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***Abstract*:** Image encryption is rapidly increased recently by the increasing use of the internet and communication media. Sharing important images over unsecured channels is liable for attacking and stealing. Encryption techniques are the suitable methods to protect images from attacks. Hill cipher algorithm is one of the symmetric techniques, it has a simple structure and fast computations, but weak security because sender and receiver need to use and share the same private key within a non-secure channels. A new image encryption technique that combines Elliptic Curve Cryptosystem with Hill Cipher (ECCHC) has been proposed in this paper to convert Hill Cipher from symmetric technique to asymmetric one and increase its security and efficiency and resist the hackers. Self-invertible key matrix is used to generate encryption and decryption secret key. So, no need to find the inverse key matrix in the decryption process. A secret key matrix with dimensions 4×4 will be used as an example in this study. Entropy, Peak Signal to Noise Ratio (PSNR), and Unified Average Changing Intensity (UACI) will be used to assess the grayscale image encryption efficiency and compare the encrypted image with the original image to evaluate the performance of the proposed encryption technique.

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