All the features extracted. Used features are highlighted in bold

Eda Features

Statistical Features:

eda\_mean: Mean of EDA signal.

eda\_std: Standard deviation of EDA signal, indicating variability.

eda\_max: Maximum value of EDA signal.

eda\_min: Minimum value of EDA signal.

eda\_range: Range of EDA signal (max - min).

eda\_kurtosis: Kurtosis of EDA signal, indicating the "tailedness" of the distribution.

eda\_skew: Skewness of EDA signal, indicating the asymmetry of the distribution.

eda\_momentum: Overall momentum of the EDA signal.

Frequency-Domain Features:

eda\_f1sc, eda\_f2sc, eda\_f3sc: Frequency-specific components of the EDA signal.

eda\_Energy: Total energy of the EDA signal.

eda\_Entropy: Entropy of EDA signal, indicating the randomness or unpredictability.

eda\_max\_freq: Maximum frequency in the EDA signal.

Skin Conductance Response (SCR) Features:

scr\_mean: Mean of SCR signal.

scr\_std: Standard deviation of SCR signal.

scr\_max, scr\_min, scr\_range, scr\_kurtosis, scr\_skew, scr\_momentum, scr\_activity, scr\_complexity, scr\_mobility, scr\_rms, scr\_acr\_length, scr\_integral, scr\_average\_power: Various statistical measures of SCR.

scr\_f1sc, scr\_f2sc, scr\_f3sc: Frequency-specific components of SCR.

scr\_Energy: Total energy of SCR signal.

scr\_Entropy: Entropy of SCR signal.

scr\_max\_freq: Maximum frequency in the SCR signal.

Skin Conductance Level (SCL) Features:

scl\_mean, scl\_std, scl\_max, scl\_min, scl\_range, scl\_kurtosis, scl\_skew, scl\_momentum: Statistical measures of SCL.

PPG-HRV Features

The HRV parameters which can be calculated

<b>Time-domain HRV parameters</b>:

- mean\_nni: mean of peak to peak intervals

- sdnn: standard deviation of peak to peak intervals

- rmssd: root mean square of successive differences between peak to peak intervals

- sdsd: standard deviation of successive differences between peak to peak intervals

- nni\_50: number of pairs of successive intervals that differ by more than 50 ms

- pnni\_50: ratio of nni\_50 to total number of intervals

- nni\_20: number of pairs of successive intervals that differ by more than 20 ms

- pnni\_20: ratio of nni\_20 to total number of intervals

- cvnni: ratio of sdnn to mean\_nni

- cvsd: ratio of rmssd to mean\_nni

- median\_nni: median of absolute values of successive differences between peak to peak intervals

- range\_nni: range of peak to peak intervals

- mean\_hr: mean heart rate

- min\_hr: minimum heart rate

- max\_hr: maximum heart rate

- std\_hr: standard deviation of heart rate

- mad\_nni: mean absolute deviation of peak to peak intervals

- mcv\_nni: ratio of mead\_nni to median\_nni

- iqr\_nni: interquartile range of peak to peak intervals

<b>Frequency-domain HRV parameters</b>:

- vlf: spectral power pertaining to very low frequency band (0.0033 to 0.04 Hz by default.)

- lf: spectral power pertaining to low frequency band (0.04 to 0.15 Hz by default.)

- hf: spectral power pertaining to high frequency band (0.15 to 0.4 Hz by default.)

- lf\_hf\_ratio: ratio of lf to hf

- total\_power: sum of vlf, lf and hf

- lfnu: normalized spectral power pertaining to low frequency band (ratio of lf to total\_power)

- hfnu: normalized spectral power pertaining to high frequency band (ratio of hf to total\_power)

- lnLF: log transformed low-frequency power

- lnHF: log transformed high-frequency power

- vlf\_peak: max peak of power spectral density in very low frequency band

- lf\_peak: max peak of power spectral density in low frequency band

- hf\_peak: max peak of power spectral density in high frequency band

<b>Nonlinear HRV parameters</b>:

- SD1: standard deviation of Poincare plot perpendicular to the line of identity

- SD2: standard deviation of Poincare plot along the line of identity

- SD2\_SD1: ratio of SD2 to SD1

- CSI: cardiac stress index

- CVI: cardiac vagal index

- CSI\_mofidied: modified cardiac stress index

- ApEn: approximate entropy of peak to peak intervals

**- SampEn: sample entropy of peak to peak intervals  
  
PPG Features**

<b>Time domain / morphological features</b>:

<u>Cycle-based features</u>:

