

论文与技术报告

喘鸣音的时频谱图特征提取与信号检测

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摘要:

文中提出了一种基于S变换时频谱图的喘鸣音信号检测算法。喘鸣音在时域中具有类似正弦波的形态,但难以直接提取特征。S变换在高频处具有较高的时间分辨率,在低频处具有较高的频率分辨率,可精细化分析喘鸣音信号时频特征。文中通过对呼吸音信号做S变换生成对应的时频谱图,提取与喘鸣音对应的二维谱图像特征,实现了喘鸣音信号检测。实验表明该算法对单个体自身训练的情形检测效果理想,检测敏感性指标可达100%,阳性预测值可达98%以上。但对于喘鸣音共性特征提取欠缺,有待进一步探索。

关键词: 喘鸣音信号检测; 呼吸音信号检测; S变换; 时频分析

Spectrum Feature Extraction and Signal Detection of Wheeze in Time-frequency domain

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Abstract:

We propose a new algorithm to detect wheeze signals in respiratory sounds based on S transform time-frequency spectrum analysis. Wheezes are of sinusoidal morphological characteristics in the time domain, and its features are difficult to extract directly. This paper introduces S transform, which shows high time analysis resolution in high frequency field and high frequency analysis resolution in low frequency field, to extract features of wheezes in the time-frequency domain. Respiratory sounds were transformed to time-frequency domain by S transform, and then, two-dimension spectrum image features, which are corresponding to wheeze signals, were extracted. Thus, wheeze signal detection has been realized. Experiments show that the algorithm do well in the case of training and detection for each subject, with a sensitivity value as high as 100% for detection and position prediction value higher than 98%. However, the method failed to extract global features of wheeze from different subjects, which requires future exploratory research.

Keywords: wheeze signal detection respiratory signal detection S transform time-frequency analysis

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