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Secure Compressed Image Transmission using Self Organizing Feature Maps

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Abstract: Due to the widespread use of multimedia applications, the data communication channels feel short of bandwidth with regard to channel capacity requirements. As such, the need for improved image compression techniques, together with image security, is increasing day by day. In this paper, the concept of compressed image security has been explored. The input image data is applied to the image partitioning and vectorization block where the whole image is divided into 4x4 non-overlapping blocks. Each block serves as a vector of 16 elements for the Self Organizing Feature Map (SOFM) network by which the indexes of the codewords are determined. These indexes are coded in a binary stream of 0's and 1's using a variab le length Entropy Coding Scheme. These long strings of 0's and 1's are scrambled by a typical scrambler i n order to secure the image data from the unauthorized receiver. The simulation results demonstrate the improved coding efficiency of the proposed method, when compared with JPEG, in addition to providing the message security. The proposed scheme achieves a compression ratio upto 38:1.

Keywords: SOFM, Entropy Coding, Codewords, Image Security, Scrambler, encryption, JPEG, Arithmetic Coding..