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Automated Heart Sound Classification from Unsegmented Phonocardiogram Signals Using Time Frequency Features

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Abstract : Cardiologists perform cardiac auscultation to detect abnormalities in heart sounds. Since accurate auscultation is a crucial first step in screening patients with heart diseases, there is a need to develop computer-aided detection/diagnosis (CAD) systems to assist cardiologists in interpreting heart sounds and provide second opinions. In this paper different algorithms are implemented for automated heart sound classification using unsegmented phonocardiogram (PCG) signals. Support vector machine (SVM), artificial neural network (ANN) and cartesian genetic programming evolved artificial neural network (CGPANN) without the application of any segmentation algorithm has been explored in this study. The signals are first pre-processed to remove any unwanted frequencies. Both time and frequency domain features are then extracted for training the different models. The different algorithms are tested in multiple scenarios and their strengths and weaknesses are discussed. Results indicate that SVM outperforms the rest with an accuracy of 73.64%.

Keywords : pattern recognition, machine learning,computer aided diagnosis, heart sound classification, and feature extraction
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