

## Gray Level Image Encryption

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**Abstract :** The aim of this paper is image encryption using Genetic Algorithm (GA). The proposed encryption method consists of two phases. In modification phase, pixels locations are altered to reduce correlation among adjacent pixels. Then, pixels values are changed in the diffusion phase to encrypt the input image. Both phases are performed by GA with binary chromosomes. For modification phase, these binary patterns are generated by Local Binary Pattern (LBP) operator while for diffusion phase binary chromosomes are obtained by Bit Plane Slicing (BPS). Initial population in GA includes rows and columns of the input image. Instead of subjective selection of parents from this initial population, a random generator with predefined key is utilized. It is necessary to decrypt the coded image and reconstruct the initial input image. Fitness function is defined as average of transition from 0 to 1 in LBP image and histogram uniformity in modification and diffusion phases, respectively. Randomness of the encrypted image is measured by entropy, correlation coefficients and histogram analysis. Experimental results show that the proposed method is fast enough and can be used effectively for image encryption.

**Keywords :** correlation coefficients, genetic algorithm, image encryption, image entropy

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