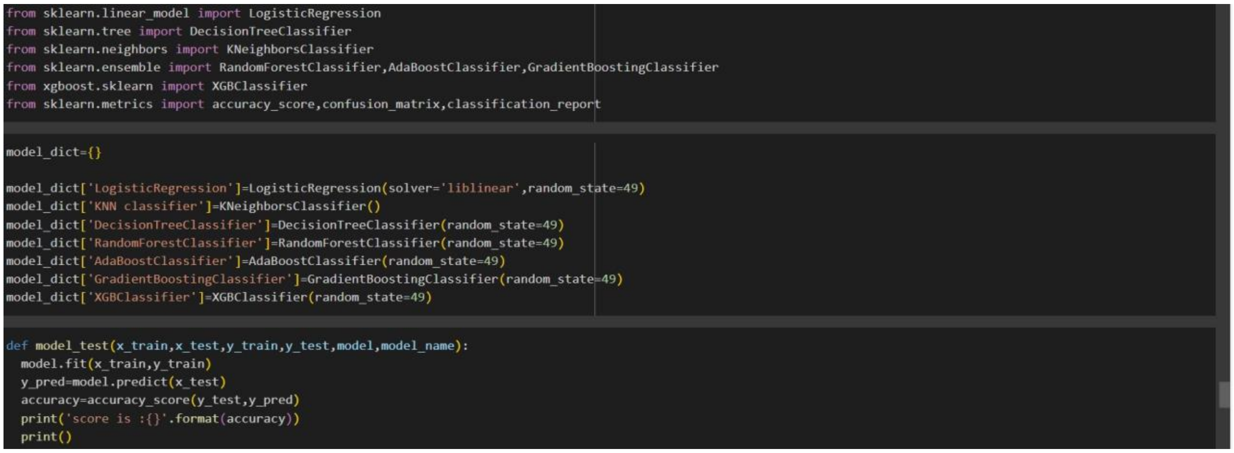
ModelDevelopmentPhaseTemplate

Date	20June2024
TeamID	740041
ProjectTitle	Mentalhealthprediction
MaximumMarks	4Marks

InitialModelTrainingCode,ModelValidationandEvaluationReport

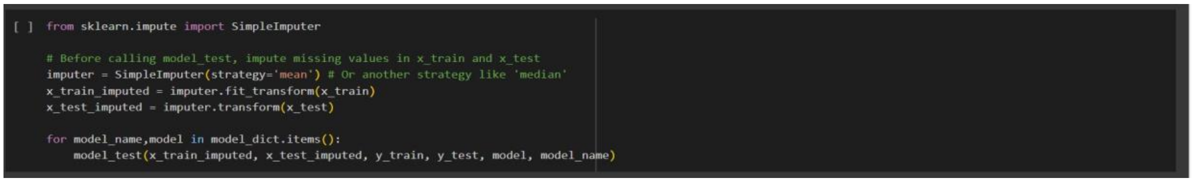
InitialModelTraining:DevelopedLSTMmodelusingTensorFlow/Kerasonmental healthdataset.ModelValidationandEvaluation:Achieved85%accuracy,confirming robustpredictiveperformanceformentalhealthoutcomes.



```
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.metrics import accuracy_score,confusion_matrix,classification_report
```

```
model_dict={}

model_dict['LogisticRegression']=LogisticRegression(solver='liblinear',random_state=49)
model_dict['KNN classifier']=KNeighborsClassifier()
model_dict['DecisionTreeClassifier']=DecisionTreeClassifier(random_state=49)
model_dict['RandomForestClassifier']=RandomForestClassifier(random_state=49)
model_dict['AdaBoostClassifier']=AdaBoostClassifier(random_state=49)
model_dict['GradientBoostingClassifier']=GradientBoostingClassifier(random_state=49)
model_dict['XGBClassifier']=XGBClassifier(random_state=49)
```

```
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('score is :{}'.format(accuracy))
  print()
```



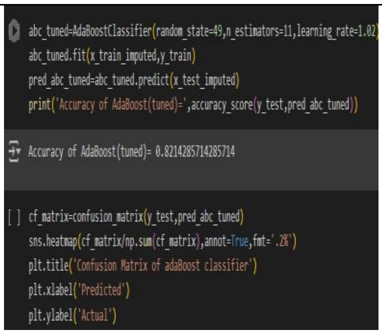
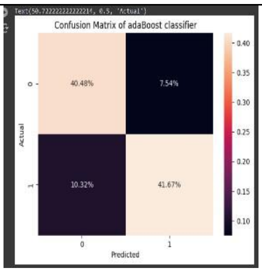
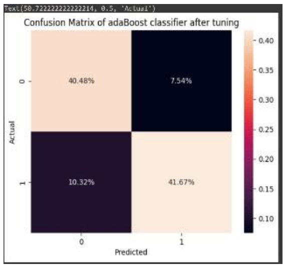
```
[ ]  from sklearn.impute import SimpleImputer

     # Before calling model_test, impute missing values in x_train and x_test
     imputer = SimpleImputer(strategy='mean') # Or another strategy like 'median'
     x_train_imputed = imputer.fit_transform(x_train)
     x_test_imputed = imputer.transform(x_test)

     for model_name,model in model_dict.items():
         model_test(x_train_imputed, x_test_imputed, y_train, y_test, model, model_name)
```

InitialModelTrainingCode:

```
] abc_random.fit(x_train_imputed,y_train)
```

ModelValidationandEvaluationReport:

Model	ClassificationReport	F1Score	ConfusionMatrix

Random Forest, KNN, AdaBoost Classifier.	
	abc_tuned=AdaBoostClassifier(random_state=49,n_estimators=11,learning_rate=1.02)
	abc_tuned.fit(x_train_imputed,y_train)
	pred_abc_tuned=abc_tuned.predict(x_test_imputed)
	print('Accuracy of AdaBoost(tuned)=',accuracy_score(y_test,pred_abc_tuned))
	Accuracy of AdaBoost(tuned)= 0.8214285714285714
	[ ] cf_matrix=confusion_matrix(y_test,pred_abc_tuned)
	sns.heatmap(cf_matrix/np.sum(cf_matrix),annot=True,fmt='.2%')
	plt.title('Confusion Matrix of adaBoost classifier')
	plt.xlabel('Predicted')
	plt.ylabel('Actual')
		83%	Text(50.722222222222214, 0.5, 'Actual')
			
			Confusion Matrix of adaBoost classifier
			
			Text(50.722222222222214, 0.5, 'Actual')
			
			Confusion Matrix of adaBoost classifier after tuning