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PROPOSAL FOR SECURE MEDICAL IMAGE SHARING SYSTEM WITH BLOCKCHAIN TECHNOLOGY

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Statement of the Problem: Introducing medical image sharing systems for widespread use is beneficial for medical practice. There are several ways to share medical images, and there are high expectations for cloud computing at present because of its scalability. However, image sharing via a cloud-based environment has raised some security and privacy concerns. The purpose of this study is to propose a method that applies blockchain technology to a cloud-based environment to address concerns regarding security and privacy without impairing IT resource effectiveness at a practical level.

Methodology & Theoretical Orientation: This method divides medical images, especially digital imaging and communications in medicine (DICOM), into metadata and pixel data. The former is managed by blockchain technology in a secure manner, and the latter is managed in a cloud-based environment. In addition, we created a multi-use key from the metadata by hashing. When physicians use medical images, the original DICOM data can be reconstructed with the key. Furthermore, we implemented pilot system to evaluate performance and scalability and access security level.

Findings: For processing 1000 medical images, our proposal takes about four seconds, and it could increase approximately linearly with number of processing. Furthermore, our proposal has some security advantages; improvement integrity, confidentiality, and privacy level.

Conclusion & Significance: The demand for medical image sharing has significantly increased; therefore new methodologies are required to manage medical images more securely and in a scalable manner. We propose applying a blockchain to a cloud-based environment to generate a synergistic effect. Although some technical challenges remain, this methodology has better security and the potential for practical application. Furthermore, our proposal could be expanded not only to academic use but also private sector for image-based system development, because patient registration is a point of departure.

Biography

Ryohei Takahashi has his expertise in Technology Management especially Data Management. He proposed model using bibliometrics for evaluating medical technology trend was published in *International Journal of Medical Informatics* in 2017. In addition to academic achievement, he has extensive experience in investment for Japanese largest trading company: Mitsubishi Corporation, and in management for technology startup in healthcare industry: Kompath. Depending on both academic and business experience, he has conducted research and development system for healthcare establishments.

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