信号处理 2014, 30(2) 205-213 DOI:
ISSN: 1003-0530 CN: 11-2406/TN

应用

认知无线网络中基于非重构序贯压缩的随机信号检测算法与分析

涂思怡, 宋晓勤, 朱勇刚, 涂建华

南京航空航天大学电子信息工程学院

摘要：

为避免失真，奈奎斯特定理规定采样频率不得低于信号最高频率的两倍。随着使用带宽的不断增加，所需高速采样速率在目前的技术水平下难以实现。压缩采样能够在远低于奈奎斯特采样速率的条件下较好地保持稀疏信号的结构和信息。已有文献均对已知信号进行讨论，针对稀疏度未知的随机信号检测问题，本文将压缩采样与序贯检测技术相结合，分别提出了基于单节点非重构序贯压缩和分布式协作非重构序贯压缩的随机信号检测算法，分析了新算法检测性能。理论分析与仿真结果表明：在保证性能的前提下，本文提出的方法显著减少了所需观测值数目，而且完全避免了复杂的信号重构，节省了时间开销，提高了检测的实时性。

关键词： 压缩采样；序贯检测；随机信号；分布式协作感知

Detection of Random Signal Based on Unreconstructed Sequential Compressive Sensing and its Analysis in Cognitive Wireless Network

TU Si-Yi, SONG Xiao-Qin, ZHU Yong-Gang, TU Jian-Hua

Nanjing University of Aeronautics and Astronautics, College of Electronic and Information Engineering

Abstract:

In order to prevent signal distortion, according to

扩展功能
本文信息
Supporting info
PDF(850KB)
[HTML全文]
参考文献[PDF]
参考文献
服务与反馈
把本文推荐给朋友
加入我的书架
加入引用管理器
引用本文
Email Alert
文章反馈
浏览反馈信息
本文关键词相关文章
压缩采样；序贯检测；随机信号；分布式协作感知
本文作者相关文章
涂思怡
宋晓勤
朱勇刚
涂建华
PubMed

the conventional Nyquist sampling theorem, the sampling rate should not be less than twice the Nyquist sampling rate. However, with the increasing use of bandwidth, high-speed sampling rate required is difficult to achieve under the current technology level. Compressive sampling can maintain the structure and information of the original sparse signal far below the Nyquist sampling rate. The existing literatures all discussed about the compressive detection of known signal. Focusing on the detection of sparse random signal , we propose a sequential compressive sensing scheme. Then we discuss the performance of detection and use it in distribute collaboration spectrum sensing. Theoretical analysis and simulation results show that sequential compressive detection can significantly save the number of measurements under a given detection performance. This algorithm reduces the detection time, and also avoids the reconstruction of original signal, of which computer complexity is very high.

Keywords: Compressive sampling Sequential detection Random signal Distribute collaboration sensing

收稿日期 2013-02-28 修回日期 2013-08-15 网络版发布日期 2014-02-25

DOI:

基金项目:

国家自然科学基金（No.61102091）;国家自然基金(No.61301103)资助项目；江苏省博士后基金（12D1076C）资助项目；中央高校基本科研业务费专项资金(No.NS2012045)资助项目；通信信息控制和安

Article by Chu, S. Y.
Article by Song, X. Q.
Article by Shu, Y. G.
Article by Chu, J. H.