

## Model Development Phase Template

Date	15 March 2024
Team ID	738193
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:

Paste the screenshot of the model training code

#### Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
<b>Model 1</b>  LogisticRegression_Classifier	<pre> precision    recall  f1-score   support  0           0.57      0.85      0.68      10066 1           0.00      0.00      0.00        2249 2           0.47      0.29      0.36       6975  accuracy              0.55      19290 macro avg      0.35      0.38      0.35      19290 weighted avg   0.47      0.55      0.49      19290           </pre>	0.55	<pre> confusion_matrix  array([[7241, 382, 2443],        [1520, 130, 599],        [4663, 342, 1970]])           </pre>

### Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
<b>Model 2</b>  RandomFore st Classifier	<pre> precision  recall  f1-score  support 0         0.59    0.82    0.69    10066 1         0.47    0.01    0.02    2249 2         0.49    0.37    0.42    6975  accuracy          0.56    19290 macro avg         0.52    0.40    0.38    19290 weighted avg      0.54    0.56    0.51    19290 </pre>	0.56	<pre> confusion_matrix  array([[8249,    5, 1812],        [1365,   23,  861],        [4351,   21, 2603]]) </pre>

### Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
<b>Model 3</b>  XG BOOST CLASSIFIE R	<pre> precision  recall  f1-score  support 0         0.60    0.80    0.69    10066 1         0.44    0.03    0.05    2249 2         0.50    0.42    0.45    6975  accuracy          0.57    19290 macro avg         0.51    0.41    0.40    19290 weighted avg      0.55    0.57    0.53    19290 </pre>	0.57	<pre> confusion_matrix  array([[8023,   28, 2015],        [1269,   60,  920],        [4009,   48, 2918]]) </pre>

<b>Model 4</b>  Decision Tree Classifier	<pre> precision  recall  f1-score  support 0         0.57    0.56    0.56    10066 1         0.15    0.15    0.15     2249 2         0.40    0.41    0.40     6975  accuracy          0.46    19290 macro avg         0.37    0.37    0.37    19290 weighted avg      0.46    0.46    0.46    19290 </pre>	0.46	<pre> confusion_matrix  array([[5637, 1116, 3313],        [1008,  348,  893],        [3257,  892, 2826]]) </pre>
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### Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
<b>Model 5</b>  AdaBoostClassifier	<pre> precision  recall  f1-score  support 0         0.59    0.82    0.69    10066 1         0.45    0.01    0.02     2249 2         0.49    0.37    0.42     6975  accuracy          0.56    19290 macro avg         0.51    0.40    0.37    19290 weighted avg      0.54    0.56    0.51    19290 </pre>	0.56	<pre> array([[8299,  10, 1757],        [1359,  19,  871],        [4409,  13, 2553]]) </pre>

### Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
<b>Model 6</b>  GradientBoos tingClassifier	<pre> precision  recall  f1-score  support 0         0.60    0.83    0.70    10066 1         0.47    0.01    0.01    2249 2         0.51    0.38    0.44    6975  accuracy          0.57    19290 macro avg         0.52    0.41    0.38    19290 weighted avg      0.55    0.57    0.52    19290 </pre>	0.57	<pre> confusion_matrix  array([[8394,    4, 1668],        [1357,   14,  878],        [4309,   12, 2654]]) </pre>

### Model Validation and Evaluation Report:

Model	Classification Report	Accuracy	Confusion Matrix
<b>Model 7</b>  KNeighborsC lassifier	<pre> precision  recall  f1-score  support 0         0.54    0.72    0.62    10066 1         0.15    0.06    0.08    2249 2         0.39    0.28    0.33    6975  accuracy          0.48    19290 macro avg         0.36    0.35    0.34    19290 weighted avg      0.44    0.48    0.45    19290 </pre>	0.48	<pre> array([[7241,  382, 2443],        [1520,  130,  599],        [4663,  342, 1970]]) </pre>