

## Model Development Phase Template

Date	5th July 2024
Team ID	739804
Project Title	Cost Prediction of Acquiring a Customer.
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:

##### RandomForest Regressor:

```
from sklearn.ensemble import RandomForestRegressor
rf=RandomForestRegressor()
rf.fit(X1_train,Y_train)
y_pred=rf.predict(X1_test)
x_pred=rf.predict(X1_train)
score=r2_score(Y_test,y_pred)
rmse=np.sqrt(mean_squared_error(Y_test,y_pred))
score1=r2_score(Y_train,x_pred)
rmse1=np.sqrt(mean_squared_error(Y_train,x_pred))
```

##### DecisionTree Regressor:

```
from sklearn.tree import DecisionTreeRegressor
from sklearn.metrics import
r2_score,mean_squared_error,mean_absolute_error
Dtr=DecisionTreeRegressor()
Dtr.fit(X1_train,Y_train)
y_pred=Dtr.predict(X1_test)
x_pred=Dtr.predict(X1_train)
score=r2_score(Y_test,y_pred)
rmse=np.sqrt(mean_squared_error(Y_test,y_pred))
score1=r2_score(Y_train,x_pred)
rmse1=np.sqrt(mean_squared_error(Y_train,x_pred))
mae=mean_absolute_error(Y_test,y_pred)
mse=mean_squared_error(Y_test,y_pred)
```

### Gradient BoostingRegressor:

```
from sklearn.ensemble import GradientBoostingRegressor
gb=GradientBoostingRegressor()
gb.fit(X1_train,Y_train)
y_pred=gb.predict(X1_test)
x_pred=rf.predict(X1_train)
score=r2_score(Y_test,y_pred)
rmse=np.sqrt(mean_squared_error(Y_test,y_pred))
score1=r2_score(Y_train,x_pred)
rmse1=np.sqrt(mean_squared_error(Y_train,x_pred))
```

### Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
Random Forest Regressor	<pre>from sklearn.ensemble import RandomForestRegressor rf=RandomForestRegressor() rf.fit(X1_train,Y_train) y_pred=rf.predict(X1_test) x_pred=rf.predict(X1_train) score=r2_score(Y_test,y_pred) rmse=np.sqrt(mean_squared_error(Y_test,y_pred)) score1=r2_score(Y_train,x_pred) rmse1=np.sqrt(mean_squared_error(Y_train,x_pred))  -----  Model performance for Test set R2_Score = 0.999999223770472 RMSE = 0.026495659012272195  -----  Model performance for Train set R2_Score = 0.9999999370963878 RMSE = 0.007523146092761905</pre>	99%	-
Decision Tree Regressor	<pre>print('-----Decision Tree Regressor model-----') print('Model performance for test set') print('R2 Score = ',score) print('RMSE = ',rmse)  print('-----') print('Model performance for Test set') print('R2_Score = ',score1) print('RMSE = ',rmse1) print('mean_absolute_error: ',mae) print('mean_squared_error: ',mse)  -----  -----Decision Tree Regressor model----- Model performance for test set R2 Score = 0.999999475396002 RMSE = 0.021762359911033424  -----  Model performance for Test set R2_Score = 1.0 RMSE = 2.7555815953433333e-13 mean_absolute_error: 0.0002487726848418434 mean_squared_error: 0.00047360030889735465</pre>	99%	-

Gradient Boosting Regressor	<pre>print('-----Gradient Boosting Regressor model-----') print('Model performance for test set') print('R2 Score = ',score) print('RMSE = ',rmse)  print('-----') print('Model performance for Test set') print('R2_Score = ',score1) print('RMSE = ',rmse1)  -----Gradient Boosting Regressor model----- Model performance for test set R2 Score = 0.9998527192487322 RMSE = 0.36463906787159356  ----- Model performance for Test set R2_Score = 0.9999999370963878 RMSE = 0.007523146092761905</pre>	99%	-
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