

Accepted Manuscript



A Novel Center of Mass Method for Estimation of Center Frequency and Spectral Edges in CR using Filter Banks

S. Chris Prema, K.S. Dasgupta

PII: S1434-8411(17)31984-2
DOI: <https://doi.org/10.1016/j.aeue.2017.11.030>
Reference: AEUE 52146

To appear in: *International Journal of Electronics and Communications*

Received Date: 17 August 2017
Accepted Date: 28 November 2017

Please cite this article as: S.C. Prema, K.S. Dasgupta, A Novel Center of Mass Method for Estimation of Center Frequency and Spectral Edges in CR using Filter Banks, *International Journal of Electronics and Communications* (2017), doi: <https://doi.org/10.1016/j.aeue.2017.11.030>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

A Novel Center of Mass Method for Estimation of Center Frequency and Spectral Edges in CR using Filter Banks

S. Chris Prema and K. S. Dasgupta

Department of Avionics, Indian Institute of Space Science and Technology, Trivandrum, India

Abstract

In this paper, we propose a novel multistage DFT based polyphase filter bank technique using center of mass approach for estimating center frequency, detecting spectral edges and identifying spectral holes in wideband cognitive radio (CR) for efficient utilization of radio frequency spectrum. Spectral holes are identified by measuring energy at the output of individual subband of filter banks. Accuracy of spectral holes detection depends on frequency resolution of subbands and can be increased with an increase in number of DFT points, however, at the expense of computational complexity. In order to reduce complexity our algorithm starts with a coarser spectral resolution in the first stage. If a primary user appears over more than one subband, center frequency can be estimated in the first stage using proposed approach. However, if the primary user appears exclusively within a single subband, center frequency can be estimated at the second stage. For center frequency estimation, we propose a novel center of mass approach to achieve better precision, where mass is related to energy and distance is related to frequency. Exhaustive simulation results show that center frequency estimation using proposed multistage polyphase filter bank based on center of mass reduces computational complexity and has higher precision compared to conventional filter bank methods.

Keywords:

Filter bank, Cognitive radio, Spectrum sensing, Center frequency, Spectral edges, Center of mass

Download English Version:

<https://daneshyari.com/en/article/6879536>

Download Persian Version:

<https://daneshyari.com/article/6879536>

[Daneshyari.com](https://daneshyari.com)