

## Model Development Phase Template

Date	June 22,2024
Team ID	team-739679
Project Title	Hospital Readmission 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:

```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test = train_test_split(x,y, random_state=20,test_size=0.25)

x_train.shape,x_test.shape,y_train.shape,y_test.shape

((43301, 25), (14434, 25), (43301,), (14434,))

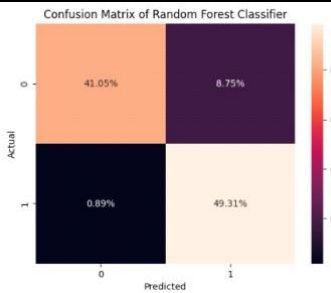
from sklearn.linear_model import LogisticRegression
from sklearn.tree import DecisionTreeClassifier
from sklearn.neighbors import KNeighborsClassifier
from sklearn.ensemble import RandomForestClassifier, AdaBoostClassifier, GradientBoostingClassifier
from xgboost.sklearn import XGBClassifier
from sklearn import metrics
from sklearn.metrics import accuracy_score,roc_curve,confusion_matrix,classification_report,auc

model_dict={}
model_dict['LogisticRegression']=LogisticRegression(solver='liblinear',random_state=20)
model_dict['DecisionTreeClassifier']=DecisionTreeClassifier(random_state=20)
model_dict['KNeighborsClassifier']=KNeighborsClassifier()
model_dict['RandomForestClassifier']=RandomForestClassifier(random_state=20)
model_dict['AdaBoostClassifier']=AdaBoostClassifier(random_state=20)
model_dict['GradientBoostingClassifier']=GradientBoostingClassifier(random_state=20)

def model_test(x_train,x_test,y_train,y_test,model,model_name):
    model.fit(x_train,y_train)
    y_pred=model.predict(x_test)
    accuracy=accuracy_score(y_test,y_pred)
    print('=====')
    print('score is :{}'.format(accuracy))
    print()

for model_name,model in model_dict.items():
    model_test(x_train,x_test,y_train,y_test,model,model_name)
```

Model Validation and Evaluation Report:

Model	Classification Report	F1 Score	Confusion Matrix	
Random Forest	<div><div>precisionrecallf1-score support</div><div><div>00.980.820.899550</div><div>10.850.980.919626</div></div><div><div>accuracy0.9019176</div><div>macro avg0.910.900.9019176</div><div>weighted avg0.910.900.9019176</div></div></div>	93%	<div>Confusion Matrix of Random Forest Classifier</div> 	
	Decision Tree		87%	-
	KNN		79%	-
	Gradient Boosting		90%	-