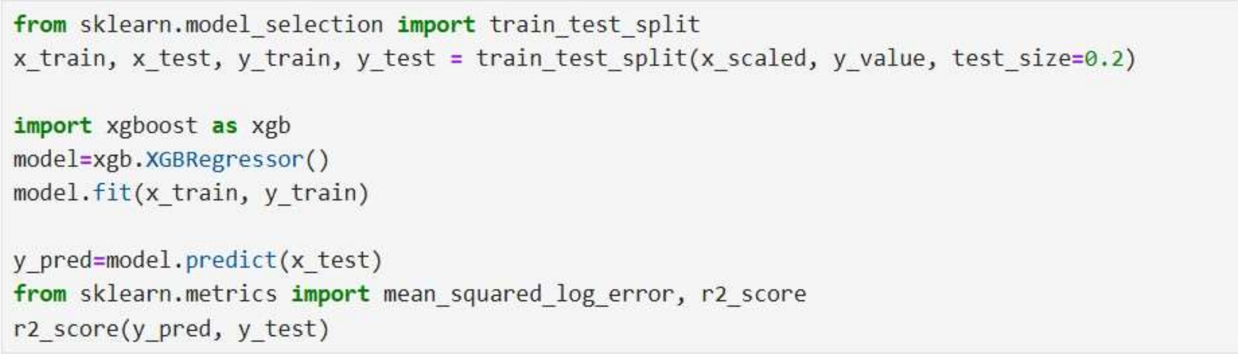
```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x_scaled, y_value, test_size=0.2)

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)



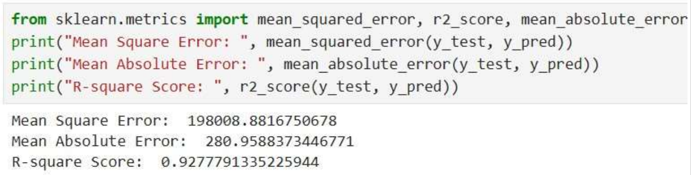
```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x_poly, y_value, test_size=0.2)

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)
```

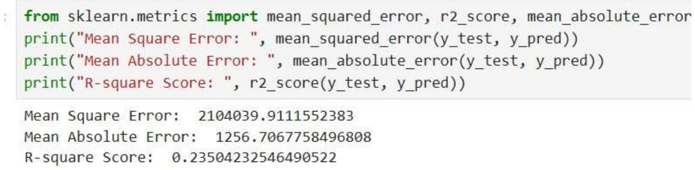
Model 4 (XG Boost)



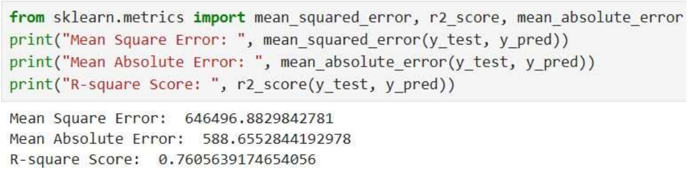
```
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test = train_test_split(x_scaled, y_value, test_size=0.2)

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)
```

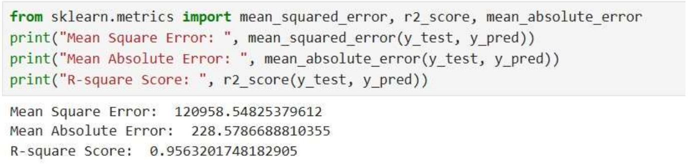
Model Validation and Evaluation Report:

Random Forest Regressor	
	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))
	Mean Square Error: 198008.8816750678
	Mean Absolute Error: 280.9588373446771
	R-square Score: 0.9277791335225944
		92%	Not Applicable

Support Vector Regressor	
	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))
	Mean Square Error: 2104039.9111552383
	Mean Absolute Error: 1256.7067758496808
	R-square Score: 0.23504232546490522
		23%	Not Applicable

Model	Regression Report	R2 Score	Confusion Matrix

Polynomial Regression	
	`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))`
	`Mean Square Error:  646496.8829842781`
	`Mean Absolute Error:  588.6552844192978`
	`R-square Score:  0.7605639174654056`
		76%	Not Applicable

XG Boost	
	`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))`
	`Mean Square Error:  120958.54825379612`
	`Mean Absolute Error:  228.5786688810355`
	`R-square Score:  0.9563201748182905`
		95%	Not Applicable