Normal and hypoacoustic infant cry signal classification using time-frequency analysis and general regression neural network

Abstract

Crying is the most noticeable behavior of infancy. Infant cry signals can be used to identify physical or psychological status of an infant. Recently, acoustic analysis of infant cry signal has shown promising results and it has been proven to be an excellent tool to investigate the pathological status of an infant. This paper proposes short-time Fourier transform (STFT) based time-frequency analysis of infant cry signals. Few statistical features are derived from the time-frequency plot of infant cry signals and used as features to quantify infant cry signals. General Regression Neural Network (GRNN) is employed as a classifier for discriminating infant cry signals. Two classes of infant cry signals are considered such as normal cry signals and pathological cry signals from deaf infants. To prove the reliability of the proposed features, two neural network models such as Multilayer Perceptron (MLP) and Time-Delay Neural Network (TDNN) trained by scaled conjugate gradient algorithm are also used as classifiers. The experimental results show that the GRNN classifier gives very promising classification accuracy compared to MLP and TDNN and the proposed method can effectively classify normal and pathological infant cries.