B-Spline Wavelets in Signal De-noising and Image Compression

OMAR ELFAROUK MAMDOUH IBRAHIM FOUAD FAHMY ,M. F. FahmyGamal Fahmy

Abstract

In this paper we propose to develop novel techniques for signal/image decomposition, and reconstruction based on the B-spline mathematical functions. Our proposed B-spline based multiscale/resolution representation is based upon a perfect reconstruction analysis/synthesis point of view. Our proposed B-spline analysis can be utilized for different signal/imaging applications such as compression, prediction, and denoising. We also present a straightforward computationally efficient approach for B-spline basis calculations that is based upon matrix multiplication and avoids any extra generated basis. Then we propose a novel technique for enhanced B-spline based compression for different image coders by preprocessing the image prior to the decomposition stage in any image coder. This would reduce the amount of data correlation and would allow for more compression, as will be shown with our correlation metric. Extensive simulations that have been carried on the well-known SPIHT image coder with and without the proposed correlation removal methodology are presented. Finally, we utilized our proposed B-spline basis for denoising and estimation applications. Illustrative results that demonstrate the efficiency of the proposed approaches are presented.

Journal of Signal, Image and Video Processing (JSIVP) 2009, November

Future University In Egypt (http://www.fue.edu.eg)

Copyright É 2023 [Future University in Egypt]. All rights reserved.