Model Development Phase Template

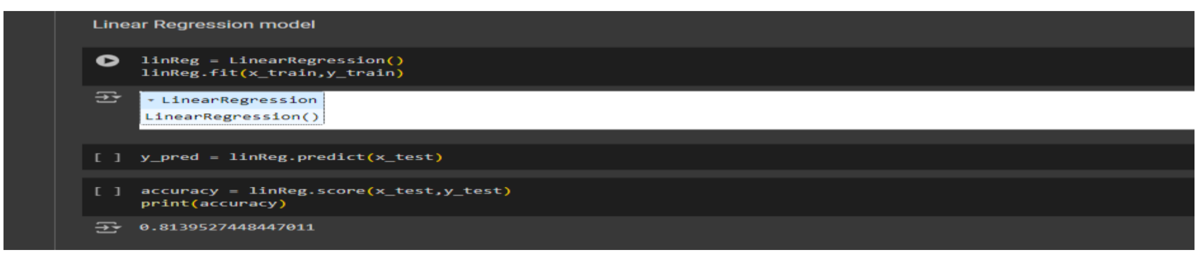
Date	07 July 2024
Team ID	740709
Project Title	House Rent Price Prediction Using Machine Learning
Maximum Marks	4 Marks

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.

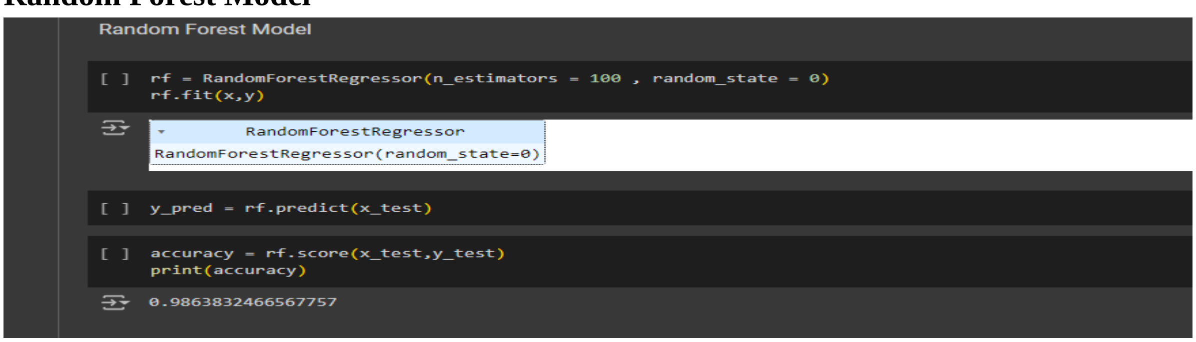
Initial Model Training Code:

Linear Regression Model



```
Linear Regression model

linReg = LinearRegression()
linReg.fit(x_train,y_train)

LinearRegression
LinearRegression()

y_pred = linReg.predict(x_test)

accuracy = linReg.score(x_test,y_test)
print(accuracy)

0.8139527448447011
```

Random Forest Model



```
Random Forest Model

rf = RandomForestRegressor(n_estimators = 100 , random_state = 0)
rf.fit(x,y)

RandomForestRegressor
RandomForestRegressor(random_state=0)

y_pred = rf.predict(x_test)

accuracy = rf.score(x_test,y_test)
print(accuracy)

0.9863832466567757
```

XGBoost Regression Model

XGBoost Regression

```
import xgboost
from xgboost import XGBRegressor
xgb_model = XGBRegressor()
xgb_model.fit(x_train, y_train)
pred_xgb = xgb_model.predict(x_test)
mae_xgb = mean_absolute_error(y_test, pred_xgb)
mse_xgb = mean_squared_error(y_test, pred_xgb)
rmse_xgb = np.sqrt(mse_xgb)
rsq_xgb = r2_score(y_test, pred_xgb)
print('MAE: %.3f' % mae_xgb)
print('MSE: %.3f' % mse_xgb)
print('RMSE: %.3f' % rmse_xgb)
print('R-Square: %.3f' % rsq_xgb)
print(accuracy)
```

```
MAE: 3266.968
MSE: 25973983.707
RMSE: 5096.468
R-Square: 0.917
0.9863832466567757
```

