算法研究

适应噪声强度突变的噪声估计加速方法

夏丙寅,鲍长春

北京工业大学 电子信息与控制工程学院 语音与音频信号处理研究室

摘要：

为提高传统噪声估计方法对噪声强度突变的跟踪能力，本文在最小值控制递归平均 (MCRA) 方法基础上提出了噪声估计加速方法。该方法首先检测功率谱的突变，在检测到突变后设定具有自适应长度的拖尾段，并在拖尾段中利用对数似然比、谱熵和平均幅度差函数进行话音活动性检测（VAD），而后结合噪声估计与功率谱最小值比例等辅助参数判定是否对噪声估计进行强制更新。ITU-T G.160测试结果表明，噪声估计加速算法的引入未对噪声强度平稳情况下的语音增强算法性能产生影响，但显著降低了噪声强度突变时的收敛时间，并在很大程度上抑制了噪声估计收敛段中的音乐噪声。

关键词： 语音增强；噪声估计；话音活动性检测；谱熵；对数似然比；平均幅度差函数

An Acceleration Method of Noise Estimation for the Abrupt Change of Noise Level

XIA Bing-yin,BAO Chang-chun

Speech and Audio Signal Processing Lab, School of Electronic Information and Control Engineering, Beijing University of Technology

Abstract:

In order to improve the tracking ability of the traditional noise estimation method when noise level changes abruptly, an acceleration method for noise estimation is proposed based on the Minima Controlled Recursive Averaging (MCRA). First, the burst detection of power spectrum is performed. If a sudden change of power spectrum is detected, a hangover period with adaptive length is enabled. Then, in the hangover period, a Voice Activity Detection (VAD) method based on the logarithmic likelihood ratio, spectral entropy and average magnitude difference is employed to detect the presence of speech. Finally, the update decision for noise estimation is made with the assistance of the ratio between noise estimation and power spectrum minimum. The test under ITU-T G.160 shows that, if the noise level is stationary, the acceleration method has no effect on the speech enhancement performance; while the noise level changes abruptly, the convergence time is reduced obviously, and the musical noise in the convergence period is also removed effectively.

Keywords: speech enhancement   noise estimation   voice activity detection   spectral entropy logarithmic likelihood ratio   average magnitude difference function

通讯作者：

作者简介：

作者Email: xby-abc@emails.bjut.edu.cn

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