

Model Development Phase

Date	06 July 2024
Team ID	739899
Project Title	SmartLender – Envisioning Success: Predicting University Scores 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 a summary and training and validation performance metrics for multiple models, presented through respective screenshots.

Initial Model Training Code :

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

```
LinearRegression  
LinearRegression()
```

```
[38] y_pred = linReg.predict(x_test)
```

✓
1s [40] `lassoReg = linear_model.Lasso(alpha = 0.1)`
`lassoReg.fit(x,y)`



▼ Lasso
Lasso(alpha=0.1)

✓
0s [41] `y_pred = lassoReg.predict(x_test)`

✓
0s [43] `svr = SVR().fit(x,y)`

✓
0s [44] `y_pred = svr.predict(x_test)`

✓
0s [46] `dt = DecisionTreeRegressor(random_state = 0)`
`dt.fit(x,y)`



▼ DecisionTreeRegressor
DecisionTreeRegressor(random_state=0)

✓
0s [47] `y_pred = dt.predict(x_test)`

✓ [49] rf = RandomForestRegressor(n_estimators = 100 , random_state = 0)
rf.fit(x,y)



RandomForestRegressor
RandomForestRegressor(random_state=0)

✓ [50] y_pred = rf.predict(x_test)

Model Validation and Evaluation Report :

Model	Summary	Training and Validation Performance Metrics
Linear Regression	<pre>[49] y_pred = lasso.predict(x_test) print("Prediction Evaluation using Lasso Regression") 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))</pre>	<pre>Prediction Evaluation using Linear Regression Mean Absolute Error: 0.9264657671450713 Mean Squared Error: 1.7808643253705259 Root Mean Squared Error: 1.11750002294066 R-squared: 0.7439493774592185</pre>
Lasso Regression	<pre>[50] y_pred = lasso.predict(x_test) print("Prediction Evaluation using Lasso Regression") 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))</pre>	<pre>Prediction Evaluation using Lasso Regression Mean Absolute Error: 0.9152851280381133 Mean Squared Error: 1.2857764008364731 Root Mean Squared Error: 1.3363254886433393 R-squared: 0.7644399332854502</pre>
Support Vector Machine	<pre>[51] y_pred = svm.predict(x_test) print("Prediction Evaluation using Support Vector Regression") 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))</pre>	<pre>Prediction Evaluation using Support Vector Regression Mean Absolute Error: 0.545434069726799 Mean Squared Error: 1.3812017290771091 Root Mean Squared Error: 1.110078460150395 R-squared: 0.8223400225544596</pre>

<p>Decision Tree</p>	<pre>[50] y_pred = dt.predict(x_test) print("Prediction Evaluation using Decision Regression ") 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))</pre>	<pre>++ Prediction Evaluation using Decision Regression Mean Absolute Error: 5.264475724948743e-15 Mean Squared Error: 2.7561365735467205e-28 Root Mean Squared Error: 1.6601616186833456e-14 R-squared: 1.0</pre>
<p>Random Forest</p>	<pre>[60] y_pred = rf.predict(x_test) print("Prediction Evaluation using Random Regression") 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))</pre>	<pre>++ Prediction Evaluation using Random Regression Mean Absolute Error: 0.010686590900099649 Mean Squared Error: 0.0009953592244319952 Root Mean Squared Error: 0.0308091870327082 R-squared: 0.9998704251212489</pre>