Time Series

df ['datetime'] = pd.to\_datetime(df['Date'])

SDNN (ms)

50 -mean

(16)- standard devaition

32–93 range

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# Heart Rate Variability Distribution

Heart rate variability (HRV) represents one of the most promising markers to determine impact of various lifestyle factors, biological factors, and fitness factors on our physical health. Many commercial devices e.g fitness watches, mobile phone apps now provide automated measurement of HRV, providing various disciplines with a seemingly simple tool for both research and clinical studies.

Variations in heart rate may be evaluated by a number of methods. Perhaps the simplest to perform are the time

domain measures. With these methods either the heart rate at any point in time or the intervals between

successive normal complexes are determined. In a continuous electrocardiographic (ECG) record, each QRS

complex is detected, and the so-called normal-to-normal (NN) intervals (that is all intervals between adjacent

QRS complexes resulting from sinus node depolarizations), or the instantaneous heart rate is determined.

Simple time–domain variables that can be calculated include the mean NN interval, the mean heart rate, the difference between the longest and shortest NN interval, the difference between night and day heart rate, etc.

import random

#import libraries

import numpy as np

import random

import pandas as pd

import neurokit2 as nk # provides data on NN interval distributions

import matplotlib.pyplot as plt # used to create distribution plots

import seaborn as sns # used to visualize random distributions

#using nuerokit2 example of plot distribution

hrv\_time = nk.hrv\_time(peaks, sampling\_rate=100, show=True)

hrv\_time

#Distribution of HRV\_NN using np.random

#seed with the mean 1060.020964

#standard deviation 83.466138

mu, sigma = 1060.020964, 83.466138 # mean and standard deviation

s = np.random.default\_rng().normal(mu, sigma, 1000) #1000 sample

sns.displot (s, kde=True)

plt.ylabel('Sample number')

plt.xlabel('HRV\_NN Score')

plt.title ("Histogram data of HRV\_NN scores.")

plt.show()

#Nuerokit2 example

# Download data

data = nk.data("bio\_resting\_8min\_100hz")

# Find peaks

peaks, info = nk.ecg\_peaks(data["ECG"], sampling\_rate=100)

# Compute HRV indices

nk.hrv(peaks, sampling\_rate=100, show=True)

### References

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