Low-Complexity Compressive Spectrum Sensing for Large-Scale Real-Time Processing

ABSTRACT

To overcome the challenges in high-speed sampling and processing of real-time spectrum measurement, compressive sensing (CS) theory has been implemented in wideband spectrum sensing. Moreover, to take full advantage of CS, the nonconvex l- norm minimization algorithms are employed to reconstruct the wideband signals from compressive samples. However, solving these algorithms usually leads to relatively high computational complexity and sensing cost, especially when the dimension of wideband signals is high. Therefore, we propose a low-complexity compressive spectrum sensing algorithm that is suitable for large-scale real-time processing problem. The numerical and experimental results demonstrate that the proposed algorithm achieves the fast convergence speed and keeps the same accurate signal reconstruction with reduced computational complexity, from cubic time to linear time.

EXISTING SYSTEM

- In existing system, an adaptively-regularized CS scheme is proposed to speed up the convergence of the signal reconstruction by reducing the required iterations of the norm minimization. .
- The AR-IRLS algorithm moves the estimated solutions along an exponential-linear path by regularizing weights with a series of non-increasing penalty terms and provides high fidelity guarantees to cope with the varying spectrum status.
- The dynamic change of channel power information from geo-location database could severely degrade the reconstruction accuracy.

PROPOSED SYSTEM

- In proposed system, a low-complexity compressive spectrum sensing algorithm is proposed for large-scale real-time processing.
- The proposed algorithm can significantly reduce the computational complexity from cubic time to linear time in each iteration and maintain high reconstruction accuracy without the cost of more iterations.
- Therefore, the proposed algorithm keeps the fast convergence speed with significantly reduced computational complexity.

SYSTEM REQUIREMENTS

HARDWARE REQUIREMENTS

- Processor - Intel core i3
- RAM - 2B
- Hard Disk - 20 GB

SOFTWARE REQUIREMENTS

- Operating System : LINUX
- Tool : Network Simulator-2
- Front End : OTCL (Object Oriented Tool Command Language)

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