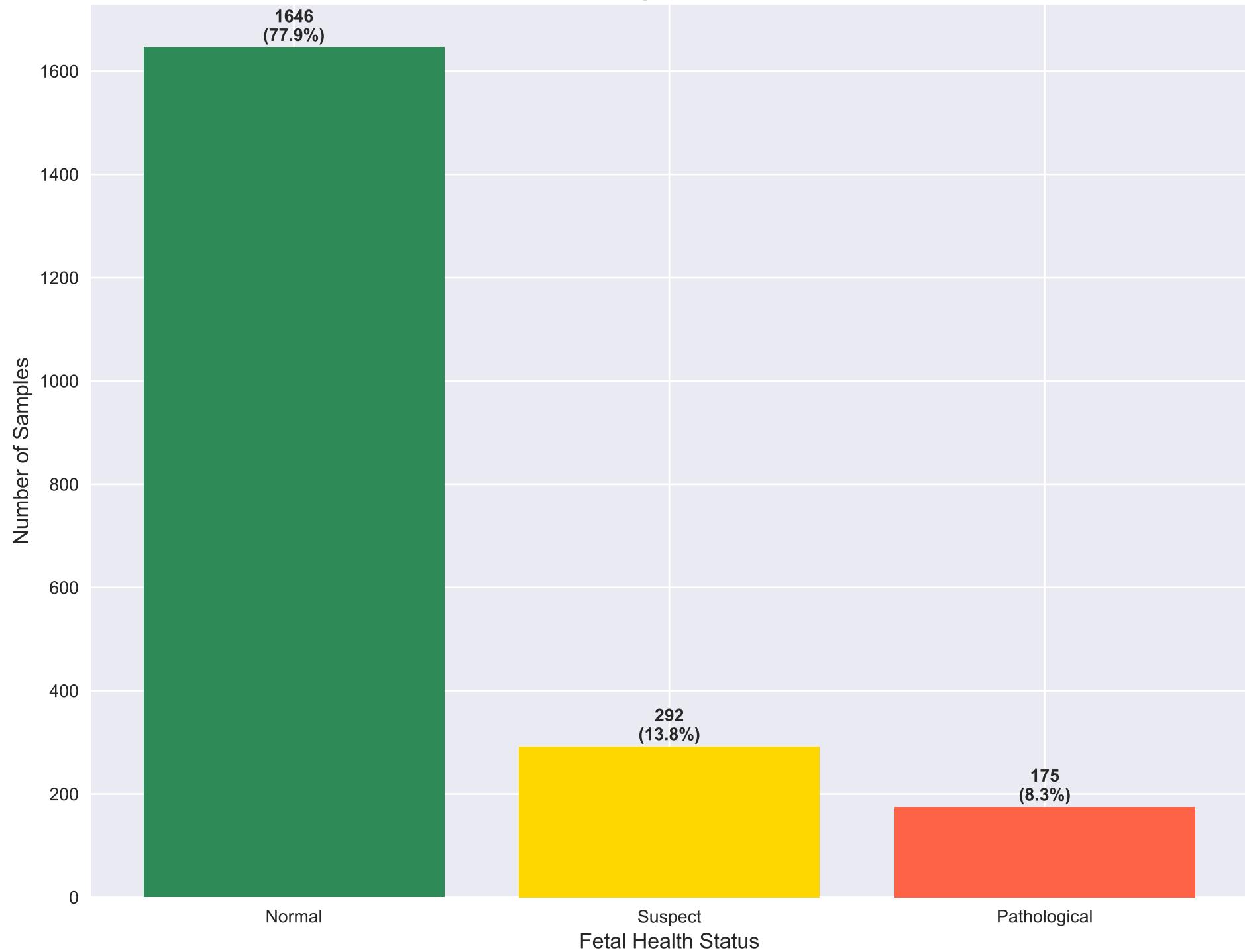
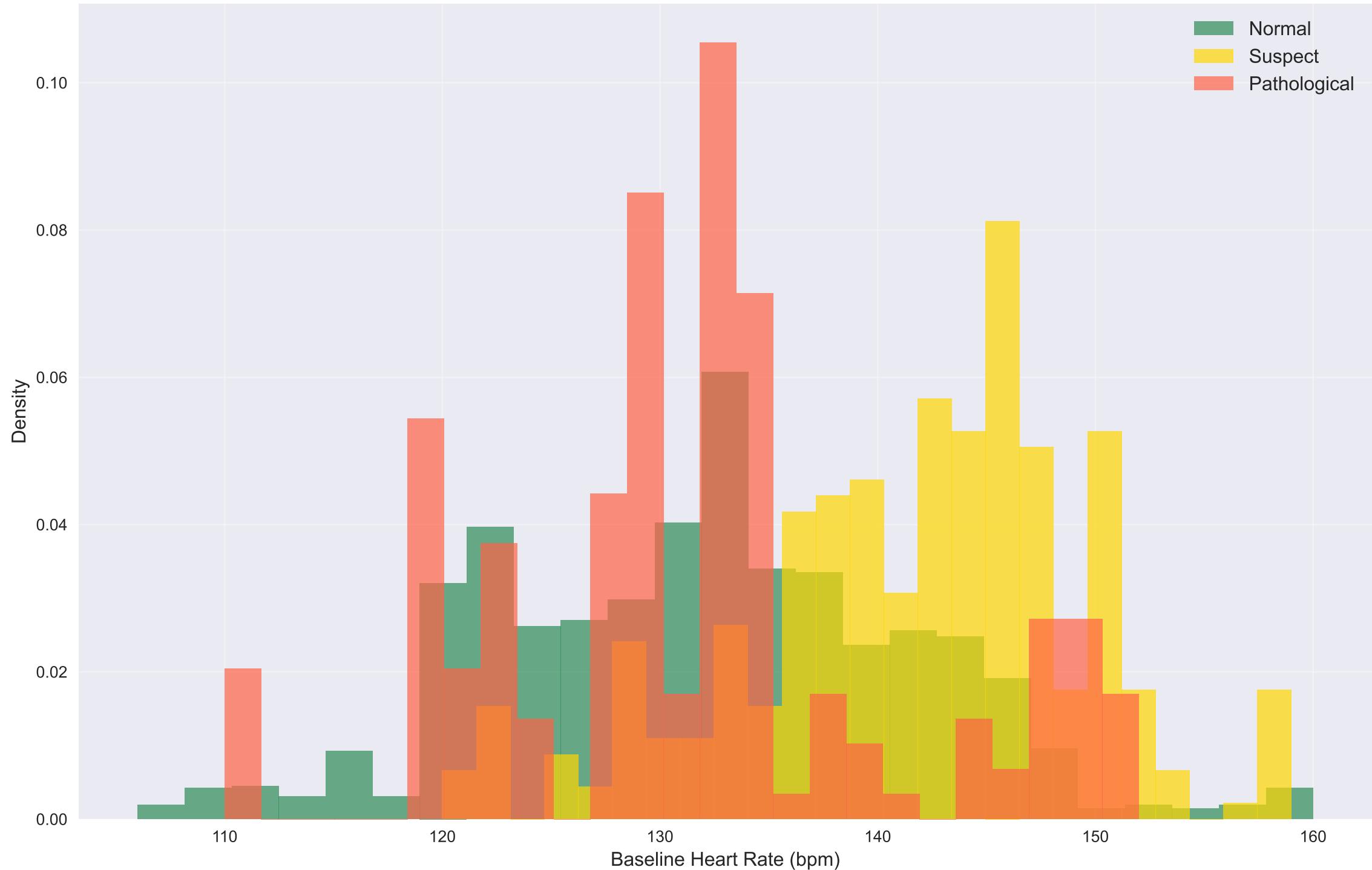


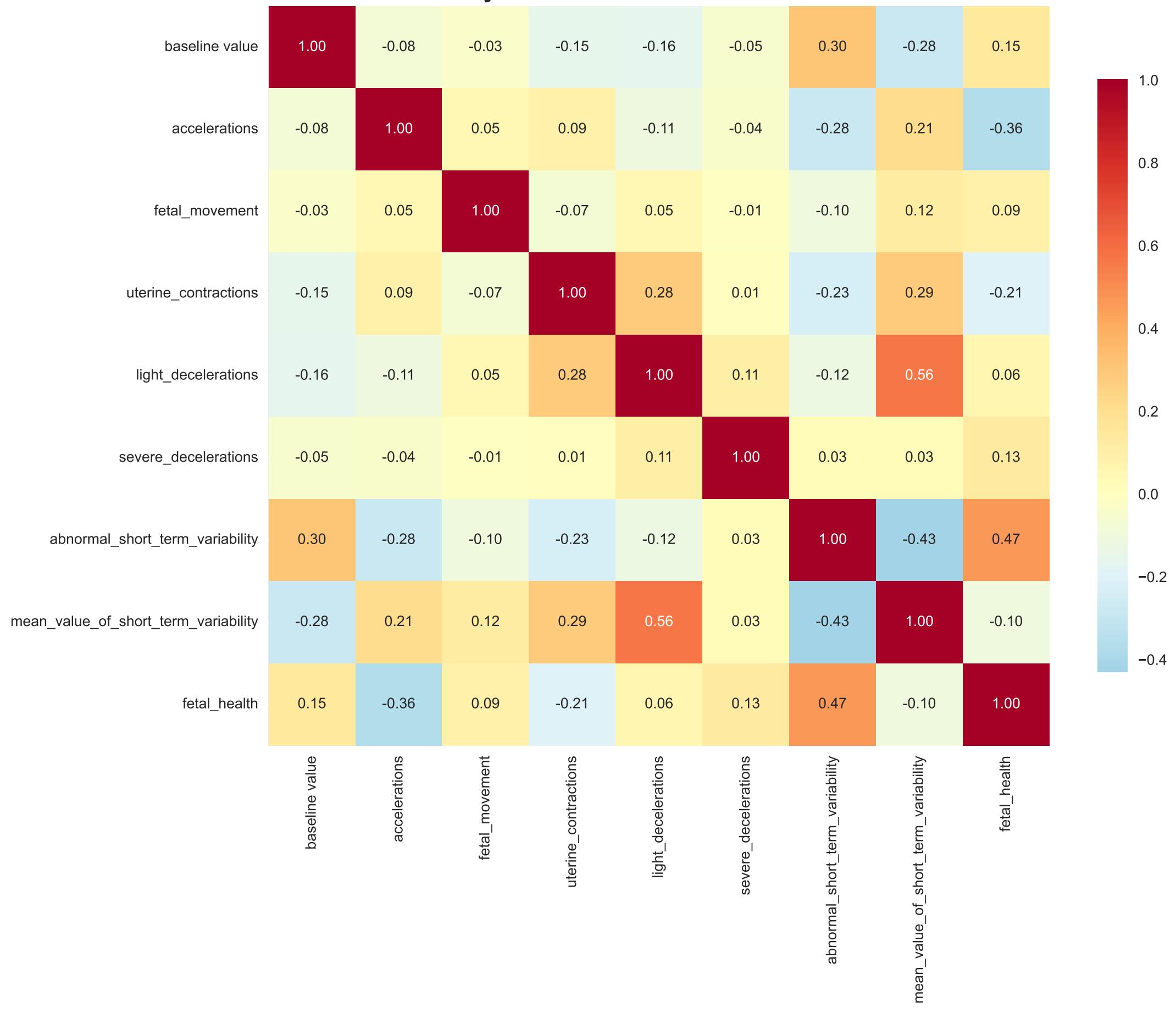
Fetal Health - Target Class Distribution



