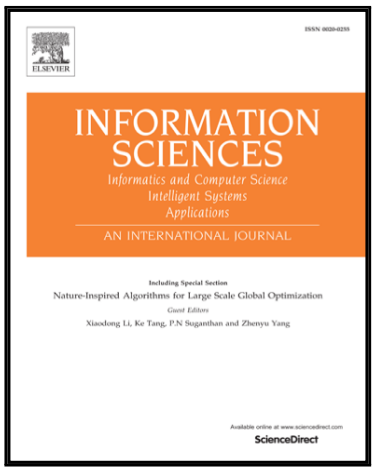

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Signal and Image Compression Using Quantum Discrete Cosine Transform

Chao-Yang Pang[a,1], Ri-Gui Zhou[b,2,*], Ben-Qiong Hu[c,3], WenWen Hu[b,4], Ahmed El-Rafei[d,5]

[a] *College of Computer Science, Sichuan Normal University, Chengdu 610101, China*
[b] *College of Information Engineering, Shanghai Maritime University, Shanghai 201306, China*
[c] *College of Management Science, Chengdu University of Technology, Chengdu 610059, China*
[d] *Engineering Physics and Mathematics Department, Faculty of Engineering, Ain Shams University, Cairo, Egypt*

Abstract

The discrete cosine transform (DCT) is widely used in image and video compression standard formats. This is due to its ability to represent signals and images using a limited number of significant coefficients without noticeable loss of visual clarity. The classical one-dimensional discrete cosine transform (1D−DCT) and two-dimensional discrete cosine transform (2D−DCT) have computational complexities of $O(N \log_2 N)$ and $O(N^2 \log_2 N)$, respectively. Thus, as the images grow in size, the runtime of the DCT highly increases which could limit its usability in real-time applications. This paper presents a quantum DCT algorithm (QDCT) that is more efficient than its classical counterpart in terms of complexity. Furthermore, the proposed QDCT is used to develop and realize a quantum image compression technique. The developed compression technique performs a search to determine the most

*Corresponding author
Email addresses: cyp_900@hotmail.com (Chao-Yang Pang), rgzhou@shmtu.edu.cn (Ri-Gui Zhou), vienvinhu@gmail.com (WenWen Hu), ahmed.elrafei@eng.asu.edu.eg (Ahmed El-Rafei)
[1]The first author
[2]The second author
[3]The third author
[4]The fourth author
[5]The fifth author