Heart rate variability (HRV), is defined as the variations in heart rate about its mean value. The human heart is a non linear system as the heart rhythm is modulated by the Autonomic nervous system (ANS). The extracted and analyzed HRV signal parameters are highly useful in diagnosis. Entropy based methods, present a good performance as irregularity measures as well as properties that make them suitable for physiological data analysis. The objective of this work is to develop and implement an algorithm for symbolic entropy and further compare it with Approximate Entropy (ApEn), and Correlation Dimension by analyzing three sets of subjects. Three cases that are taken for the analysis are the first case is with healthy subjects, second case is subjects with some cardiac related problems and third case is with thyroid affected and depressed affected subjects. It may be concluded that Symbolic Entropy is best suited for small datasets and clearly demarks the healthy and disease subjects such as Atrial
Fibrillations (AF), Congestive heart failure (CHF) and Premature ventricular Complex (PVC) subjects and also for subjects having seizures as compared to ApEn For case of thyroid the values are same as ApEn For Asthma subjects the Symbolic entropy is not suitable to demark.

Reference

- Chengyu Liu, Changchun Liu and Liping Li “Systolic and Diastolic Time interval Variability Analysis and Their relations with Hear rate variability” 3rd International Conference on Bioinformatics and Biomedical Engineering, ICBBE 2009, pp 1-4 [IEEE Explorer]
- G. Krstacic et. al, "Non linear Analysis of Hear Rate Variability in Patients with Coronary Heart Disease" Computers in Cardiology 2002,29:673-675
- Joan E. Deffeyes, Regina T. Harbourne Stacey L. Dejong, Anastasia Kyvelidou, Wayne A Stuberg and Nicholas Stergiou "Use of information entropy measure of sitting posture always to quantify developmental delay in infants" Journal of Neuro Engineering and Rehabilitation 2009, 6:34
- Li Helong, Yang Lihua and Huang Daren " Application of Hilbert Huang Transform to heart rate variability Analysis" 2nd International Conference on Bioinformatics and Biomedical Engineering, ICBBE 2008, pp 648-651 [IEEE Explorer]
- M.G. Signorini, M. Ferrario, M. Marchetti, and A. Marseglia “Nonlinear analysis of Heart Rate Variability Signal for the characterization of Cardiac Heart Failure Patients “In the Proceedings of 28th IEEE embs Annual International Conference, New York, USA, 2006, pp 3431-3434
- Ch. Renu Madhavi and A. G. Ananth “Effect of Psychological Disorder on Heart Dynamics from Correlation Dimension and Approximate Entropy Computations of Heart Rate Variability “In the Proceedings of International Conference on Informatics, Cybernetics, and Computer
Quantification of Heart Rate Variability (HRV) Data using Symbolic Entropy to Distinguish between Healthy and Disease Subjects

Applications (ICICCA2010), Held at Gopalan College Of Engineering and Management, Bangalore, India, July 2010

- CH. Renumadhavi and A.G. Ananth "Quantification of Heart Rate Variability of Normal and Thyroid Subjects with Computerized Non linear Techniques" in the proceedings of International Conference on Aerospace Electronics, Communications and Instrumentation ASECII2010, held at Vijayawada, India
- http://www.physionet.org/physiobank/database/#rr

Index Terms

- Computer Science
- Bioinformatics

Key words

- HRV
- Symbolic Entropy
- Approximate Entropy
- ANS
- Thyroid