Baseline Heart Rate Distribution by Fetal Health Class

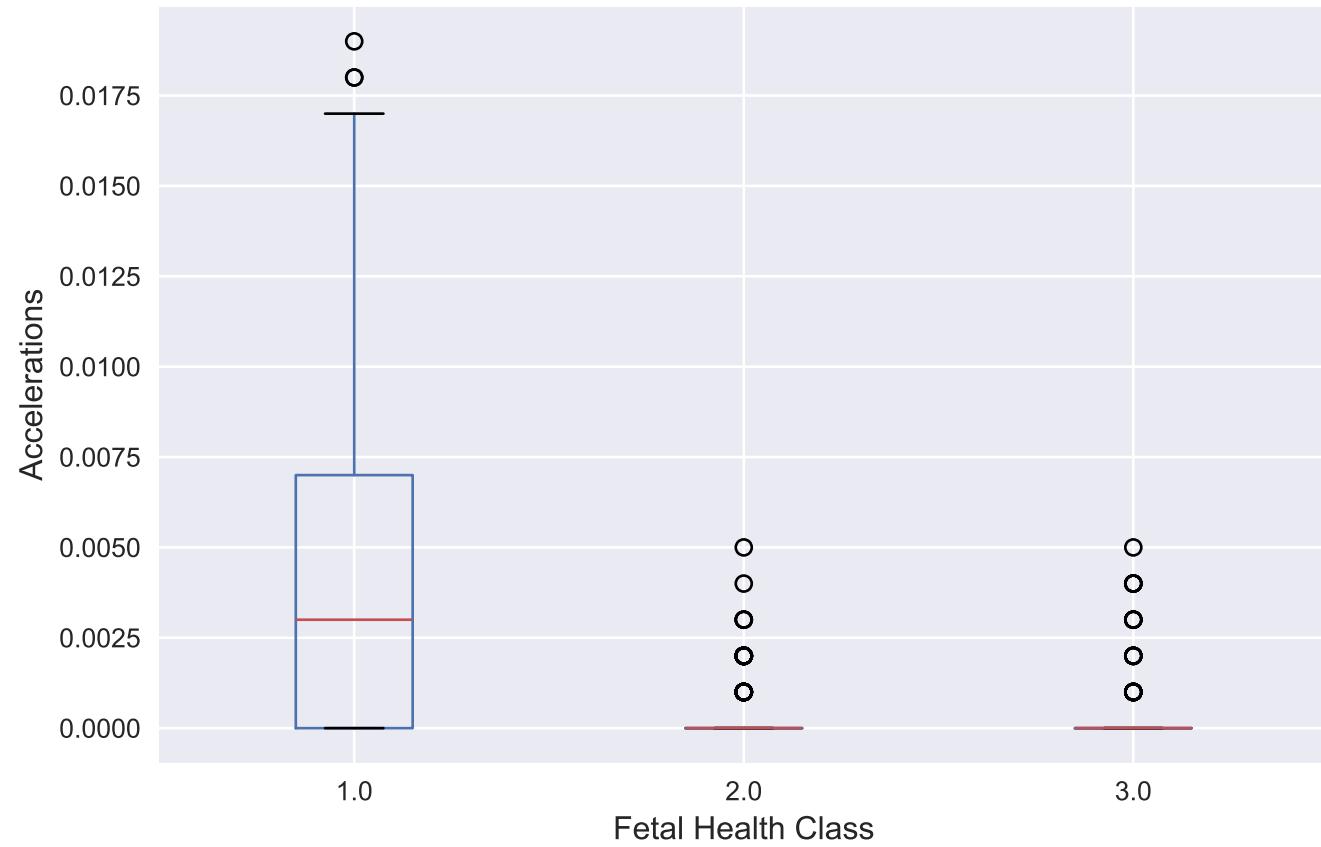


Key CTG Features Correlation Matrix

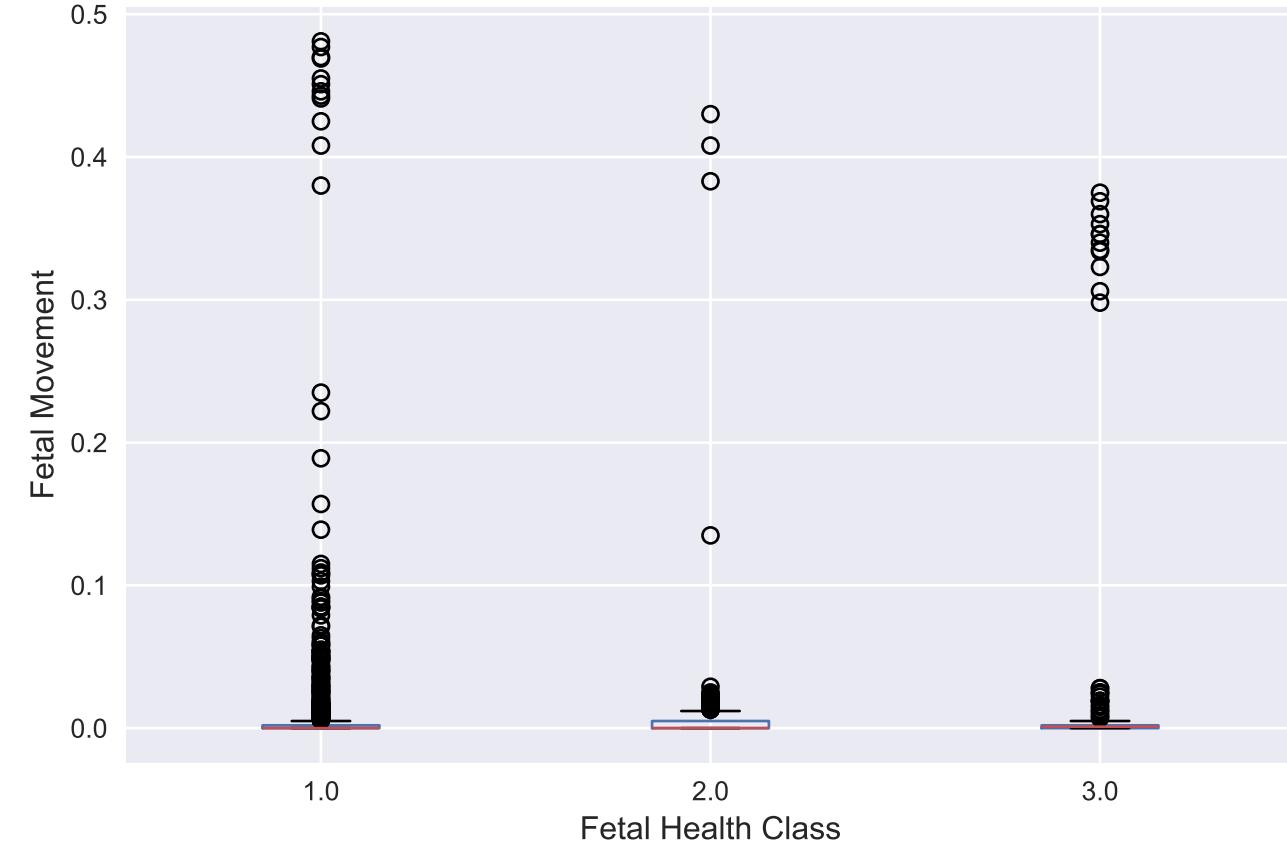


CTG Feature Distributions by Fetal Health Class

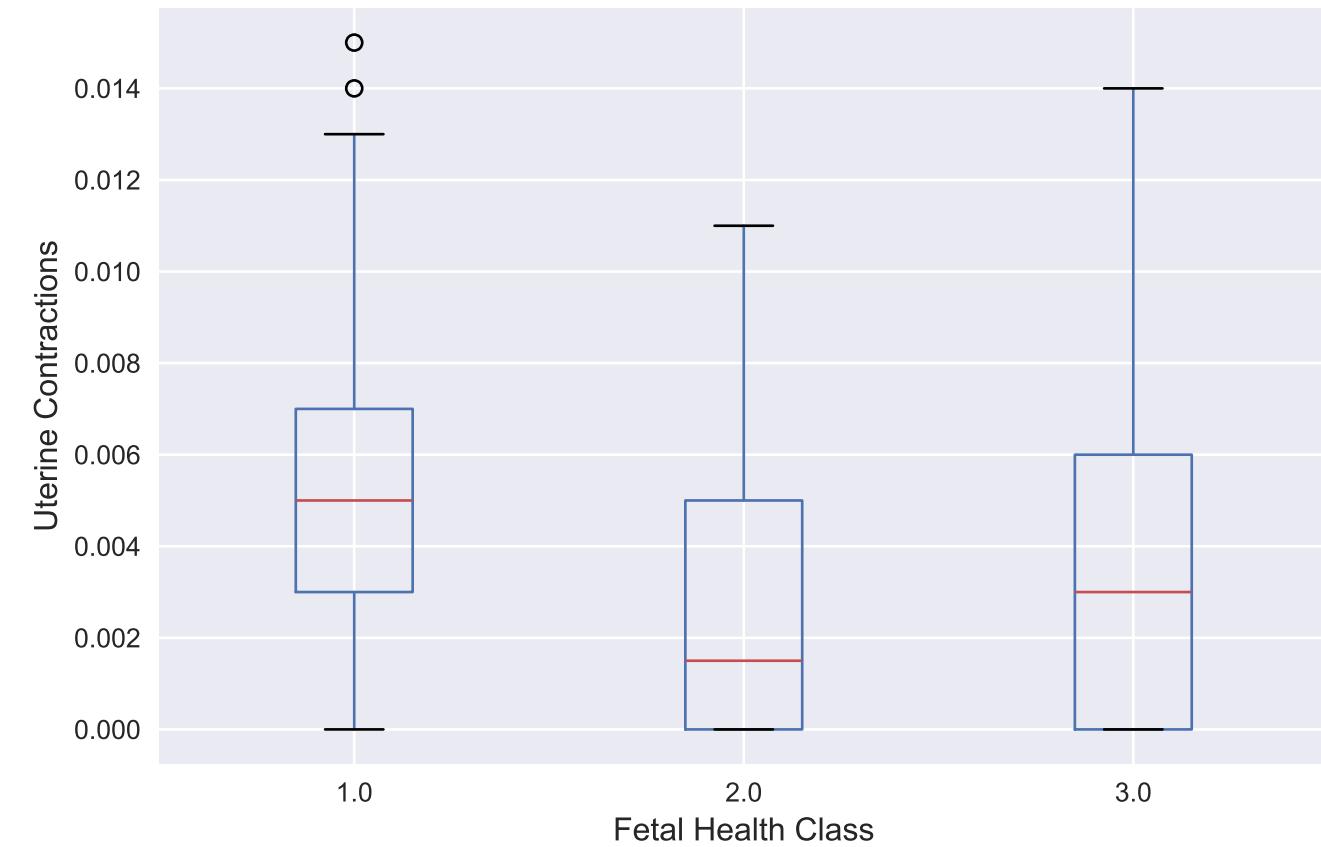
Accelerations