- a\_S: Mean amplitude of the systolic peaks

- t\_S: Mean systolic peak duration

- t\_C: Mean cycle duration

- DW: Mean diastolic peak duration

- SW\_10: The systolic peak duration at 10% amplitude of systolic amplitude

- SW\_25: The systolic peak duration at 25% amplitude of systolic amplitude

- SW\_33: The systolic peak duration at 33% amplitude of systolic amplitude

- SW\_50: The systolic peak duration at 50% amplitude of systolic amplitude

- SW\_66: The systolic peak duration at 66% amplitude of systolic amplitude

- SW\_75: The systolic peak duration at 75% amplitude of systolic amplitude

- DW\_10: The diastolic peak duration at 10% amplitude of systolic amplitude

- DW\_25: The diastolic peak duration at 25% amplitude of systolic amplitude

- DW\_33: The diastolic peak duration at 33% amplitude of systolic amplitude

- DW\_50: The diastolic peak duration at 50% amplitude of systolic amplitude

- DW\_66: The diastolic peak duration at 66% amplitude of systolic amplitude

- DW\_75: The diastolic peak duration at 75% amplitude of systolic amplitude

- DW\_SW\_10: The ratio of diastolic peak duration to systolic peak duration at 10% amplitude of systolic amplitude

- DW\_SW\_25: The ratio of diastolic peak duration to systolic peak duration at 25% amplitude of systolic amplitude

- DW\_SW\_33: The ratio of diastolic peak duration to systolic peak duration at 33% amplitude of systolic amplitude

- DW\_SW\_50: The ratio of diastolic peak duration to systolic peak duration at 50% amplitude of systolic amplitude

- DW\_SW\_66: The ratio of diastolic peak duration to systolic peak duration at 66% amplitude of systolic amplitude

- DW\_SW\_75: The ratio of diastolic peak duration to systolic peak duration at 75% amplitude of systolic amplitude

- PR\_mean: Mean pulse rate

- a\_D: Mean amplitude of the diastolic peaks

- t\_D: Mean difference between diastolic peak and onset

- r\_D: Mean ratio of the diastolic peak amplitude to diastolic peak duration

- a\_N: Mean amplitude of the dicrotic notchs

- t\_N: Mean dicrotic notch duration

- r\_N: Mean ratio of the dicrotic notch amplitude to dicrotic notch duration

- dT: Mean duration from systolic to diastolic peaks

- r\_D\_NC: Mean ratio of diastolic peak amplitudes to difference between ppg wave duration and dictoric notch duration

- r\_N\_NC: Mean ratio of dicrotic notch amplitudes to difference between ppg wave duration and dictoric notch duration

- a\_N\_S: Mean ratio of dicrotic notch amplitudes to systolic peak amplitudes

- AI: Mean ratio of diastolic peak amplitudes to systolic peak amplitudes

- AI\_2: Mean ratio of difference between systolic and diastolic peak amplitudes to systolic peak amplitudes

<u>Segment-based features</u>:

- zcr: Zero crossing rate

- snr: Signal to noise ratio

<b>Frequency domain features</b>:

<u>Segment-based features</u>:

- p\_1: The amplitude of the first peak from the fft of the signal

- f\_1: The frequency at which the first peak from the fft of the signal occurred

- p\_2: The amplitude of the second peak from the fft of the signal

- f\_2: The frequency at which the second peak from the fft of the signal occurred

- p\_3: The amplitude of the third peak from the fft of the signal

- f\_3: The frequency at which the third peak from the fft of the signal occurred

- pow: Power of the signal at a given range of frequencies

- rpow: Ratio of the powers of the signal at given ranges of frequencies

<b>Statistical features</b>:

<u>Cycle-based features</u>:

- mean\_peaks: Mean of the peak amplitudes

- std\_peaks: Standard deviation of the peak amplitudes

<u>Segment-based features</u>:

- mean: Mean value of the signal

- median: Median value of the signal

- std: Standard deviation of the signal

- pct\_25: 25th percentile of the signal

- pct\_75 75th percentile of the signal

- mad: Mean absolute deviation of the signal

- skewness: Skewness of the signal

- kurtosis: Kurtosis of the signal

- entropy: Entropy of the signal

<b>Time domain / morphological features</b>:

PPG signal waveform includes two peaks which are systolic and diastolic peaks however the diastolic peak may not be observable in some conditions. From the diastolic peak locations, some extra features may be calculated.

