

## ABSTRACT

The advent of mobile banking applications has transformed the way customers' access banking services from brick-and-mortar to remote banking. The ubiquitous nature of this innovation has encouraged its adoption. This is because of improved banking services and accessibility to the services on a 24/7 basis using the internet. However, mobile banking applications are susceptible to numerous security threats and vulnerabilities that adversaries take advantage of to siphon money from bank customers. The aim of this study is to design and evaluate least significant bit and advanced encryption standard cryptography (LSB-AES) hybrid algorithm to protect data on transmission in mobile banking. This study employs data science research design, and performance evaluations demonstrated through simulations using MATLAB. Findings of this study can be applied to banks offering mobile banking across the world. This study utilized six color images from University of Southern California's Signal and Image Processing Institute (USC-SIPI) dataset which were stored in Tagged Image File Format (TIFF). Contemporary steganographic systems utilize a minimum of 2 to 10 images for test simulations. Visual quality analysis of cover images and stego images was done using the following evaluation metrics: Mean Squared Error (MSE), Peak Signal-to-Noise Ratio (PSNR), and histogram analysis. Security of the proposed algorithm was done using entropy analysis. MSE values of cover and stego images should be closer to zero and indicate that cover image is of good quality for embedding data. On the other hand, PSNR values should be more than 40 decibel (dB) which indicates good imperceptibility. Histogram analysis should demonstrate no visible distortions between the cover and stego image for it to be free from statistical attacks. Entropy analysis should yield values close to 8 for the algorithm to be robust. Results from the proposed LSB-AES hybrid algorithm evaluation metrics reveals that Mean Squared Error (MSE) values ranges from 0.0001297 to 0.0005646 while Peak Signal-to-Noise Ratio (PSNR) values ranges from 80.65 to 87.71 and entropy values ranges from 6.295 to 7.762. Histogram analysis reveals that the cover and stego images are almost similar. These results infer that the proposed algorithm has good quality images with good imperceptibility and that the proposed algorithm is reliable, robust and secure for mobile banking. Entropy and histogram analysis results show that the proposed algorithm is resistant to Man-in-the-Middle attacks. This study recommends that legislation evaluates and amends security of mobile banking policies so that the proposed LSB-AES hybrid algorithm can be adopted as a secure solution for mobile banking.