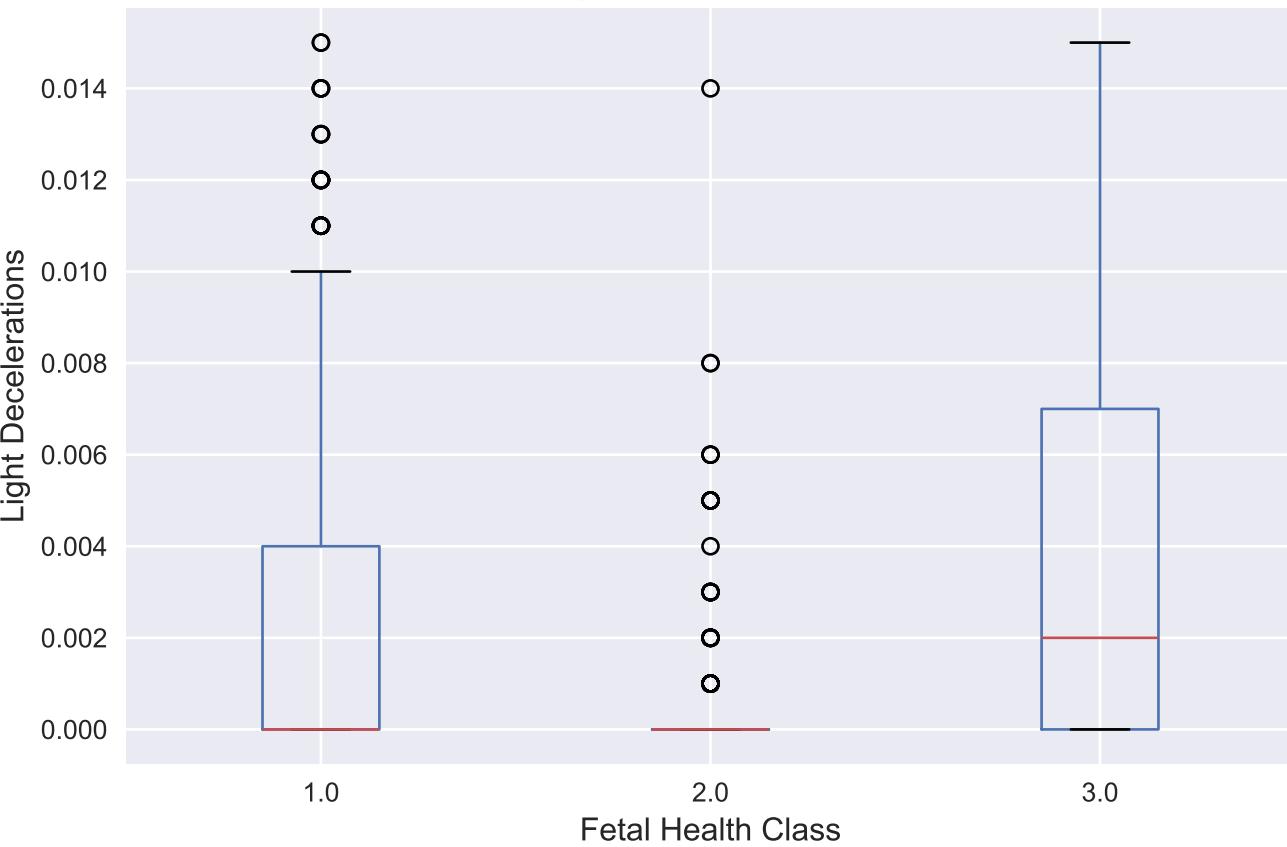
Fetal Movement



Uterine Contractions

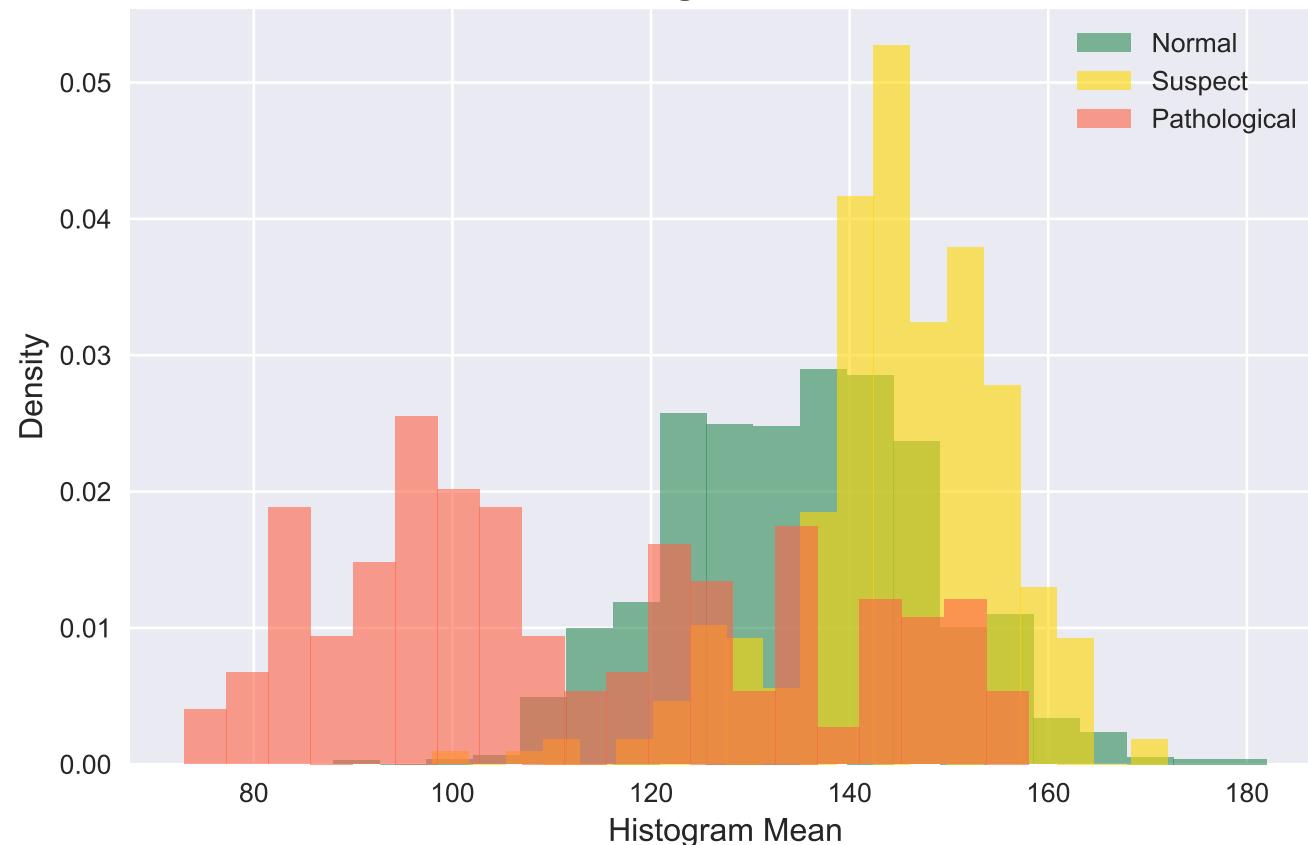


Light Decelerations

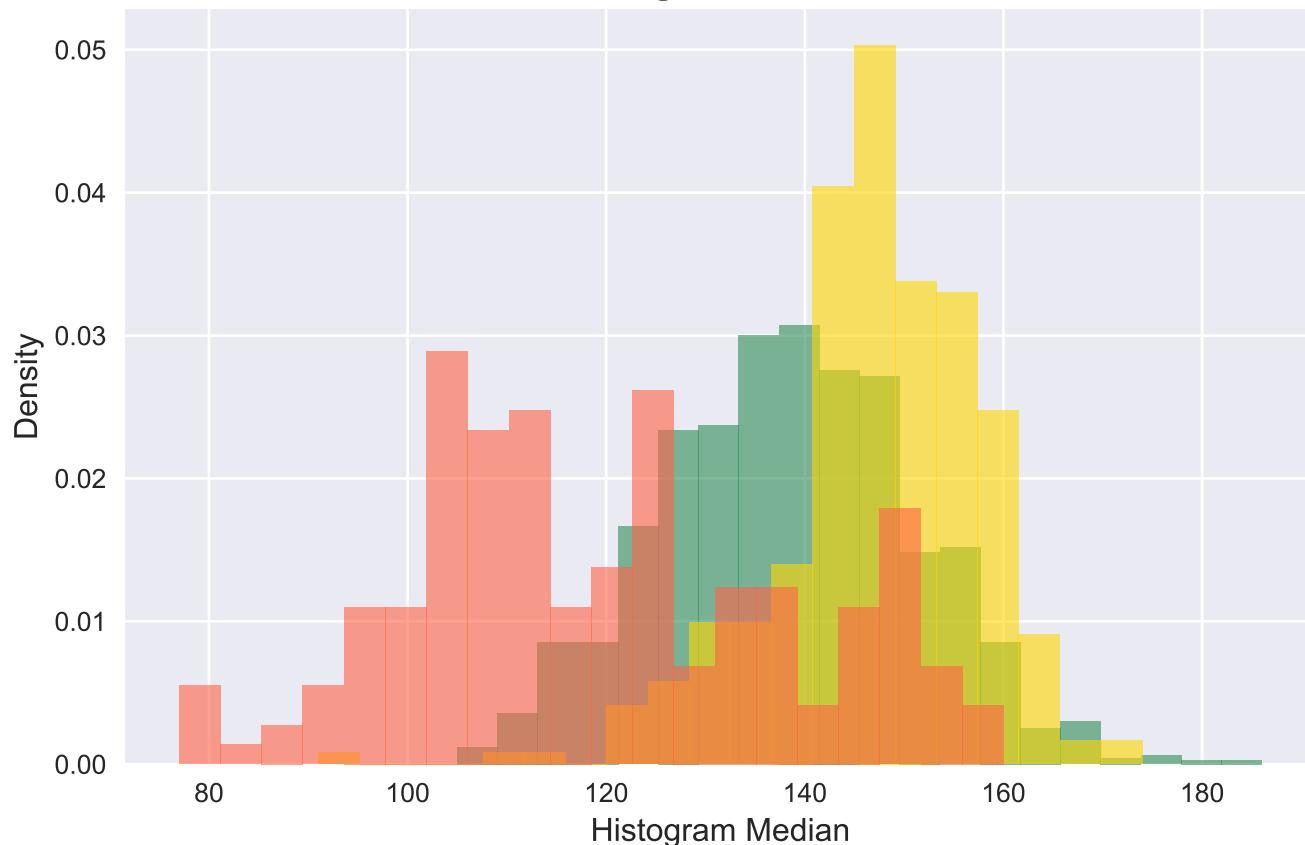


CTG Histogram Features Analysis

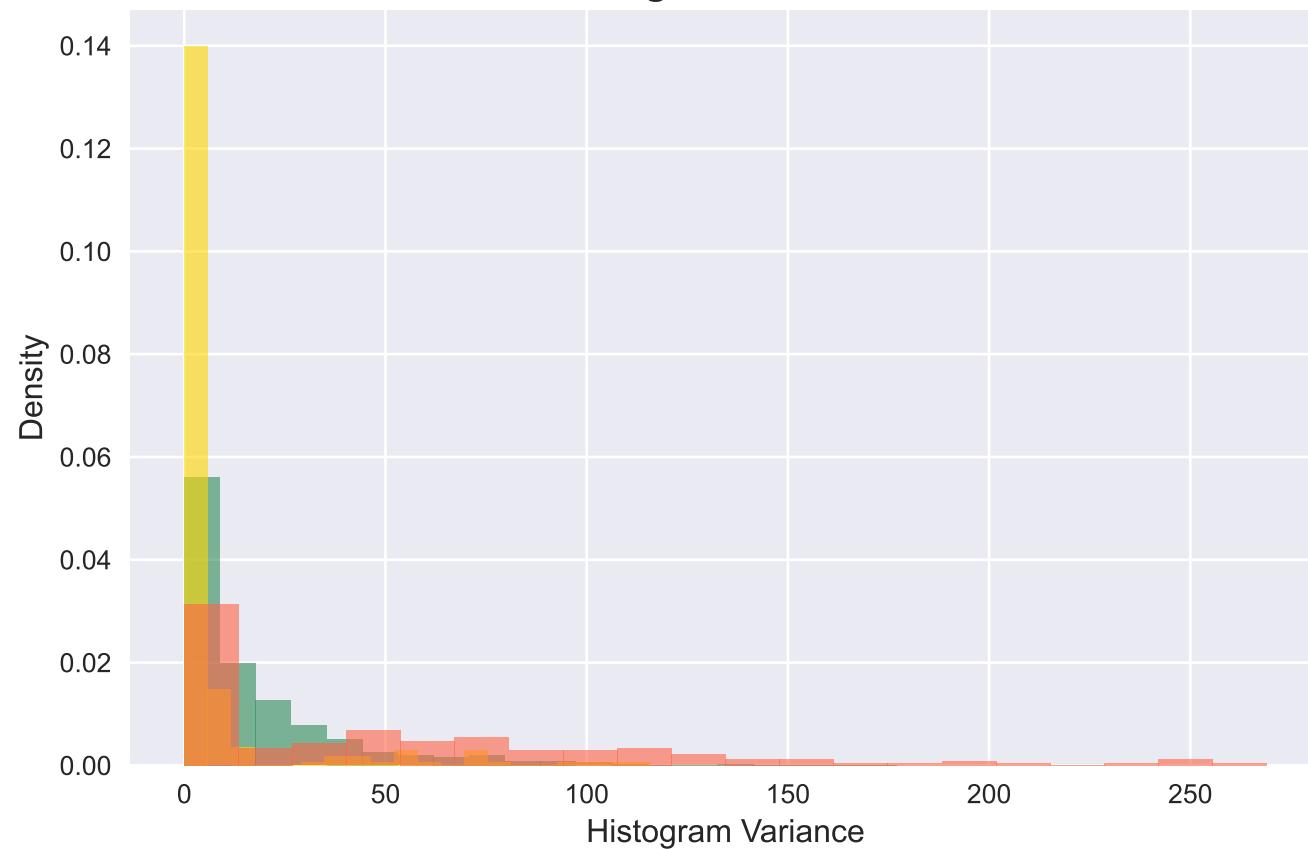
Histogram Mean



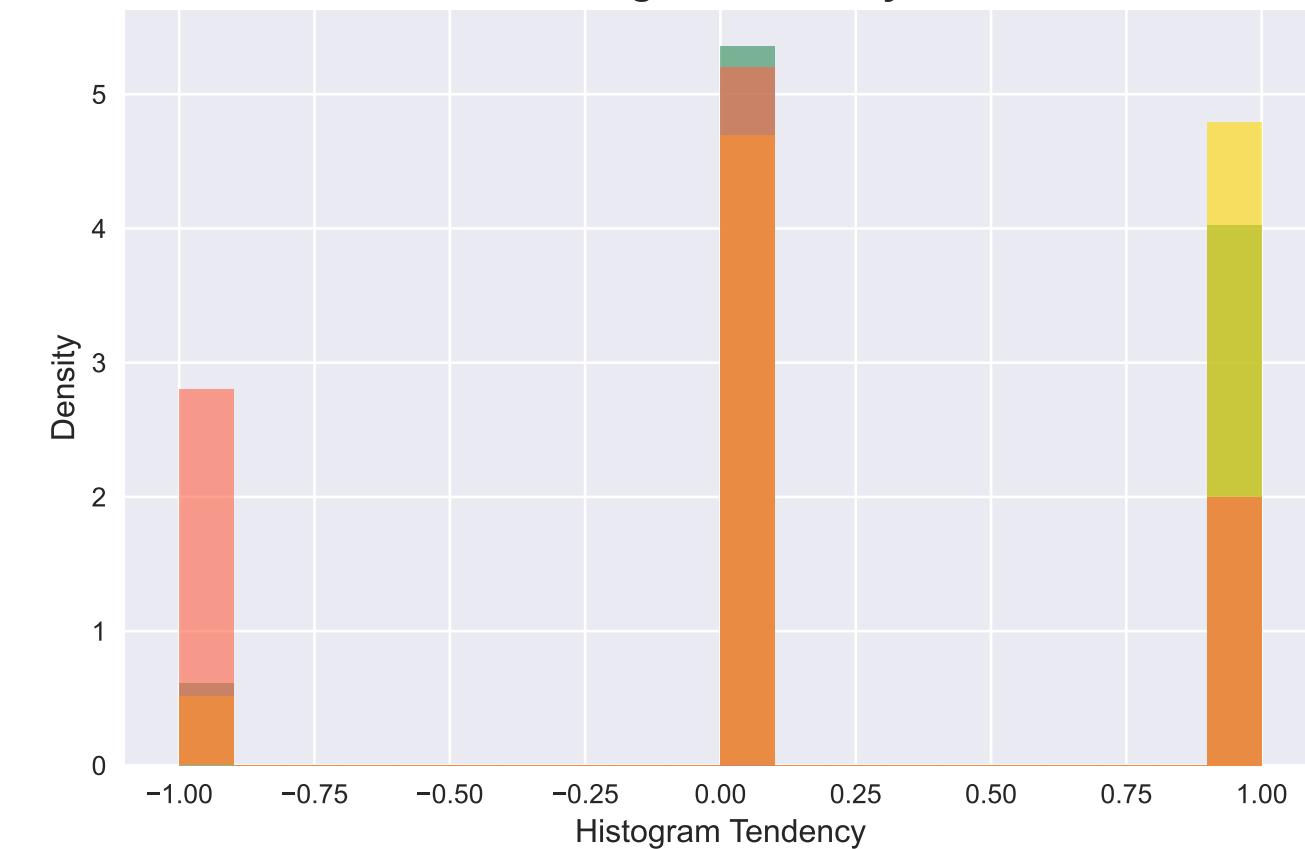
