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# Medical Image Encryption Using Hybrid Adaptive Elliptic Curve Cryptography and Logistic Map-based DNA Sequence in IoT Environment

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## Abstract

Digital medical images play an increasingly important role in diagnosing and treating diseases in modern hospitals that interact with the Internet of Things environment. Some of these images are sensitive and confidential, especially when they involve a great deal of patient privacy. Maintaining the security of these medical images is challenging. Therefore, in this work, hybrid adaptive elliptic curve cryptography (AECC)

we encrypt the image using the AECC technique. Then, to enhance the security of the image, again we encrypt the image using the Logistic Map-Based DNA Sequence encryption algorithm. The logistic map initial values are optimally selected using the Enhanced Mexican axolotl algorithm (EMA$^2$). Finally, after decoding the diffused DNA matrix, we obtain the cipher image. The DNA encoding/decoding rules of the plain image and the key matrix are determined by the plain image. The performance of the proposed approach is analysed based on different metrics and efficiency compared with various algorithms. The experimental results show the proposed method attained the maximum security level of 96%, PSNR of 49.6, NPCR of 99.63%, and UACI of 33.77%.

**KEYWORDS:** Adaptive elliptic curve cryptography Cryptography DNA Enhanced Mexican axolotl algorithm Medical image

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## DISCLOSURE STATEMENT

No potential conflict of interest was reported by the author(s).

# Additional information

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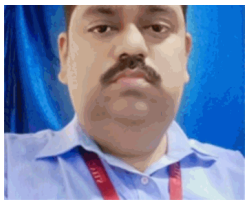

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