Abstract

The principle difficulty with the analysis of the heart rate variability (HRV) is that heart rate dynamics are non-linear and non-stationary. Detrended fluctuation analysis (DFA) and correlation dimension (CD) are non-linear HRV measures to quantify fractal-like autocorrelation properties and to characterize the complex behaviour of nonlinear time series. Optimal ECG sampling rate is an important issue for accurate quantification of HRV. High ECG sampling rate
results in very high processing time and low sampling rate produces signal quality degradation
results in clinically misinterpreted HRV. In this work the impact of ECG sampling frequency on
non-linear HRV have been quantified in terms of short-range & long-range DFA and CD on
short-term (N=200), medium-term (N=500) and long-term (N=1000) data. Non-linear HRV
parameters are found to be sensitive to ECG sampling frequency and effect of sampling
frequency will be a function of data length.

References

  Combinations of Heart Rate Variability Measures for Cardiac Rhythm Classification. Biomedical
  34, no. 6, 623-648.
- Task Force of European society of Cardiology and the North American Society of Pacing
  and Electrophysiology. 1996. Heart rate variability, standard of measurement, physiological
  Proceedings, vol. 69, 1380-1419.
  algorithm for spectral analysis of heart rate variability. IEEE Transactions on Biomedical
  Engineering, vol. BME-33, 900-904.
  aging effects on blood pressure and heart rate variations in healthy subjects. Journal of Medical
- Hoyer, D. , Schmidt, K. , Bauer, R. , Zwiener, U. , Kohler, M. , Luthke, B. and Eiselt, M.
  and Biology, vol. 16, no. 1. 31-39.
- Kanters, J. K. , Hojgaard, M. V. , Agncr, E. and Holstein-Rathlou, N-H. 1996. Short-
  and long-term variations in non-linear dynamics of heart rate variability. Cardiovascular
  subjects: Contribution of different complexity based estimators. IEEE Transactions on
  Biomedical Engineering, vol. 53, no. 1, 43-52.
- Goldberger, A. L. 1991. Is normal heartbeat chaotic or homoststic?. News
  Physiological Science, vol. 6, 87-91.


Index Terms

Computer Science
Information Sciences

Keywords