Histogram Median



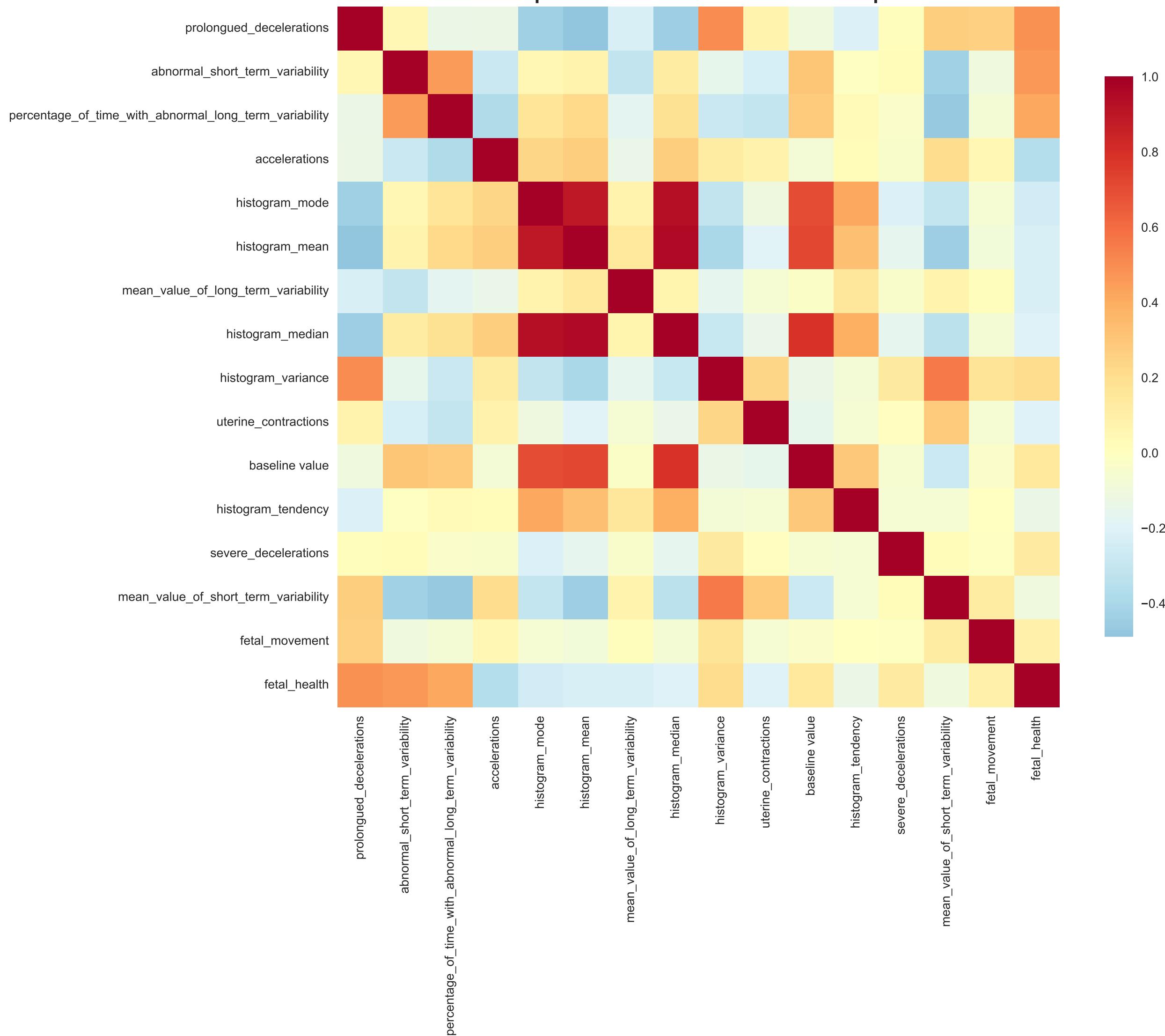
Histogram Variance



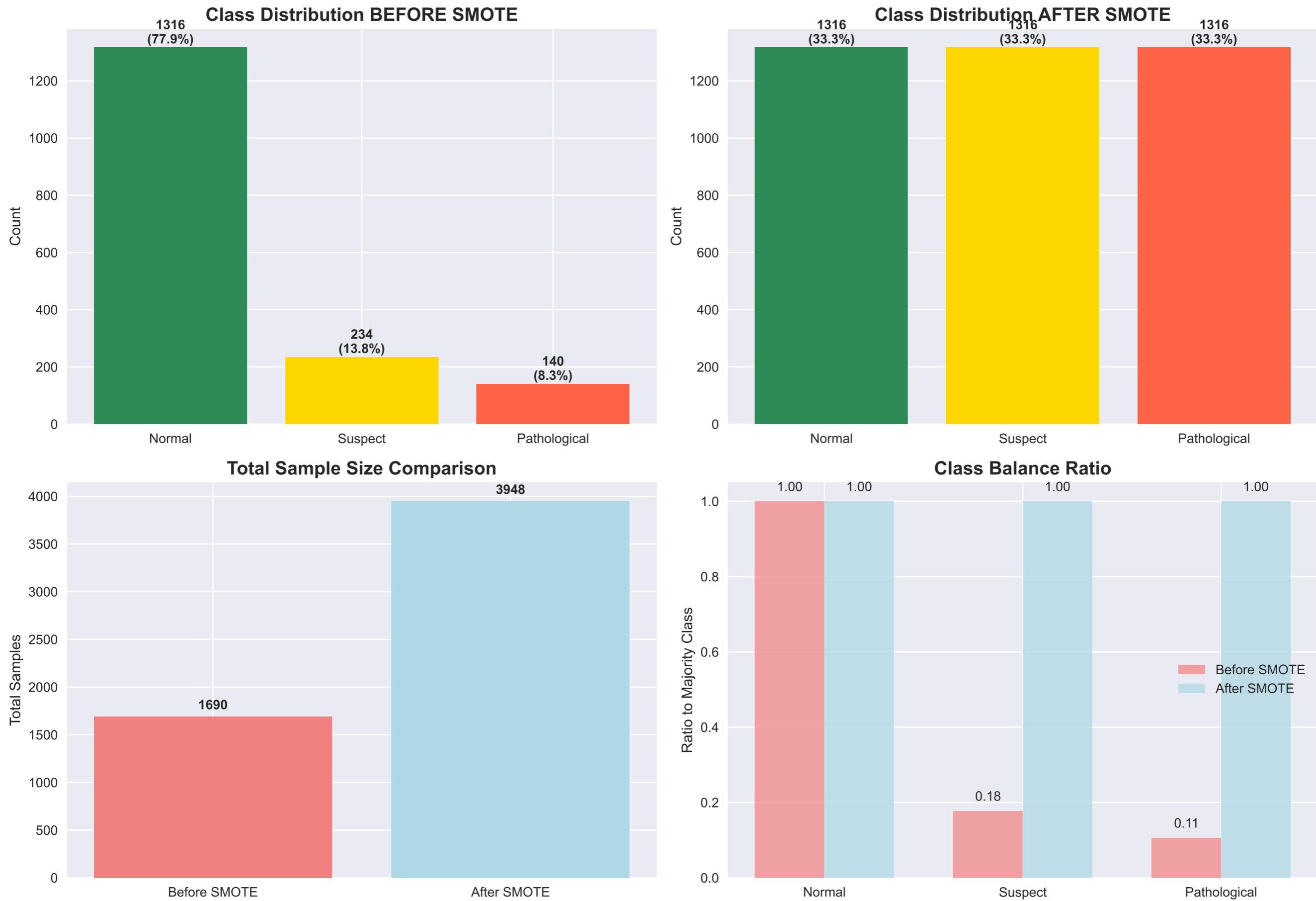
Histogram Tendency



Top CTG Features Correlation Heatmap

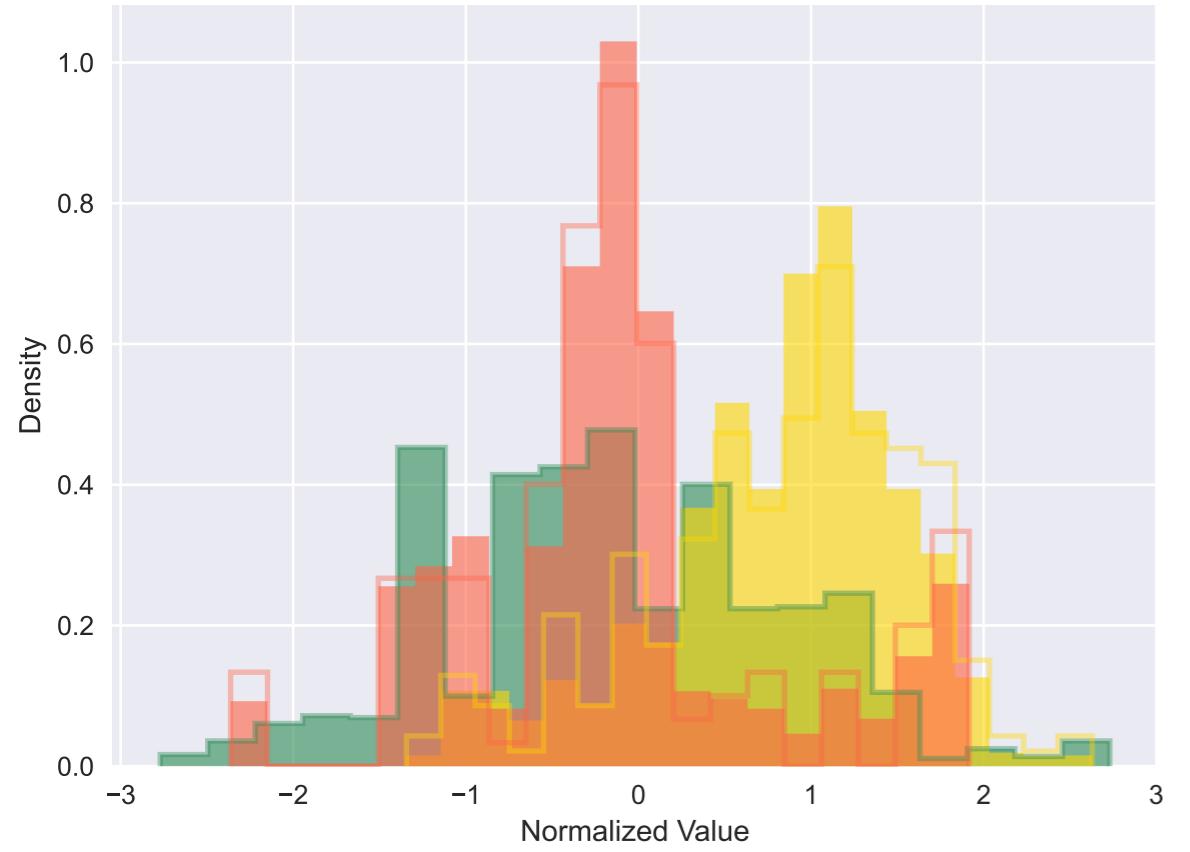


SMOTE Impact Analysis - Overview

