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**Compressive Sensing and Random Numbers Insertion based Image Encryption and Hiding Algorithm**

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**ABSTRACT.**

Most current image encryption algorithms encrypt plain images directly into meaningless cipher images. Visually, a few of them are vulnerable to illegal attacks on a few sharing platforms or open channels when being transmitted. Therefore, this paper proposes a new meaningful image encryption algorithm based on compressive sensing and information hiding technology, which hides the existence of the plain image and reduces the possibility of being attacked. Firstly, the discrete wavelet transform (DWT) is employed to sparse the plain image. This is followed by confusion operation on pixel positions, where logistic-tent map is employed to produce a confusion sequence. And then the image is compressed and encrypted by compressive sensing to form an intermediate cipher image. Here, measurement matrix is generated using low-dimension complex tent-sine system. To further enhance recovery quality, we suggest that the inter-mediate cipher image be filled with random numbers according to the compression ratio and confusing them to obtain the secret image. Finally, two-dimensional (2D) DWT of the carrier image is performed, followed by singular value decomposition. The singular values of the secret image are embedded into the singular values of the carrier image with certain embedding strength to obtain the final visually meaningful encrypted image.