

## Multi-level basis selection of wavelet packet decomposition tree for heart sound classification.

### Abstract

Wavelet packet transform decomposes a signal into a set of orthonormal bases (nodes) and provides opportunities to select an appropriate set of these bases for feature extraction. In this paper, multi-level basis selection (MLBS) is proposed to preserve the most informative bases of a wavelet packet decomposition tree through removing less informative bases by applying three exclusion criteria: frequency range, noise frequency, and energy threshold. MLBS achieved an accuracy of 97.56% for classifying normal heart sound, aortic stenosis, mitral regurgitation, and aortic regurgitation. MLBS is a promising basis selection to be suggested for signals with a small range of frequencies.

**Keyword:** Phonocardiographic signal (PCG); Heart murmur; Wavelet packet transform; Multi-level basis selection; Feature extraction; Relative energy; Support vector machine.