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基于超高斯激励的噪声顽健语音线性预测分析算法

Noise-robust linear prediction analysis of speechbased on super-Gaussian excitation

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中文摘要：

　　针对传统的语音信号线性预测分析算法在噪声环境下性能恶化的问题，提出了一种新的基于超高斯激励的噪声顽健线性预测算法。该算法采用具有超高斯特性的学生t分布对语音信号线性预测激励建模，并显式地考虑环境噪声的影响，从而构建语音信号线性预测分析的概率图模型。在此基础上，利用变分贝叶斯的方法求解模型参数的近似后验分布，进而实现对带噪语音线性预测系数的最优估计。实验结果表明，该算法能够有效提高噪声环境下语音信号线性预测分析的顽健性。

英文摘要：

　　To overcome the problem that the performance of the traditional linear prediction (LP) analysis of speech deteriorates significantly in the presence of background noise, a novel algorithm for robust LP analysis of speech based on super-Gaussian excitation was proposed. The excitation noise of LP was modeled as a Student-t distribution, which was shown to be super-Gaussian. Then a novel probabilistic graphical model for robust LP analysis of speech was built by incorporating the effect of additive noise explicitly. Furthermore, variational Bayesian inference was adopted to approximate the intractable posterior distributions of the model parameters, based on which the LP coefficients of the noisy speech were estimated iteratively. The experimental results show that the developed algorithm performs well in terms of LP coefficients estimation of speech and is much more robust to ambient noise than several other algorithms.

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