电子与信息学报 2009 31 (12): 2948-2952 ISSN: 1009-5896 CN: 11-4494/TN

论文

# 基于近似KLT域的语音信号压缩感知

郭海燕, 杨 震

南京邮电大学信号处理与传输研究院 南京 210003

收稿日期 2008-12-15 修回日期 2009-5-18 网络版发布日期 2009-12-4 接受日期

摘要
压缩感知是近年来兴起的研究热点，该文基于语音信号在KLT域的稀疏特性，提出了基于模板匹配的近似KLT，并在基于模板匹配近似KLT域上研究了语音信号的压缩感知性能。首先验证语音信号在基于模板匹配近似KLT域上的稀疏性，然后由语音信号与观测矩阵构造相应的观测，采取固定分配每帧观测个数和按帧能量自适应分配每帧观测个数两种方案，再以观测为已知条件利用L1优化算法重构语音信号在基于模板匹配近似KLT域的稀疏系数向量，进而重构原始语音信号。实验表明，语音信号在基于模板匹配的近似KLT域的压缩感知性能较好。

关键词 语音合成 压缩感知 稀疏性 L1优化 Karhunen-Loeve变换(KLT)

分类号 TN912.3



## Compressed Speech Signal Sensing Based on Approximate KLT

Guo Hai-yan, Yang Zhen

Institute of Signal Processing and Transmission, Nanjing University of Posts and Telecommunications, Nanjing 210003, China

Abstract
Compressed Sensing is a research focus rising in recent years. On the basis of the signal's sparse representation in the KLT domain, this paper proposes an approximate KLT method using template matching and studies on the corresponding compressed speech signal sensing. First, it verifies the sparsity of speech signal in the approximate KLT domain. Second, by speech signal and a measurement matrix, it arranges measurements of fixed or adaptive length according to frame energy. Third, according to the measurements, it finds the speech signal's sparsest coefficient vector through L1 optimization algorithm to recover the speech signal. Simulation results demonstrate that compressed speech signal sensing in the approximate KLT using template matching has good performance.

Key words Speech synthesis Compressed Sensing (CS) Sparsity L1 optimization Karhunen-Loeve Transform (KLT)

DOI:

通讯作者

作者个人主页 郭海燕; 杨 震