MODEL METRICS

Gradient Boost (SMOTE) Model

Apply the SMOTE method due to the target data being imbalanced.

from imblearn.over\_sampling import SMOTE

sm = SMOTE(random\_state=2)

Xtrain\_res, ytrain\_res= sm.fit\_resample(Xtrain, ytrain)

ytrain\_res.value\_counts()

3.0 1323

1.0 1323

2.0 1323

Parameters and Hyperparameters of the Gradient Boost (SMOTE) Model

GradientBoostingClassifier(learning\_rate=0.05, max\_depth=8, max\_leaf\_nodes=110,

n\_estimators=180, random\_state=5, subsample=0.8)

Performance Metrics

Accuracy: 0.931924882629108

Recall: 0.931924882629108

Precision: 0.9308142978604173

F1: 0.9311891422778102

Features Importance scores

9 percentage\_of\_time\_with\_abnormal\_long\_term\_var... 0.271332

7 abnormal\_short\_term\_variability 0.253091

17 histogram\_mean 0.202921

1 accelerations 0.077726

6 prolongued\_decelerations 0.040268

13 histogram\_max 0.030624

0 baseline\_value 0.015532

8 mean\_value\_of\_short\_term\_variability 0.014398

3 uterine\_contractions 0.014152

12 histogram\_min 0.012492

14 histogram\_number\_of\_peaks 0.011875

16 histogram\_mode 0.010502

18 histogram\_median 0.009924

2 fetal\_movement 0.008975

10 mean\_value\_of\_long\_term\_variability 0.007465

11 histogram\_width 0.006279

19 histogram\_variance 0.005641

4 light\_decelerations 0.002902

15 histogram\_number\_of\_zeroes 0.001784

20 histogram\_tendency 0.001154

5 severe\_decelerations 0.000963