

LETTER TO THE EDITOR

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Letter to the editor: “Potential applicability of blockchain technology in the maintenance of chain of custody in forensic casework”

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The Editor,

I recently had the opportunity to delve into the intriguing review paper titled “Potential applicability of blockchain technology in the maintenance of chain of custody in forensic casework” by Patil et al. (2024). This paper provides a thought-provoking exploration into leveraging blockchain technology for improving the integrity and reliability of the chain of custody in forensic casework, an area of growing importance in our increasingly digital world.

I commend the authors for their pioneering efforts to address the complex challenges surrounding digital evidence management in forensic investigations. The initiative to integrate blockchain technology as a solution for enhancing evidence security, transparency, and verifiability is both innovative and timely. It represents a significant step forward in the quest for more rigorous and tamper-proof forensic processes.

However, upon thorough examination, I believe the paper’s impact and usefulness could be greatly amplified by addressing several key areas.

A deeper comparative analysis between the traditional chain of custody mechanisms and the proposed blockchain-based solution is essential. This not only should highlight qualitative differences but also should present

quantitative assessments such as efficiency gains, cost implications, and improved security metrics. Demonstrating specific scenarios where blockchain significantly outperforms traditional systems could offer compelling evidence for its adoption (Tripathi et al. 2023).

The methodology section would benefit greatly from detailed implementation specifics, possibly through a case study or prototype demonstration. This could help illustrate the practical application and feasibility of the blockchain solution in real forensic settings. Additionally, a comprehensive security assessment, addressing potential vulnerabilities unique to blockchain technology within the forensic domain, is crucial. An exploration of how the system withstands common cybersecurity threats and blockchain-specific attacks would lend credibility and robustness to the proposed solution.

The inclusion of empirical evidence supporting the theoretical advantages of a blockchain-based chain of custody is necessary to validate the authors’ claims. Data from pilot studies, simulations, or even theoretical models could substantiate the solution’s effectiveness and efficiency. Furthermore, a discussion on scalability, addressing how the system manages increasing volumes of digital evidence and its performance under different operational loads, would enhance the paper’s relevance to large-scale forensic applications.

An in-depth exploration of the legal and ethical dimensions associated with the adoption of blockchain technology in forensic investigations would be invaluable. This includes examining the admissibility of blockchain-based evidence in courtrooms across different jurisdictions and addressing potential privacy concerns and ethical

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dilemmas that may arise from the implementation of such a system.

The paper would benefit from a nuanced analysis of the impact on various stakeholders involved in the forensic process, including law enforcement, forensic analysts, and judicial personnel. Assessing the practicality of blockchain adoption, potential barriers, and the required training for these stakeholders to effectively utilize the new system is essential for understanding its feasibility and potential resistance.

In conclusion, while the review paper presents an innovative approach to leveraging blockchain for forensic evidence management, addressing areas such as comparative analysis, practical implementation details, empirical validation, legal/ethical considerations, and stakeholder impact is crucial. To realize the immediate implementation of this technology, a multidisciplinary approach involving computer scientists, forensic experts, legal professionals, and policymakers is recommended. Establishing dedicated task forces or working groups could facilitate the development of standardized frameworks, best practices, and training programs tailored to the specific needs of different jurisdictions and forensic organizations.

By addressing these critical aspects, the proposed blockchain-based chain of custody system can unlock its full potential, ushering in a new era of enhanced digital forensics and contributing to the pursuit of justice in an increasingly digital world. I am optimistic about the potential of this innovative approach to bring about transformative improvements in forensic science and eagerly anticipate further research in this direction.

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