

## Model Development Phase Template

Date	22 April 2024
Team ID	Team-738178
Project Title	Envisioning Success : Predicting University Scores With Machine Learning
Maximum Marks	4 Marks

### Initial Model Training Code, Model Prediction and Evaluation Report

The initial model training code will be showcased in the future through a screenshot. The model performance evaluation report will include Performance reports, Mean Squared Error, and Comparison between Actual and Predicted Values for multiple models, presented through respective screenshots.

### Initial Model Training Code:

Linear Regression:

```
[77] linReg = LinearRegression()  
linReg.fit(X_train, y_train)  
y_pred_lr= linReg.predict(X_test)
```

Lasso Regression:

```
[78] lassoReg = linear_model.Lasso(alpha=0.1)  
lassoReg.fit(X, y)  
y_pred_lasso = lassoReg.predict(X_test)
```

Support Vector Regression(SVR):

```
[79] svr = SVR().fit(X, y)
     y_pred_svr=svr.predict(X_test)
```

Random Forest:

```
[81] rf = RandomForestRegressor(n_estimators=100, random_state=0)
     rf.fit(X, y)
     y_pred_rf = rf.predict(X_test)
```

Decision Tree:

```
[80] dt = DecisionTreeRegressor(random_state = 0)
     dt.fit(X, y)
     y_pred_dt = dt.predict(X_test)
```

## Model Prediction and Evaluation Report:

Model	Performance Report	MSE	Comparison between Actual and Predicted Values
Lasso Regression	<pre># Printing results print("Prediction Evaluation using Lasso Regression:") print("MAE:", lasso_mae) print("MSE:", lasso_mse) print("RMSE:", lasso_rmse) print("R-squared:", lasso_r2) print("\n")</pre> <p>Prediction Evaluation using Lasso Regression:  MAE: 2.6604781238340274  MSE: 28.893569757635724  RMSE: 5.3752739239629195  R-squared: 0.4635298370613741</p>	28.89	<pre># Printing actual and predicted values print("Actual value:", y_actual) print("Predicted value:", y_pred_lasso[0])</pre> <p>Actual value: 100  Predicted value: 62.96954350809409</p>
Linear Regression	<pre># Printing results print("Prediction Evaluation using Linear Regression:") print("MAE:", lr_mae) print("MSE:", lr_mse) print("RMSE:", lr_rmse) print("R-squared:", lr_r2) print("\n")</pre> <p>Prediction Evaluation using Linear Regression:  MAE: 2.6657340636132827  MSE: 28.917809410716295  RMSE: 5.377528187812342  R-squared: 0.4630797766933825</p>	28.92	<pre># Printing actual and predicted values print("Actual value:", y_actual) print("Predicted value:", y_pred_lr[0])</pre> <p>Actual value: 100  Predicted value: [63.33166471]</p>
SVR	<pre># Printing results print("Prediction Evaluation using SVR:") print("MAE:", svr_mae) print("MSE:", svr_mse) print("RMSE:", svr_rmse) print("R-squared:", svr_r2) print("\n")</pre> <p>Prediction Evaluation using SVR:  MAE: 1.7292341972937126  MSE: 26.883723937063873  RMSE: 5.184951681266073  R-squared: 0.50084687070893</p>	26.88	<pre># Printing actual and predicted values print("Actual value:", y_actual) print("Predicted value:", y_pred_svr[0])</pre> <p>Actual value: 100  Predicted value: 60.02460149545989</p>
Random Forest	<pre># Printing results print("Prediction Evaluation using Random Forest:") print("MAE:", rf_mae) print("MSE:", rf_mse) print("RMSE:", rf_rmse) print("R-squared:", rf_r2) print("\n")</pre> <p>Prediction Evaluation using Random Forest:  MAE: 0.5947518939393951  MSE: 1.6870365632197004  RMSE: 1.2988597165281939  R-squared: 0.9686766021801541</p>	1.69	<pre># Printing actual and predicted values print("Actual value:", y_actual) print("Predicted value:", y_pred_rf[0])</pre> <p>Actual value: 100  Predicted value: 99.42905833333333</p>

Decision Tree	<pre># Printing results print("Prediction Evaluation using Decision Tree:") print("MAE:", dt_mae) print("MSE:", dt_mse) print("RMSE:", dt_rmse) print("R-squared:", dt_r2)  Prediction Evaluation using Decision Tree: MAE: 0.7953636363636363 MSE: 3.165202727272727 RMSE: 1.7791016629953238 R-squared: 0.941231324579233</pre>	3.16	<pre># Printing actual and predicted values print("Actual value:", y_actual) print("Predicted value:", y_pred_dt[0])  Actual value: 100 Predicted value: 100.0</pre>
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