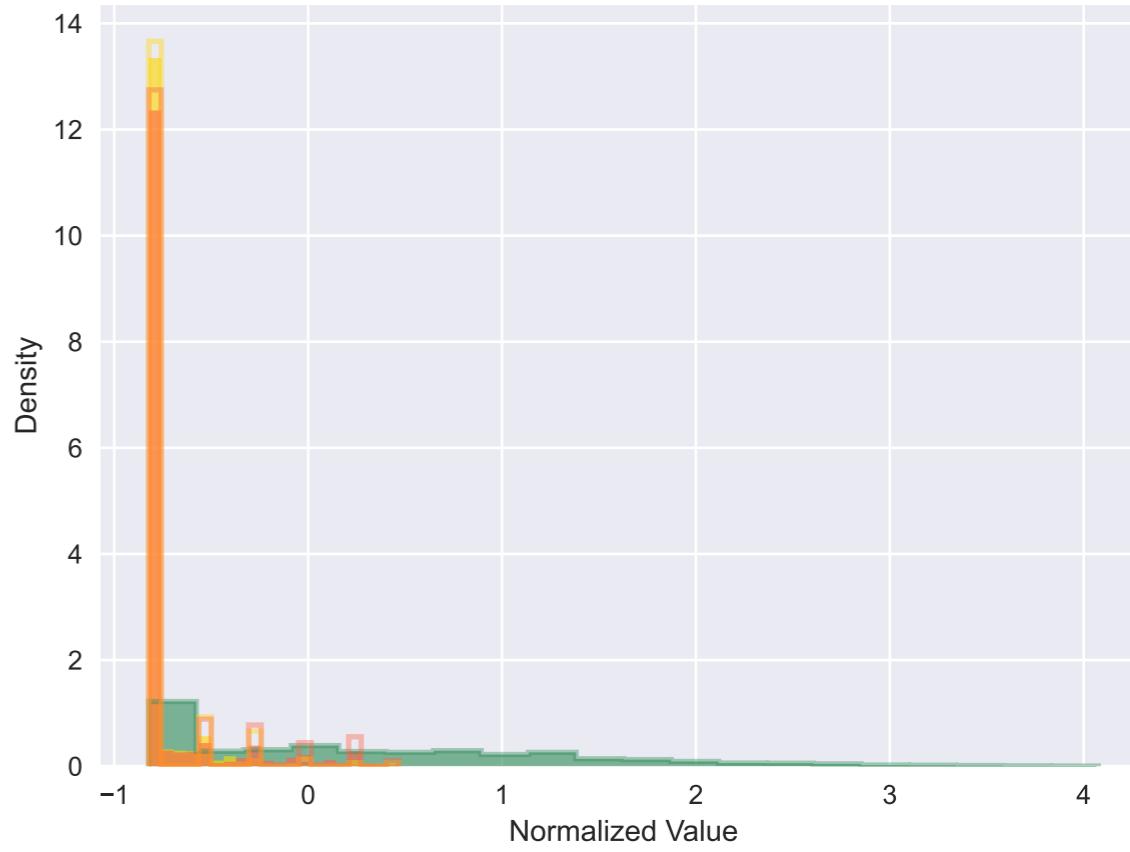


SMOTE Impact on Feature Distributions

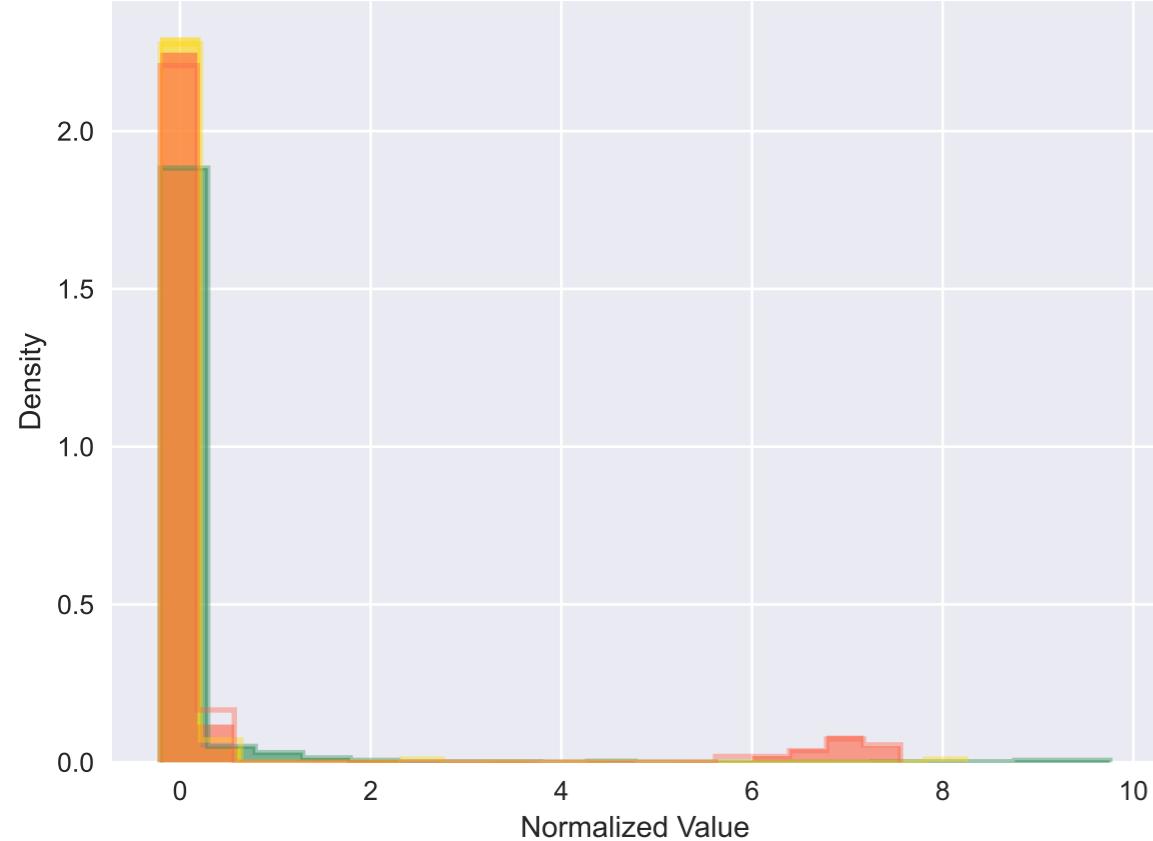
Baseline Value Distribution



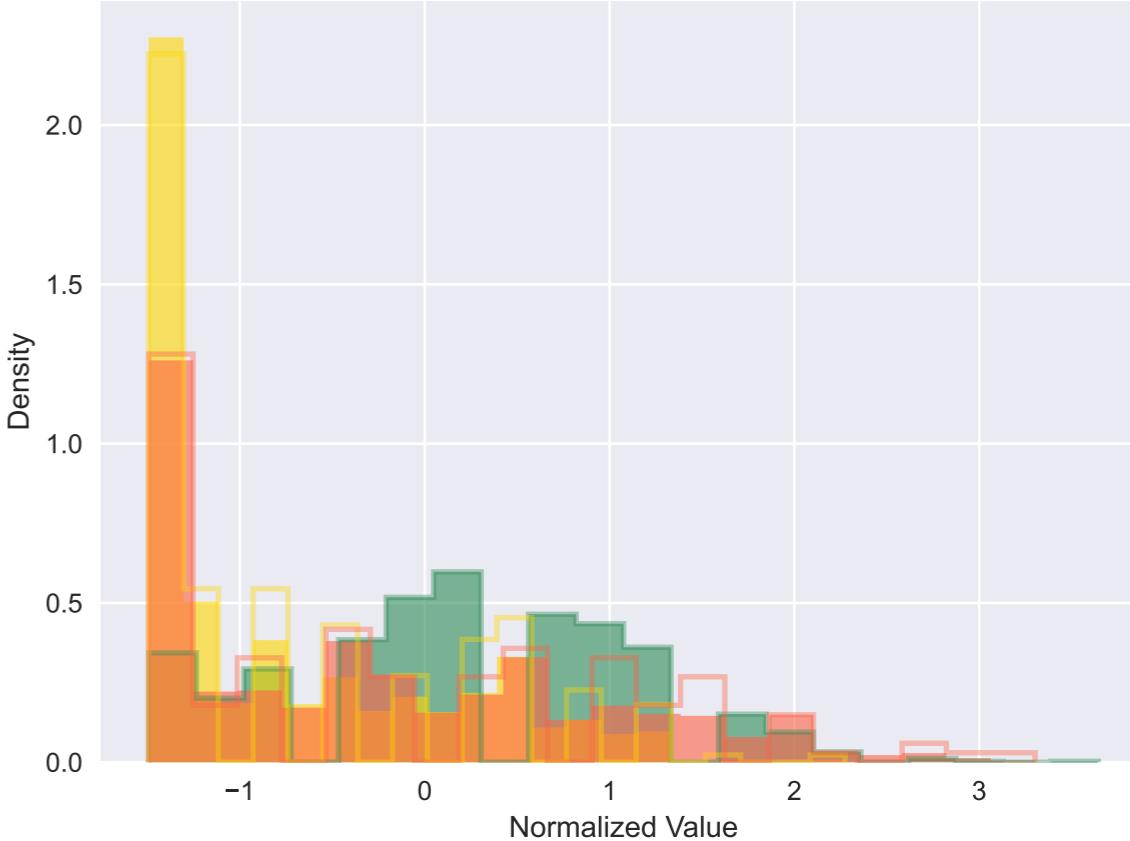
Accelerations Distribution



Fetal Movement Distribution

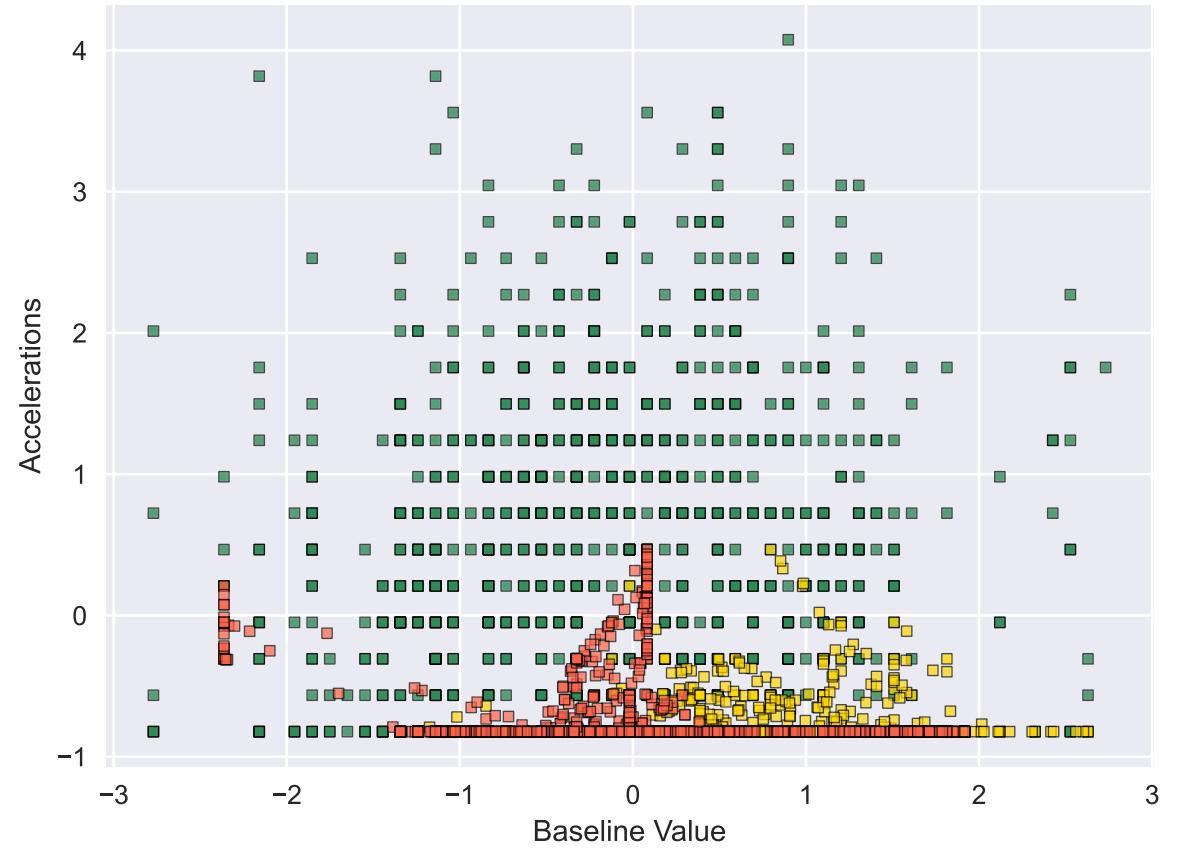


Uterine Contractions Distribution

