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Early detection of cardiac disorder using artificial intelligence

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In the modern industrialized countries every year millions of people die due to cardiac disorders. India has highest incidence of heart related diseases in the world. The WHO's world statistics report 2016 shows that the life expectancy in India was 68.3 years. If no initiative is taken to check this most predictable and preventable among all chronic diseases, life expectancy may further decrease. The main aim of this work is to enable the clinical doctors to diagnose cardiac disorders using computer based analysis as the manual analysis is tedious and time consuming task. Early detection of cardiac disease is of paramount importance for saving the life of patients. Electrocardiogram (ECG) is an important bio-medical signal representing the electrical activity of the heart. A significant amount of work has been done in the past to identify cardiac disorders. All the developed linear algorithms considered that the ECG signal as stationery. But on observing the fact that ECG is non-stationery. It has been duly noted from Maedeh Kiani Sarkaleh (2012) paper in which the author has successfully classified 10 files, which include both normal and two types of cardiac disorders and produced results with an accuracy of 96.5%. However, this paper concentrates on developing novel feature extraction scheme using nonlinear signal processing technique and supervised learning technique to improve classification accuracy of cardiac arrhythmias. The proposed system aims at classifying Normal Sinus Rhythm (NSR) and 4 types of Cardiac arrhythmias-Sudden Cardiac Arrest (SCA), Ventricular Tachycardia(VT), Ventricular Fibrillation(VF) and Cardiac Ischemia(CI). Daubechies wavelet transform (db4) 6-level decomposition technique is used for extraction of ECG features. Finally these features are fed to Multi-Layer Perceptron Neural Network classifier. The classification accuracy obtained is 100% and its computation time is only 0.28 seconds. Selection of optimum number of features is essential to improve classification accuracy. The feasibility of all the above proposed method has been tested using benchmarked MIT-BIH database and the performance of MLP classifier has been evaluated in Waikato Environment for Knowledge Analysis.

Biography

Mrs. V. Rama obtained her B.Tech in Electronics and Communication Engineering from JNTU, Kakinada and M. Tech. (E&I) from NIT, Warangal. Pursuing Ph D from NIT, Warangal under the guidance of Dr.C.B.Rama Rao. She has been working as Asst Professor in the ECE Dept., NIT, Warangal for 18 years. Her area of research is Bio Medical Signal Processing. She has published no. of papers in national and international conferences and Journals.

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