ABSTRACT

Cardiac diseases are the major causes of death and physical disorder throughout the world among human population. Among cardiac patients, over 40 percent of them are neither properly diagnosed nor have they been identified of a specific cardiac problem. Thus, the relevance of newer, more effective, less time-consuming cost effective and non-invasive methods of prognostication, like effective software systems are really the need of the hour in this area. To achieve this, we take cardiac sound signals and analyze the normality and abnormality of the human heart functions. In this research, a perfect experimental laboratory setup is developed to assess the cardiac sound signals, apart from a thorough study of polygraph amplifier and TMS 320C30 processor. An effective software system is developed in C to acquire and digitize the cardiac sound signal. For this, a software is developed to do the spectral characteristic study of the Apex Cardiogram signal, by using FFT and spectral averaging methods. Accurate graphical representations are obtained and these representations help doctors and other related people to find out more information about the normal and abnormal conditions of the heart. They also aid them as a diagnostic tool to conclude about the valve diseases and coronary arterial diseases. An user-friendly software package using MATLAB under windows environment is developed for AR Modeling study of cardiac sound signal by using Yule-Walker method. Levinson-Durbin algorithm is used to develop this software. Maximum entropy method (MEM) is also used to find out the power spectral density of the cardiac sound signal, which uses Burg algorithm and is implemented in C++. Sixteen different cardiac sound signals belonging to both sexes of the human population are taken and analyzed. Applying data specimens to this system more accurate information about the functioning of the human heart is obtained, the results thus obtained and the results obtained from earlier research works have been compared. More accurate predictions are made using the newly developed software. Finally, an effective system design was prepared for modern hospital management. The main feature of the above hospital management system is information storage and retrieval of the medical signal and image data.