

Heart Murmur Diagnostic System (HMDS)

Abstract

Many heart diseases cause changes in heart sounds and additional murmurs before other signs and symptoms appear. Heart sound auscultation is the primary test conducted by general practitioner (GP). A heart murmur is an abnormal, extra sound during the heartbeat cycle made by blood flowing through the heart and its valves. Murmurs are characterized by their timing, intensity, pitch, shape and location. Timing refers to whether the murmur occurs during systole, diastole or is continuous throughout the cardiac cycle. This paper describes the diagnosis of heart sounds and heart murmurs using stethoscope based on MFCC-HMM. Diagnosing heart sounds depends on the experience and training of the General Practitioner. Echocardiography is the gold standard alternative for diagnosing heart diseases. Even though it provides a more definitive diagnosis in this respect, it is expensive and not widely available throughout Malaysia especially in local hospitals. For the classification based on the HMM, the continuous cyclic heart sound signal needs to be automatically segmented to obtain isolated cycles of the signal. The ECG signal characteristic of the R to R point is used to determine every one minute cycles of both ECG and heart sound data. The experiment includes varying the number of states and a number of mixtures. In the classification experiments, the proposed method performed successfully with an accuracy of about 98.9% with 5 states, 16 gaussian model.