#In order to detect the location of diastolic peak, generally the first and second derivatives of PPG signal are needed. First, fiducial points on the first derivative (Velocity Plethysmogram, VPG) and the second derivative (Acceleration Plethysmogram, APG) should be detected. Fiducials can also be used to calculate VPG and APG features which may be helpful in some analysis, e.g. blood pressure estimation from PPG signal.

<u>Cycle-based features</u>:

- a\_S: Mean amplitude of the systolic peaks

- t\_S: Mean systolic peak duration

- t\_C: Mean cycle duration

- DW: Mean diastolic peak duration

- SW\_10: The systolic peak duration at 10% amplitude of systolic amplitude

- SW\_25: The systolic peak duration at 25% amplitude of systolic amplitude

- SW\_33: The systolic peak duration at 33% amplitude of systolic amplitude

- SW\_50: The systolic peak duration at 50% amplitude of systolic amplitude

- SW\_66: The systolic peak duration at 66% amplitude of systolic amplitude

- SW\_75: The systolic peak duration at 75% amplitude of systolic amplitude

- DW\_10: The diastolic peak duration at 10% amplitude of systolic amplitude

- DW\_25: The diastolic peak duration at 25% amplitude of systolic amplitude

- DW\_33: The diastolic peak duration at 33% amplitude of systolic amplitude

- DW\_50: The diastolic peak duration at 50% amplitude of systolic amplitude

- DW\_66: The diastolic peak duration at 66% amplitude of systolic amplitude

- DW\_75: The diastolic peak duration at 75% amplitude of systolic amplitude

- DW\_SW\_10: The ratio of diastolic peak duration to systolic peak duration at 10% amplitude of systolic amplitude

- DW\_SW\_25: The ratio of diastolic peak duration to systolic peak duration at 25% amplitude of systolic amplitude

- DW\_SW\_33: The ratio of diastolic peak duration to systolic peak duration at 33% amplitude of systolic amplitude

- DW\_SW\_50: The ratio of diastolic peak duration to systolic peak duration at 50% amplitude of systolic amplitude

- DW\_SW\_66: The ratio of diastolic peak duration to systolic peak duration at 66% amplitude of systolic amplitude

- DW\_SW\_75: The ratio of diastolic peak duration to systolic peak duration at 75% amplitude of systolic amplitude

- PR\_mean: Mean pulse rate

- a\_D: Mean amplitude of the diastolic peaks

- t\_D: Mean difference between diastolic peak and onset

- r\_D: Mean ratio of the diastolic peak amplitude to diastolic peak duration

- a\_N: Mean amplitude of the dicrotic notchs

- t\_N: Mean dicrotic notch duration

- r\_N: Mean ratio of the dicrotic notch amplitude to dicrotic notch duration

- dT: Mean duration from systolic to diastolic peaks

- r\_D\_NC: Mean ratio of diastolic peak amplitudes to difference between ppg wave duration and dictoric notch duration

- r\_N\_NC: Mean ratio of dicrotic notch amplitudes to difference between ppg wave duration and dictoric notch duration

- a\_N\_S: Mean ratio of dicrotic notch amplitudes to systolic peak amplitudes

- AI: Mean ratio of diastolic peak amplitudes to systolic peak amplitudes

- AI\_2: Mean ratio of difference between systolic and diastolic peak amplitudes to systolic peak amplitudes

<u>Segment-based features</u>:

- zcr: Zero crossing rate

- snr: Signal to noise ratio

<b>Frequency domain features</b>:

<u>Segment-based features</u>:

- p\_1: The amplitude of the first peak from the fft of the signal

- f\_1: The frequency at which the first peak from the fft of the signal occurred

- p\_2: The amplitude of the second peak from the fft of the signal

- f\_2: The frequency at which the second peak from the fft of the signal occurred

- p\_3: The amplitude of the third peak from the fft of the signal

- f\_3: The frequency at which the third peak from the fft of the signal occurred

- pow: Power of the signal at a given range of frequencies

- rpow: Ratio of the powers of the signal at given ranges of frequencies

<b>Statistical features</b>:

<u>Cycle-based features</u>:

- mean\_peaks: Mean of the peak amplitudes

- std\_peaks: Standard deviation of the peak amplitudes

<u>Segment-based features</u>:

- mean: Mean value of the signal

- median: Median value of the signal

- std: Standard deviation of the signal

- pct\_25: 25th percentile of the signal

- pct\_75 75th percentile of the signal

- mad: Mean absolute deviation of the signal

- skewness: Skewness of the signal

- kurtosis: Kurtosis of the signal

- entropy: Entropy of the signal