

Automatic heart diseases detection techniques using musical approaches

ABSTRACT

In this study, a musical approach to provide an automatic heart disease detection system is proposed. Heart sounds are recorded with audio format. Audio files are converted to semi-structured music files that can be represented textually. Samples were captured from different heart diseases and were stored in a database. Two different approaches which are information retrieval based on n-gram and longest common subsequence are used to retrieve the similarity of a given sample with existing heart diseases in the database. Since the frequency of heart sound is relative to age and physical characteristics of a patient, an important feature of using n-gram in this study is to retrieve diseases without respect to the different heart sounds frequencies. The effects of window sizes for n-gram approach on the accuracy of the information retrieval were tested and a proper window size was extracted. The results of the performed experiments showed that window size of 5 notes revealed a high performance in comparison with other window sizes. Hence, the proposed technique can detect and recognize a heart disease with a reliable accuracy. Average of precision values for around 85% in information retrieval and 55% in longest common subsequence technique were obtained for the retrieval of heart sound categories. Moreover, the results of string matching technique demonstrated that threshold level of 65% could appropriately detect heart disease.

Keyword: Heart disease; Heart sound; Multimedia; Music information retrieval; Signal preprocessing