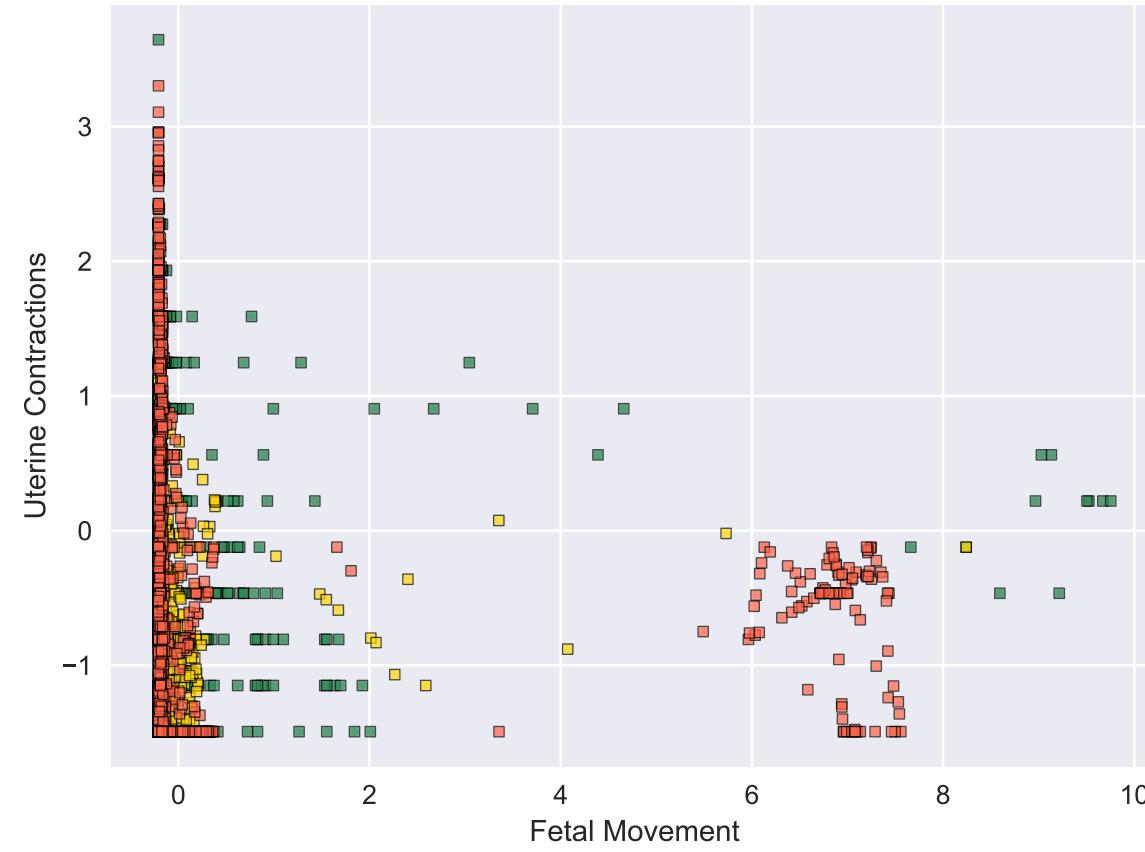


SMOTE Impact on Feature Relationships

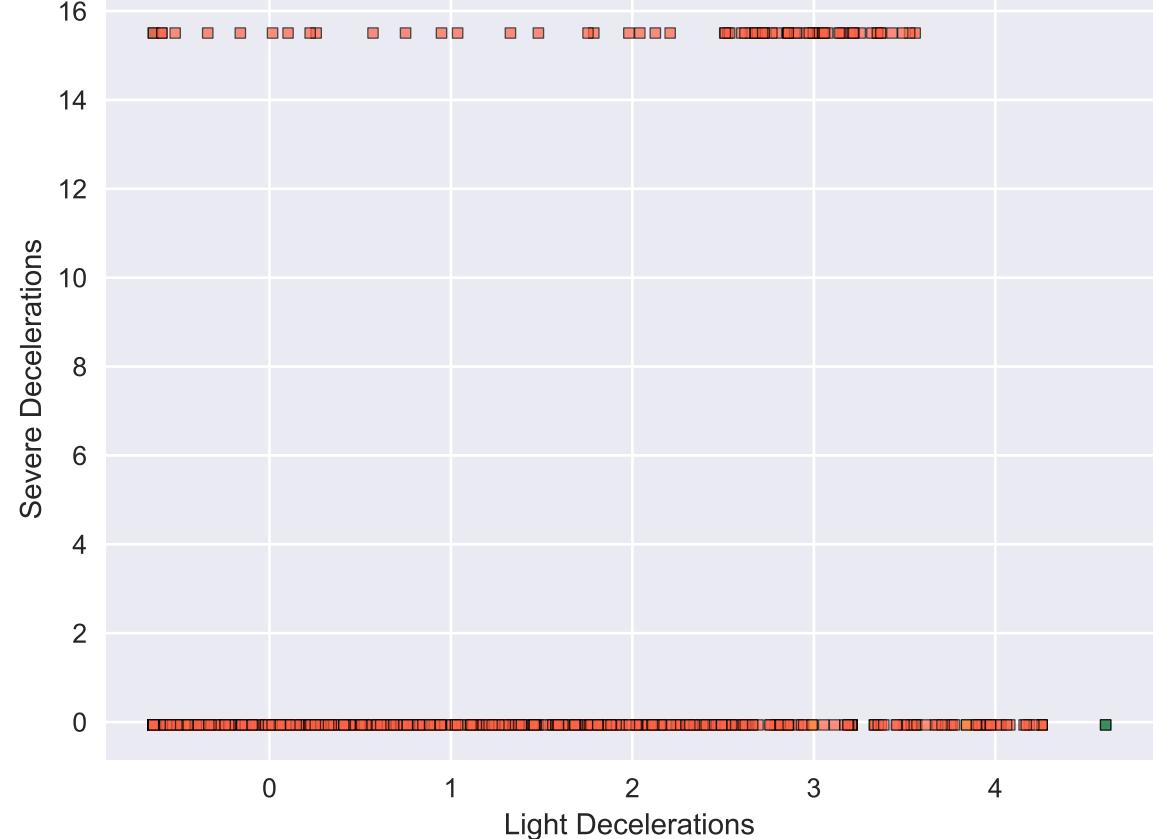
Baseline Value vs Accelerations



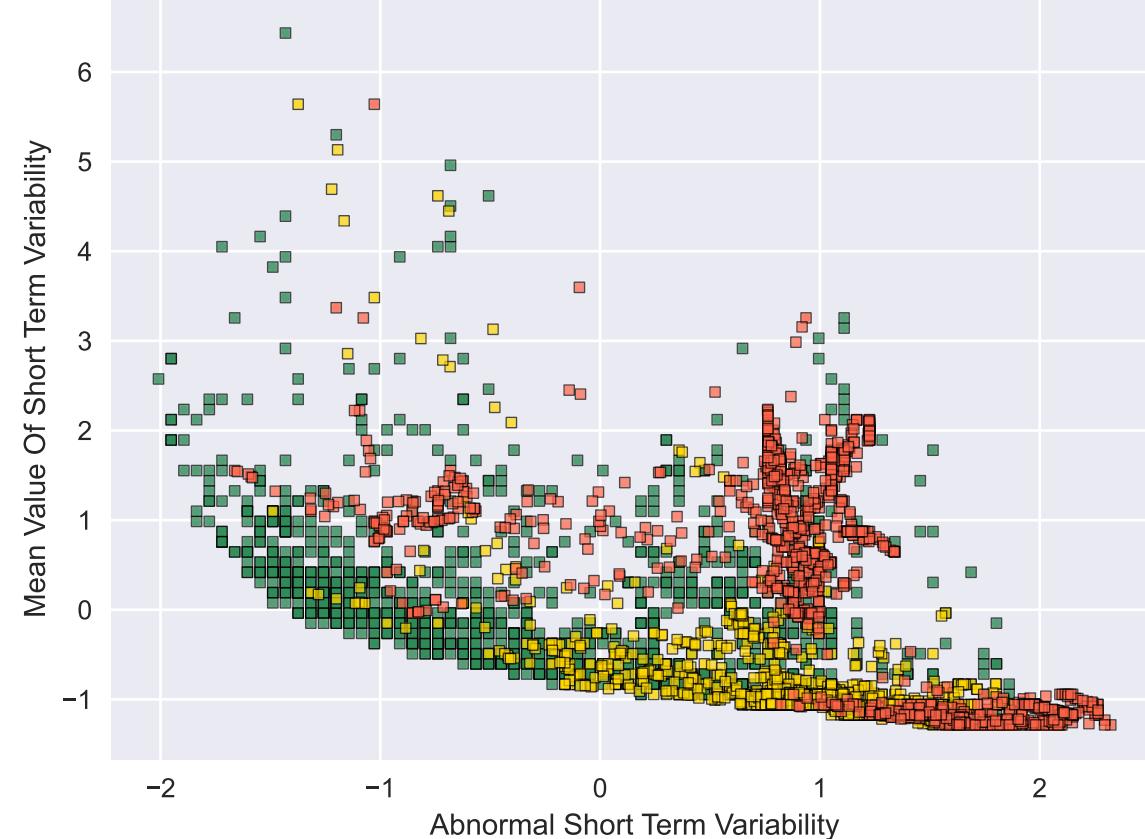
Fetal Movement vs Uterine Contractions



Light Decelerations vs Severe Decelerations

