

## Model Development Phase Template

Date	23 September 2024
Team ID	LTVIP2024TMID25001
Project Title	Customer Segmentation 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:

##### Random ForestClassifier:

##### KNN Classifier:

##### Decision Tree Classifier:

```
from sklearn.ensemble import RandomForestClassifier
from sklearn import tree
import xgboost

rand_model = RandomForestClassifier()
tree_model = tree.DecisionTreeClassifier()
xgb_model = xgboost.XGBClassifier()

rand_model.fit(x_train,y_train)
tree_model.fit(x_train,y_train)
xgb_model.fit(x_train,y_train)
```

```
pred = rand_model.predict(x_train)
pred1 = tree_model.predict(x_train)
pred2 = xgb_model.predict(x_train)
```

```
print(metrics.accuracy_score (pred, y_train))
print(metrics.accuracy_score(pred1,y_train))
print(metrics.accuracy_score(pred2,y_train))
```

```
from sklearn.metrics import accuracy_score
from xgboost import XGBClassifier
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
from sklearn.neighbors import KNeighborsClassifier
```

```
dt = DecisionTreeClassifier()
rf = RandomForestClassifier()
knn = KNeighborsClassifier()
xg = XGBClassifier()
```

```
dt.fit(x_train,y_train)
rf.fit(x_train,y_train)
knn.fit(x_train,y_train)
xg.fit(x_train,y_train)
```

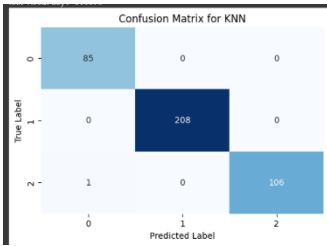
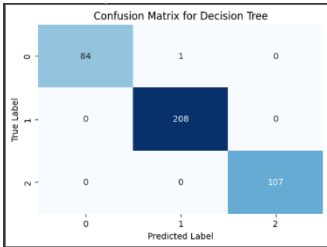
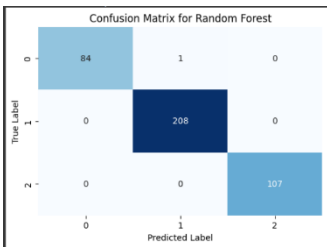
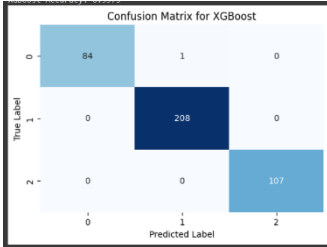
Show hidden output

```
pred1=dt.predict(x_train)
pred2=rf.predict(x_train)
pred3=knn.predict(x_train)
pred4=xg.predict(x_train)
```

XGB\_MODEL:

```
xgb_model = xgboost.XGBClassifier()
xgb_model.fit(x_train,y_train)
```

## Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix																
KNN	<pre> KNN Classification Report:       precision    recall  f1-score   support       0       0.99      1.00      0.99        85      1       1.00      1.00      1.00       208      2       1.00      0.99      1.00       107   accuracy          1.00      1.00      1.00       400  macro avg          1.00      1.00      1.00       400  weighted avg       1.00      1.00      1.00       400  KNN Accuracy: 0.9975           </pre>	Accuracy:0.9975	 <p>Confusion Matrix for KNN</p> <table border="1"> <thead> <tr> <th>True Label \ Predicted Label</th> <th>0</th> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr> <th>0</th> <td>85</td> <td>0</td> <td>0</td> </tr> <tr> <th>1</th> <td>0</td> <td>208</td> <td>0</td> </tr> <tr> <th>2</th> <td>1</td> <td>0</td> <td>106</td> </tr> </tbody> </table>	True Label \ Predicted Label	0	1	2	0	85	0	0	1	0	208	0	2	1	0	106
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1	0	208	0																
2	1	0	106																
Decision Tree	<pre> Decision Tree Classification Report:       precision    recall  f1-score   support       0       1.00      0.99      0.99        85      1       1.00      1.00      1.00       208      2       1.00      1.00      1.00       107   accuracy          1.00      1.00      1.00       400  macro avg          1.00      1.00      1.00       400  weighted avg       1.00      1.00      1.00       400  Decision Tree Accuracy: 0.9975           </pre>	Accuracy:0.9975	 <p>Confusion Matrix for Decision Tree</p> <table border="1"> <thead> <tr> <th>True Label \ Predicted Label</th> <th>0</th> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr> <th>0</th> <td>84</td> <td>1</td> <td>0</td> </tr> <tr> <th>1</th> <td>0</td> <td>208</td> <td>0</td> </tr> <tr> <th>2</th> <td>0</td> <td>0</td> <td>107</td> </tr> </tbody> </table>	True Label \ Predicted Label	0	1	2	0	84	1	0	1	0	208	0	2	0	0	107
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Random Forest	<pre> Random Forest Classification Report:       precision    recall  f1-score   support       0       1.00      0.99      0.99        85      1       1.00      1.00      1.00       208      2       1.00      1.00      1.00       107   accuracy          1.00      1.00      1.00       400  macro avg          1.00      1.00      1.00       400  weighted avg       1.00      1.00      1.00       400  Random Forest Accuracy: 0.9975           </pre>	Accuracy:0.9975	 <p>Confusion Matrix for Random Forest</p> <table border="1"> <thead> <tr> <th>True Label \ Predicted Label</th> <th>0</th> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr> <th>0</th> <td>84</td> <td>1</td> <td>0</td> </tr> <tr> <th>1</th> <td>0</td> <td>208</td> <td>0</td> </tr> <tr> <th>2</th> <td>0</td> <td>0</td> <td>107</td> </tr> </tbody> </table>	True Label \ Predicted Label	0	1	2	0	84	1	0	1	0	208	0	2	0	0	107
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XGBoost	<pre> XGBoost Classification Report:       precision    recall  f1-score   support       0       1.00      0.99      0.99        85      1       1.00      1.00      1.00       208      2       1.00      1.00      1.00       107   accuracy          1.00      1.00      1.00       400  macro avg          1.00      1.00      1.00       400  weighted avg       1.00      1.00      1.00       400  XGBoost Accuracy: 0.9975           </pre>	Accuracy :0.9975	 <p>Confusion Matrix for XGBoost</p> <table border="1"> <thead> <tr> <th>True Label \ Predicted Label</th> <th>0</th> <th>1</th> <th>2</th> </tr> </thead> <tbody> <tr> <th>0</th> <td>84</td> <td>1</td> <td>0</td> </tr> <tr> <th>1</th> <td>0</td> <td>208</td> <td>0</td> </tr> <tr> <th>2</th> <td>0</td> <td>0</td> <td>107</td> </tr> </tbody> </table>	True Label \ Predicted Label	0	1	2	0	84	1	0	1	0	208	0	2	0	0	107
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