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SECURE BLOCKCHAIN ATM SIMULATOR: MULTI-LAYER ENCRYPTION AND PROOF OF WORK FOR ENHANCED FINANCIAL TRANSACTIONS



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Abstract:

In finance, the shift toward digital tools has highlighted the necessity for greater security measures that eliminate both fraud and access by unauthorized users. In this paper, we demonstrate a functional blockchain ATM simulator based on the use of multi-layer encryption using AES-256-GCM and ChaCha20-Poly1305 algorithms, and a lightweight Proof of Work system to secure transactions. The ATM simulator constructs multiple layers of dynamic puzzle-based credentials for the user that can protect against brute force attacks and replay attacks. Transactions verified by our ATM simulator follow a decentralized model, as opposed to the centralized model utilized by traditional ATMs. Moreover, our ATM simulator provides for efficient verification of transactions, resulting in a positive trade-off between security and performance. Based on our experimental results, we find that our experimental security methods could be applied successfully to protect against possible cyber-attacks, supporting their use as a secure means of performing digital financial transactions within the rapidly growing digital financial market.

Keywords: Blockchain, ATM Simulator, Multi-Layer Encryption, Proof of Work, Cybersecurity

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