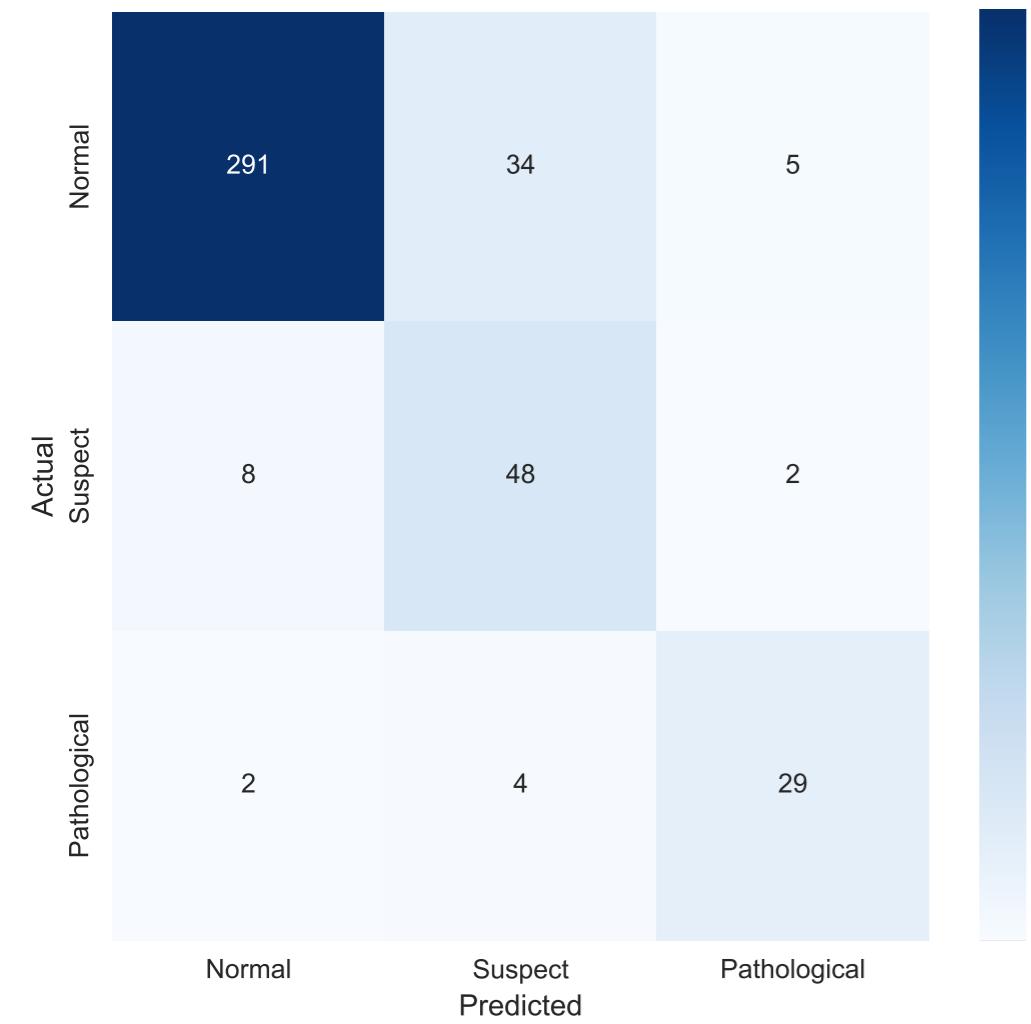


Abnormal Short Term Variability vs Mean Value Of Short Term Variability

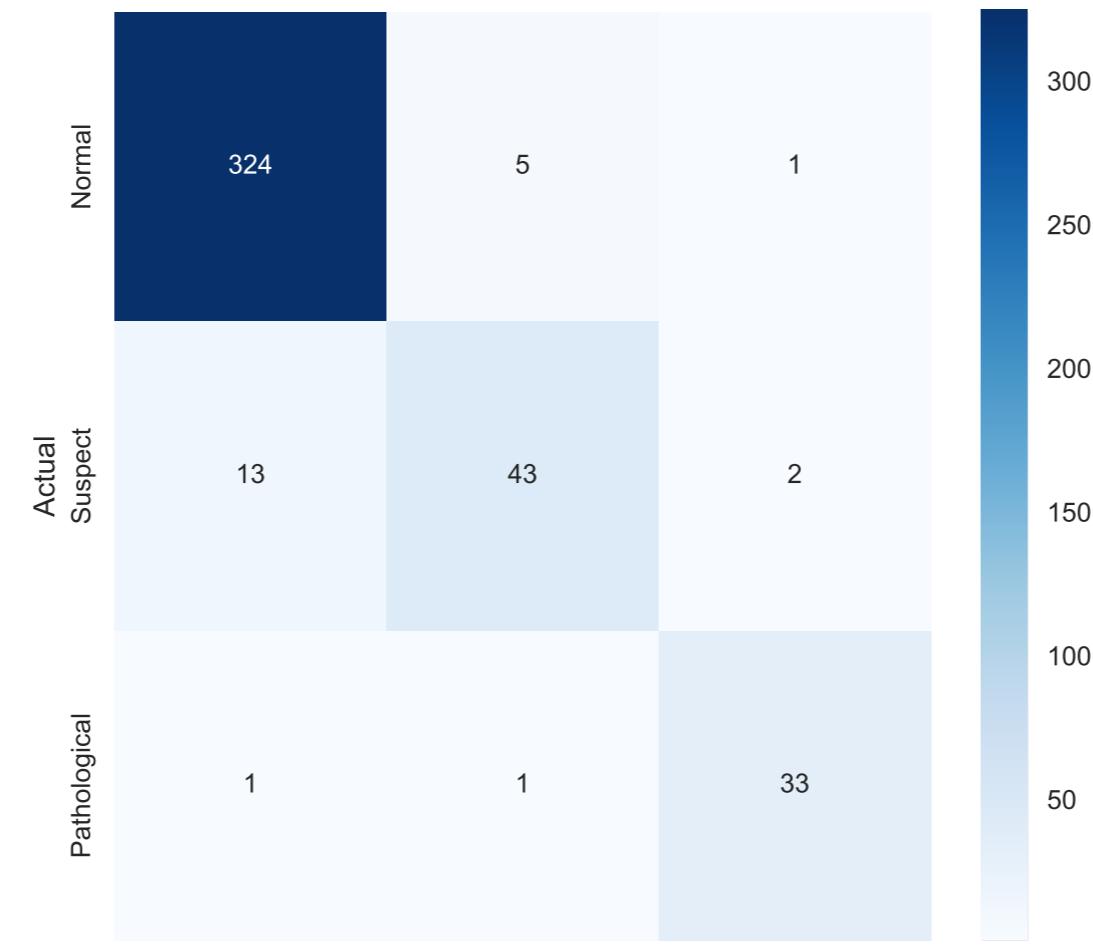


Machine Learning Model Performance Analysis

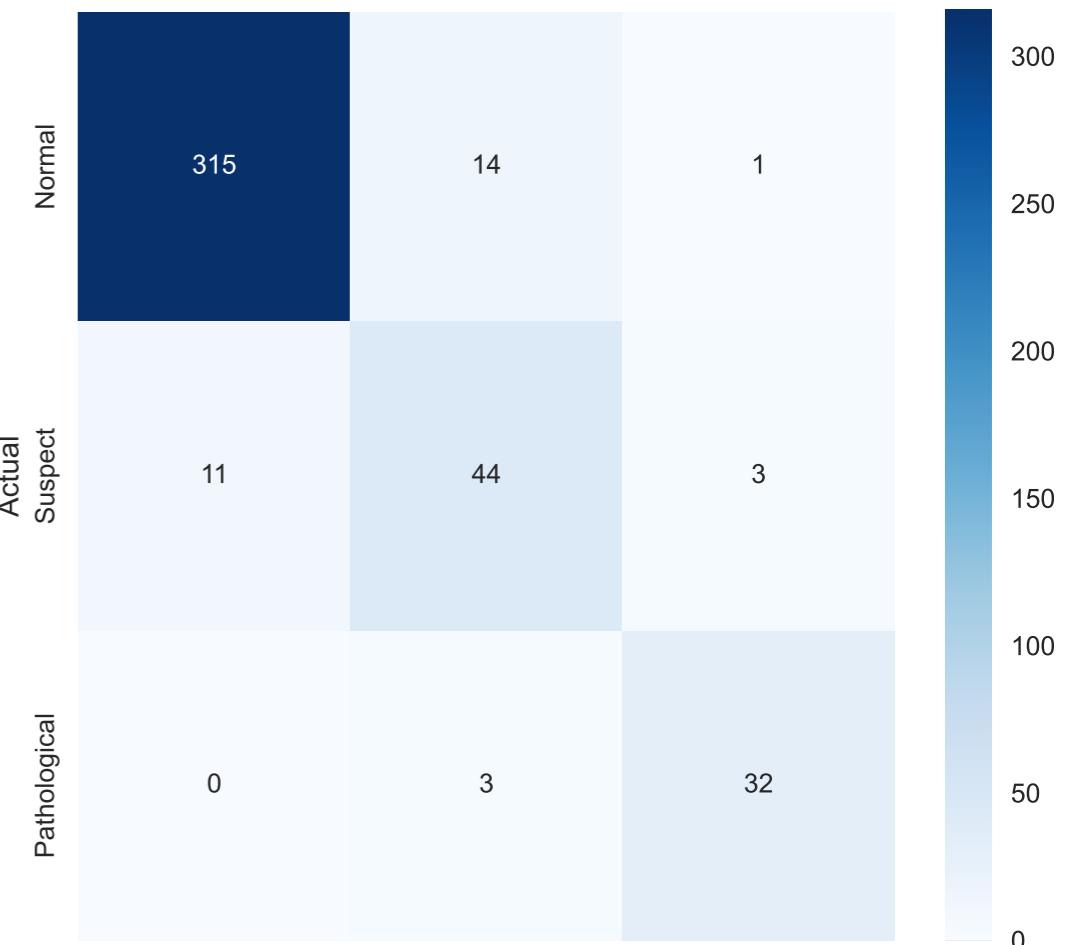
**Logistic Regression
Confusion Matrix**



