

## **Diagnosis of heart valve disorders through trapezoidal features and hybrid classifier.**

### **Abstract**

Numerous studies are being conducted in recent years focusing on phonocardiographic (PCG) signals due to their capability to characterize heart sounds. These characteristics can be exploited in developing computer-aided auscultation system as a complementary tool for clinicians in diagnosis of cardiovascular disorders. This study proposes a new type of features to distinguish five categories of heart sounds, including normal, mitral stenosis, mitral regurgitation, aortic stenosis, and aortic regurgitation. PCG signals were collected from online resources and training CDs. Wavelet packet transform was utilized for heart sound analysis as opposed to discrete wavelet transform that has been extensively used in the previous studies. Then, trapezoidal function was calculated for deriving feature vectors. A hybrid classifier was designed composing of three types of classifiers, multilayer perceptron (MLP) artificial neural network, k-nearest neighbor (KNN), and support vector machine (SVM), to classify feature vectors. The promising results demonstrate the effectiveness of the proposed trapezoidal features and hybrid classifier for heart sound classification.

**Keyword:** Feature extraction; Heart murmur; Hybrid classification; Trapezoidal function; Wavelet packet transform.