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Document Sections

- I. Introduction
- II. Contributions of the Work
- III. Related Works
- IV. Methodology
- V. Experimental Setup & Findings

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Abstract:

The secure and efficient sharing of healthcare data is crucial in the rapidly evolving healthcare landscape. This paper addresses the critical need for secure and efficient healthcare data sharing in today's rapidly evolving healthcare landscape. While sharing health information can significantly improve healthcare quality and treatment coordination, challenges like security, privacy concerns, data consistency, and timely access across healthcare facilities remain. To overcome these obstacles, our proposed solution harnesses Ethereum Blockchain technology, Artificial Intelligence (AI), and the Health Level 7 standard (HL7). This integrated approach redefines data modeling, creating a flexible and scalable system that prioritizes medical data and service privacy and security. The fusion of AI and Ethereum Blockchain technology effectively tackles Health Information Exchange challenges. Additionally, our BERT-CNN classifier, achieving an impressive 94.2% accuracy, excels in classifying medical data, outperformed MLP, SVM, and Random Forest classifiers. We employ modern cryptographic methods like Fully Homomorphic Encryption over the Torus (TFHE) to ensure secure computation and protect sensitive medical data. These strategies promise more effective and secure medical data sharing, leading to improved patient care, advances in medical research, and increased confidence across the healthcare ecosystem.

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I. Introduction

The healthcare industry is undergoing a transformation driven by technology and the need for streamlined data sharing, with challenges related to data security and privacy [1] [2]. Blockchain technology offers a solution for secure data sharing and transparency [3] [4], while Artificial Intelligence (AI) enhances data analysis and decision-making [5]. Robust encryption techniques like Fully Homomorphic Encryption over the Torus (TFHE) are crucial for safeguarding healthcare data [6]. These advancements are vital for reliable healthcare data sharing in the modern landscape.

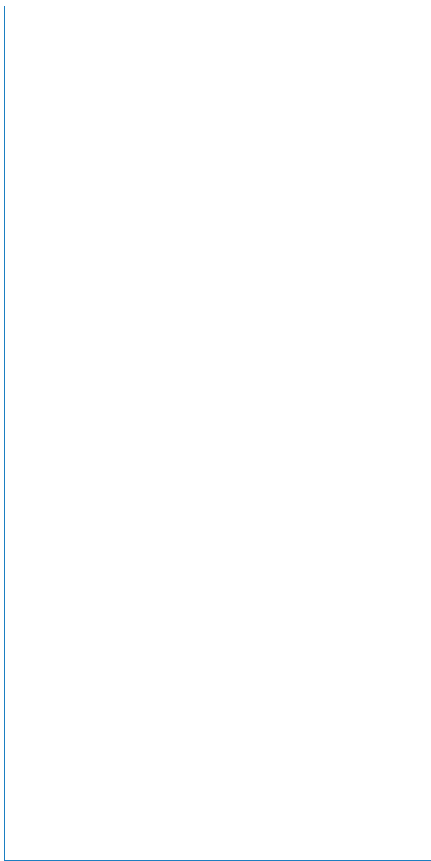
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