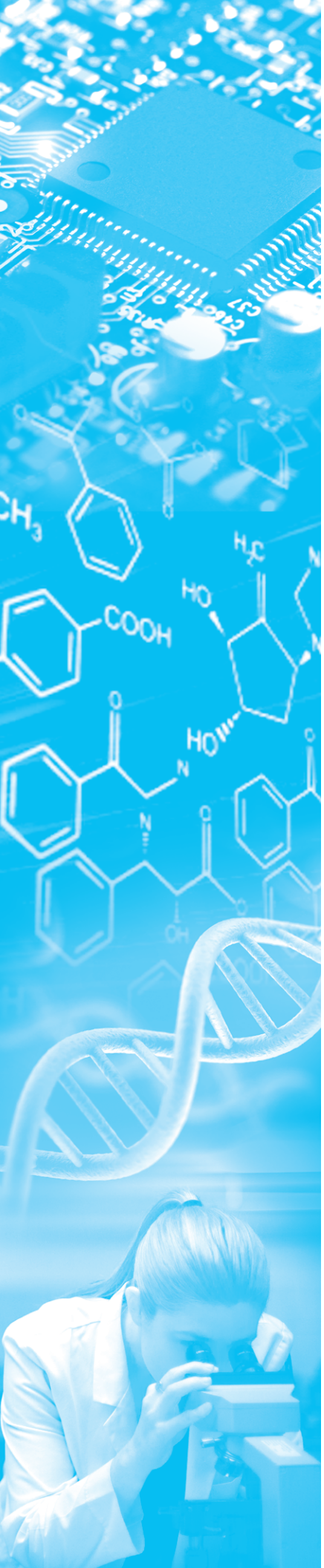

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Data Adaptive Compression and Data Encryption Using Kronecker Products

The growth of big data has been exponential for the past decade. Image data is a major component of big data. In many sectors of computing and data analysis the end users are facing serious data storage and data transfer limits. Another major concern is data security including images. Therefore, the need for advanced image compression and encryption to address storage, transmission and security issues is critical. Applications include for example medical imaging, scientific imaging, satellite imaging, remote sensing imaging, internet transmission, internet downloading, desktop publishing, and document imaging. This invention converts a digitized image to a matrix and a proprietary algorithm to compress the image into multiple matrices that can be decompressed via the Kronecker product. Here the image to be transmitted is compressed and encrypted with a compression ratio of more than 10:1. The images using this invention can be compressed lossless or lossy. In addition, the compression algorithm can be applied to video frames.

Advantages/Benefits

- Compared to JPEG, the compression ratio reduction is up to 50%. In the case of large high definition images, the compression ratio reduction is more than 50%.
- Inherent encryption
- Superior color retention
- Less need for memory
- Faster transmission of images

Status of Development

- Demonstration available in MATLAB coded product
- Established proof of principle
- Product can be demonstrated with test images

Patent Status

U.S. Patent number 10,070,158 entitled “Data Adaptive Compression and Data Encryption Using Kronecker Products” issued on September 4, 2018. A continuation was filed prior to the issue date.

National Phase patents were filed in Canada, Europe, Korea and Japan on February 22, 2017.

Information on Inventor

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Dr. Bourouihiya earned a Ph.D. in Mathematics from University of Maryland. After graduation, he was a post-doctoral fellow at the Norbert Wiener Center for Harmonic Analysis and Applications, University of Maryland, where he participated in several research projects in signal processing. He is currently an Associate Professor of Mathematics. His research interests include Functional and Harmonic Analysis with application to signal and image processing.

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