

基于多元Laplace语音模型的语音增强算法

周彬* 邹霞 张雄伟*

解放军理工大学指挥自动化学院 南京 210007

Speech Enhancement with Multivariate Laplace Speech Model

Zhou Bin Zou Xia Zhang Xiong-wei*

Institute of Command Automation, PLA University of Science and Technology, Nanjing 210007, China

摘要

参考文献

相关文章

Download: [\[PDF 341KB\]](#) [HTML 1KB](#) Export: [BibTeX](#) or [EndNote \(RIS\)](#) [Supporting Info](#)

摘要 传统的短时谱估计语音增强算法通常假设语音谱分量相互独立, 没有考虑语音谱分量间的相关性。针对这一问题, 该文提出一种新的基于多元Laplace分布模型的短时谱估计算法。首先, 假设语音的离散余弦变换(DCT)系数服从多元Laplace分布, 以此利用谱分量间的相关性; 在此基础上, 利用多元随机矢量的高斯尺度混合模型表示, 推导得到语音DCT系数矢量的最小均方误差(MMSE)估计的解析表达式; 并进一步推导了基于该分布模型的语音存在概率, 对最小均方误差估计子进行修正。实验结果表明, 该算法在抑制背景噪声和减少语音失真等方面优于传统的语音增强方法。

关键词: 语音增强 最小均方误差 多元Laplace分布模型

Abstract: The spectral components of speech are usually assumed to be independent in traditional short-time spectrum estimation, which is not the case in practice. To solve this problem, a new speech enhancement algorithm with multivariate Laplace speech model is proposed in this paper. Firstly, the speech Discrete Cosine Transform (DCT) coefficients are modeled by a multivariate Laplace distribution, so the correlations between speech spectral components can be exploited. And then a Minimum-Mean-Square-Error (MMSE) estimator based on the proposed model is derived using a Gaussian scale mixture representation of random vectors. Furthermore, the speech presence uncertainty with the new model is derived to modify the MMSE estimator. Experimental results show that the developed method has better noise suppression performance and lower speech distortion compared to the traditional speech enhancement method.

Keywords: Speech enhancement Minimum-Mean-Square-Error (MMSE) Multivariate Laplace distribution model

Received 2011-12-12;

本文基金:

江苏省自然科学基金(BK2009059)和国家博士后科研基金资助课题

通讯作者: 周彬 Email: zhoubin_185@163.com

引用本文:

周彬, 邹霞, 张雄伟. 基于多元Laplace语音模型的语音增强算法[J] 电子与信息学报, 2012, V34(7): 1562-1567

Zhou Bin, Zou Xia, Zhang Xiong-Wei. Speech Enhancement with Multivariate Laplace Speech Model[J], 2012, V34(7): 1562-1567

链接本文:

<http://jeit.ie.ac.cn/CN/10.3724/SP.J.1146.2011.01312> 或 <http://jeit.ie.ac.cn/CN/Y2012/V34/I7/1562>

Service

- ▶ [把本文推荐给朋友](#)
- ▶ [加入我的书架](#)
- ▶ [加入引用管理器](#)
- ▶ [Email Alert](#)
- ▶ [RSS](#)

作者相关文章

- ▶ [周彬](#)
- ▶ [邹霞](#)
- ▶ [张雄伟](#)