Decision Tree Model

Decision Tree Model:

```
from sklearn.tree import DecisionTreeRegressor
dt = DecisionTreeRegressor(random_state = 0)
dt.fit(x,y)
```

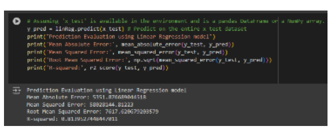
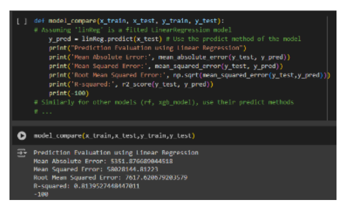
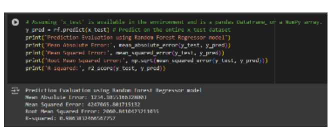
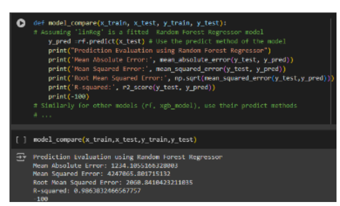
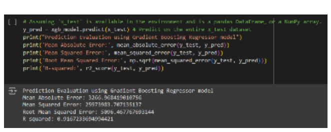
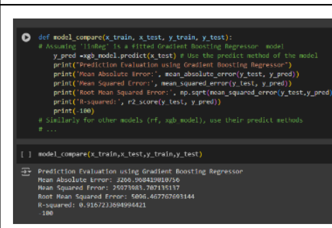
```
DecisionTreeRegressor
DecisionTreeRegressor(random_state=0)
```

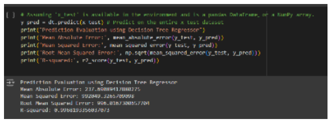
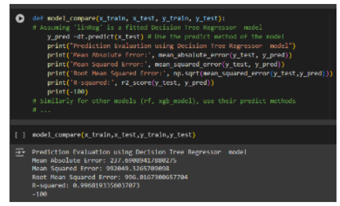
```
y_pred = dt.predict(x_test)
```

```
accuracy = dt.score(x_test,y_test)
print(accuracy)
```

```
0.9968193356037073
```

Model Validation and Evaluation Report:

Model	Regression Report	Accuracy	Regression Matrix
Linear Regression		81.3%	
Random Forest Regressor		98.6%	
XGBoost Regression		91.6%	

Decision Tree	
	`# Assuming 'x_test' is available in the environment and is a pandas DataFrame, or a NumPy array.`
	`y_pred = dt.predict(x_test) # Predict on the entire x_test dataset`
	`print("Prediction Evaluation using Decision Tree Regressor")`
	`print('Mean Absolute Error:', mean_absolute_error(y_test, y_pred))`
	`print('Mean Squared Error:', mean_squared_error(y_test, y_pred))`
	`print('Root Mean Squared Error:', np.sqrt(mean_squared_error(y_test, y_pred)))`
	`print('R-squared:', r2_score(y_test, y_pred))`
	`Prediction Evaluation using Decision Tree Regressor`
	`Mean Absolute Error: 237.69089417880275`
	`Mean Squared Error: 992049.3265709098`
	`Root Mean Squared Error: 996.0167300657704`
	`R-squared: 0.9968193356037073`
		99.6%	
			`def model_compare(x_train, x_test, y_train, y_test):`
			`# Assuming 'linReg' is a fitted Decision Tree Regressor  model`
			`    y_pred =dt.predict(x_test) # Use the predict method of the model`
			`    print("Prediction Evaluation using Decision Tree Regressor  model")`
			`    print('Mean Absolute Error:', mean_absolute_error(y_test, y_pred))`
			`    print('Mean Squared Error:', mean_squared_error(y_test, y_pred))`
			`    print('Root Mean Squared Error:', np.sqrt(mean_squared_error(y_test,y_pred)))`
			`    print('R-squared:', r2_score(y_test, y_pred))`
			`    print(-100)`
			`# Similarly for other models (rf, xgb_model), use their predict methods`
			`# ...`
			`model_compare(x_train,x_test,y_train,y_test)`
			`Prediction Evaluation using Decision Tree Regressor  model`
			`Mean Absolute Error: 237.69089417880275`
			`Mean Squared Error: 992049.3265709098`
			`Root Mean Squared Error: 996.0167300657704`
			`R-squared: 0.9968193356037073`
			`-100`