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Chaotic Image Encryption Scheme Implemented in FPGA for Security Enhance

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Abstract:
The internet has always faced significant security challenges when it comes to transferring information. Throughout and following the recent outbreak, it has become evident that as digital transactions surge, so do incidents of hacking and breaches. This highlights the growing need for secure transaction methods. In response, this paper introduces a novel cryptographic approach for image encryption and decryption, utilizing chaotic algorithms. To ensure the robustness of the encryption, we perform a series of rigorous performance evaluations, including Histogram, Entropy, NPCR, UACI Analyses. This study showcases the implementation of a one-dimensional reduce Henon chaotic map on an FPGA board, enhancing both the encryption and integrity of images.

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I. Introduction

Chaotic events have a broad spectrum of engineering and scientific uses, such as secure data transmission, nonlinear control, and image encryption [1]. Researchers largely agree that chaos-based systems can be built using FPGA boards, discrete electronic cor

. The advent of field-programmable gate arrays (FPGAs) has accelerated the p making it more accessible [3]. Many scholars are now employing FPGAs to quickly prototype new hardware for chaotic systems, memristors, and various non-clonable type of functions [4].

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