Accepted Manuscript

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PII: S1047-3203(16)30149-3
DOI: http://dx.doi.org/10.1016/j.jvcir.2016.07.023
Reference: YJVCI 1827

To appear in: *J. Vis. Commun. Image R.*

Received Date: 29 February 2016
Revised Date: 25 July 2016
Accepted Date: 27 July 2016

Please cite this article as: A.H.M. Kamal, M.M. Islam, Boosting up the Data Hiding Rate through Multi Cycle Embedment Process, *J. Vis. Commun. Image R.* (2016), doi: http://dx.doi.org/10.1016/j.jvcir.2016.07.023

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Boosting up the Data Hiding Rate through Multi Cycle Embedment Process

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Abstract— Prediction error based multi-layer data embedment schemes conceal secrets into several high frequency errors by modifying their prediction error histogram (PEH). It is investigated that *k*-times data embedment into *n/k* errors of PEH produces higher embedding payload, while maintaining better stego-image quality compared to those for embedding into *n* distinct errors for a single time only. This paper proposes a novel multi-cycle embedment scheme in which data is embedded into the errors of a defined range in each of its *k* cycles. Experiments were conducted to examine the performance of the proposed scheme comparing the multi-layer vs. multi-cycle embedding schemes individually and jointly. The scheme explores the points at which significantly better payloads can be obtained at the lower image distortions. Substantial improved performance were obtained during investigations, especially while large volume data embedment. The proposed scheme can embed massive and hybrid data of type text, numeric, image and audio.

Index Terms—Data hiding, multi-layer embedding, multi-cycle embedding, reversible data hiding, prediction error histogram, steganography.

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