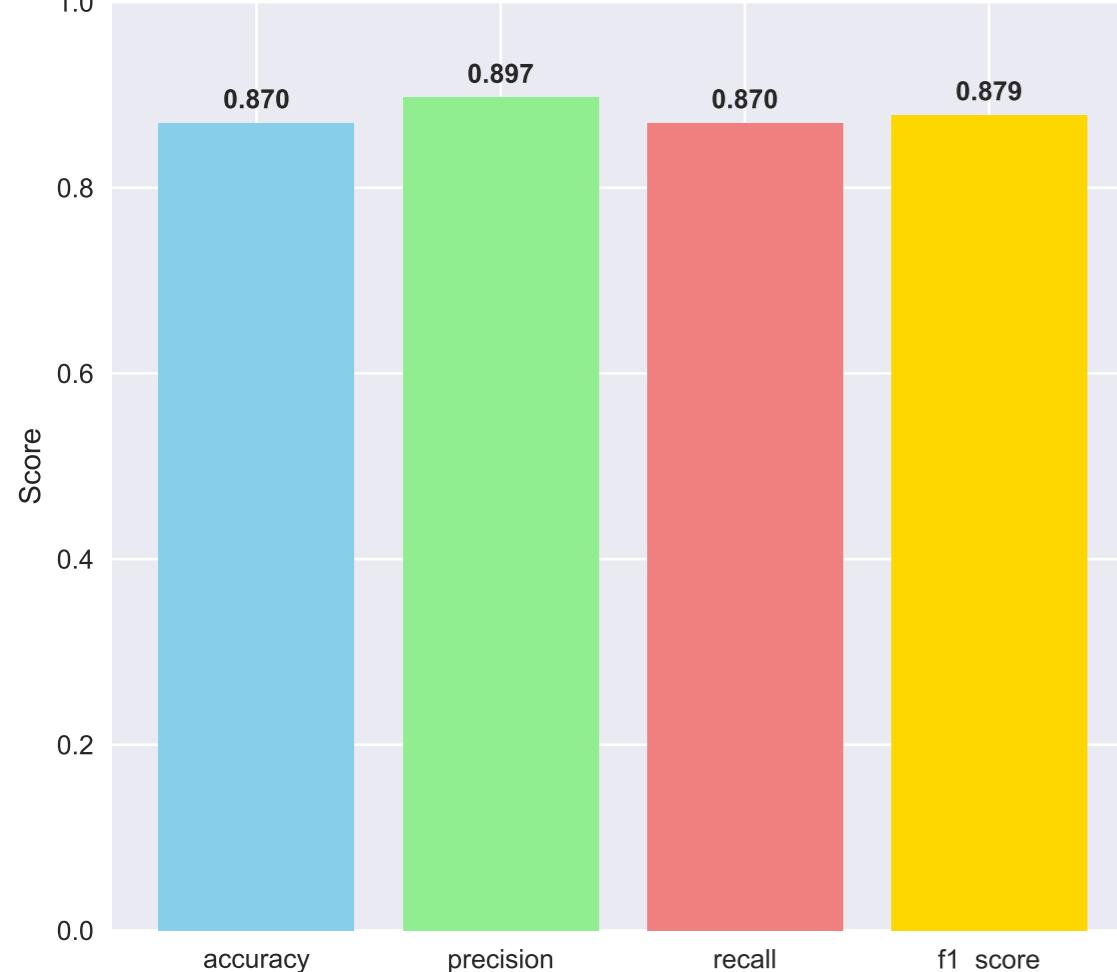
**Random Forest
Confusion Matrix**



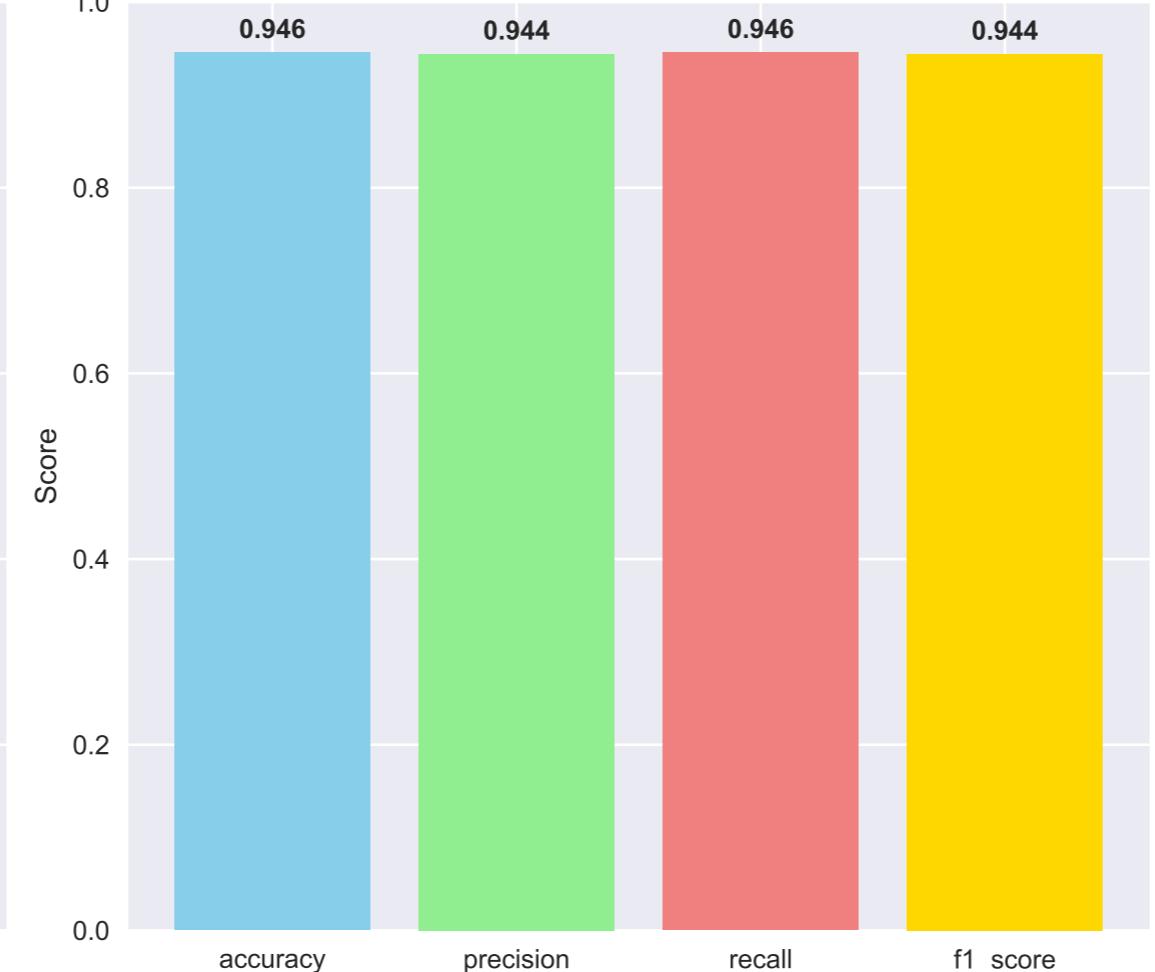
**Svm
Confusion Matrix**



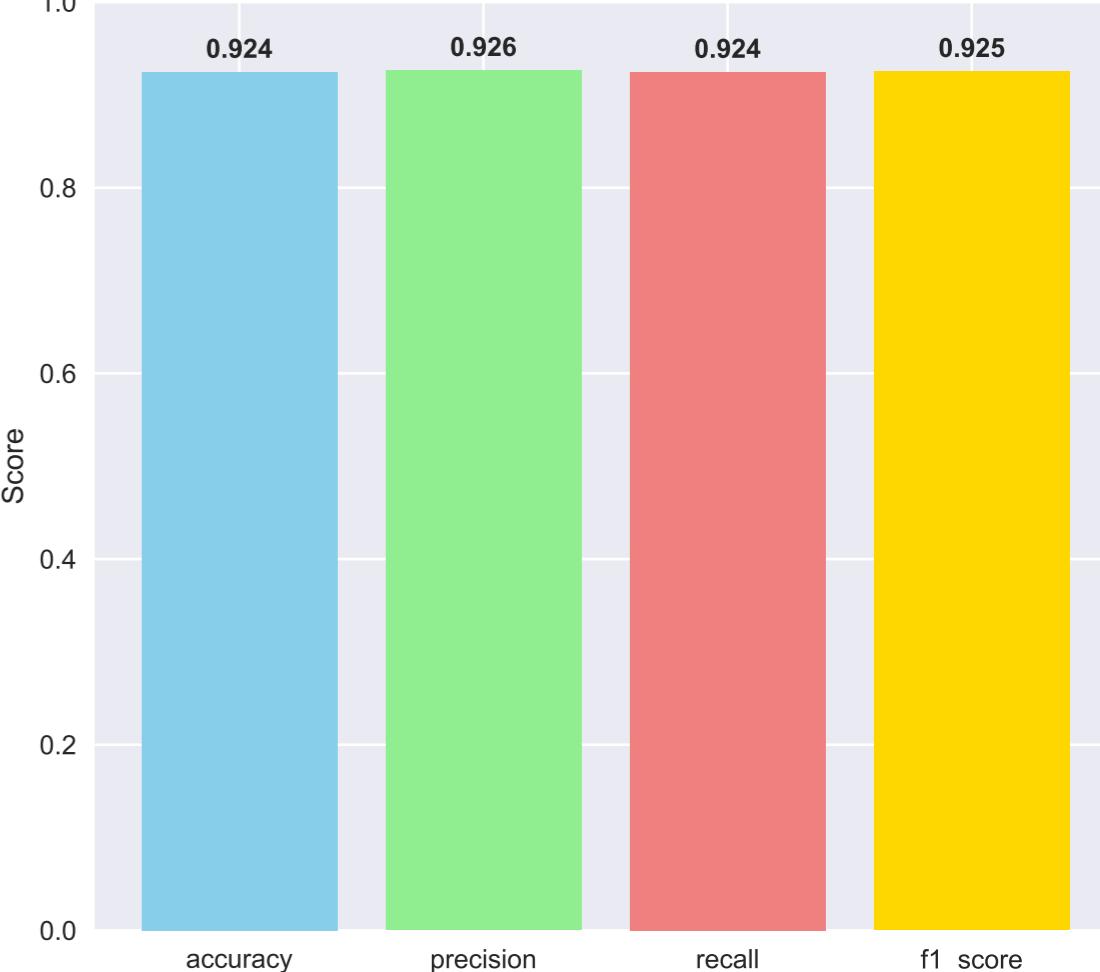
**Logistic Regression
Performance Metrics**



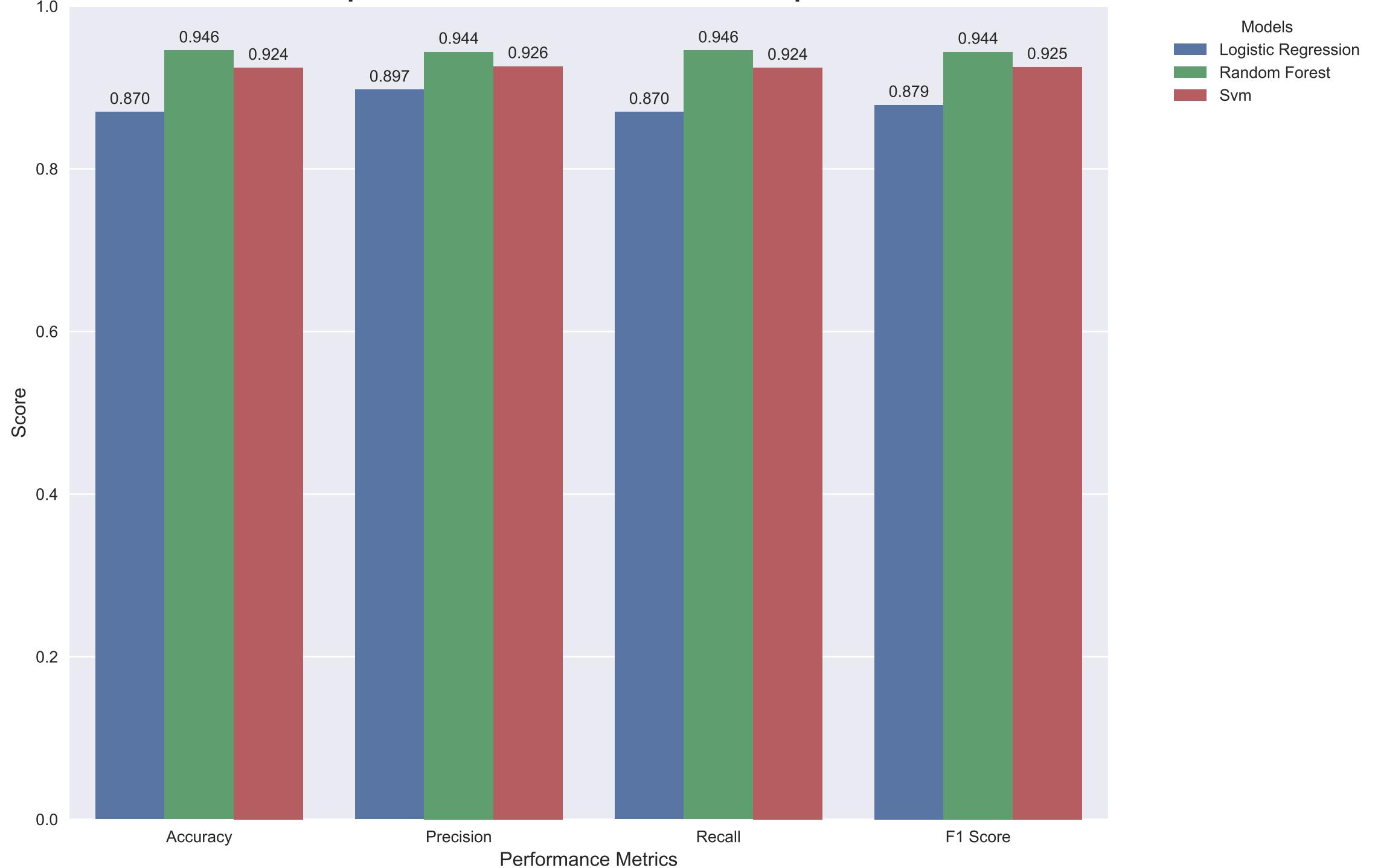
**Random Forest
Performance Metrics**



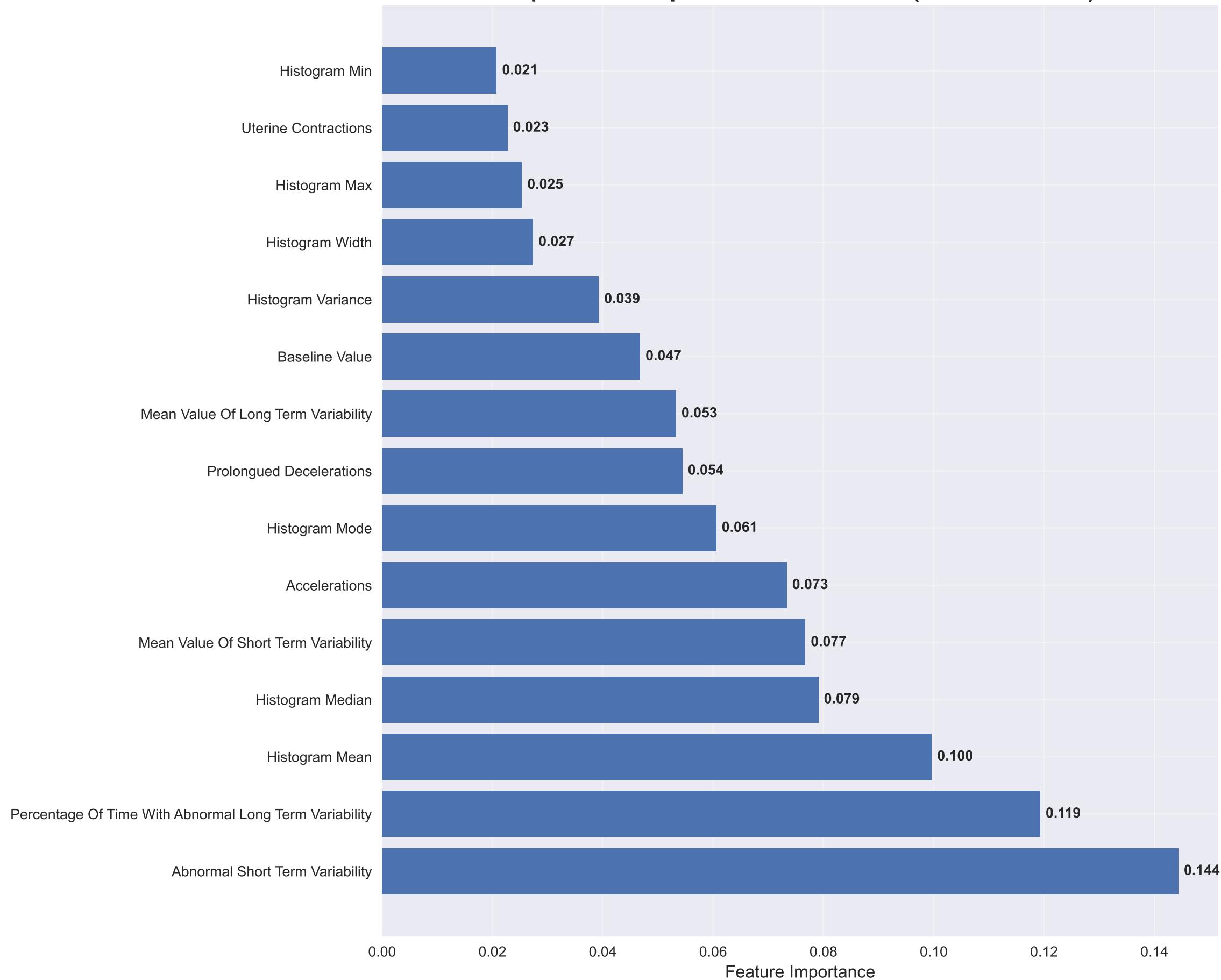
**Svm
Performance Metrics**



Comprehensive Model Performance Comparison



Top 15 Most Important CTG Features (Random Forest)



FETAL HEALTH CLASSIFICATION - COMPREHENSIVE ANALYSIS SUMMARY

DATASET OVERVIEW:

- Total samples: 2113
- Number of features: 21
- Missing values: 0

CLASS DISTRIBUTION:

- Normal: 1646 samples (77.9%)
- Suspect: 292 samples (13.8%)
- Pathological: 175 samples (8.3%)

MODEL PERFORMANCE SUMMARY:

- Logistic Regression:
 - Accuracy: 0.8700
 - Precision: 0.8974
 - Recall: 0.8700
 - F1-Score: 0.8786
- Random Forest:
 - Accuracy: 0.9456
 - Precision: 0.9440
 - Recall: 0.9456
 - F1-Score: 0.9439
- Svm:
 - Accuracy: 0.9243
 - Precision: 0.9263
 - Recall: 0.9243
 - F1-Score: 0.9252

BEST PERFORMING MODEL:

- Random Forest
- F1-Score: 0.9439

KEY INSIGHTS:

- CTG features show significant correlation with fetal health status
- Baseline heart rate, accelerations, and variability are key indicators
- SMOTE technique effectively addresses class imbalance
- Machine learning models achieve high accuracy for fetal health classification
- Random Forest typically provides the best balance of performance metrics