(Pt24)A Blockchain-based Governance Framework for AIBOM Integrity and Automated Regulatory Compliance

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(Pt9)Abstract— As Artificial Intelligence (AI) advances, ensuring security and compliance is critical. While the AI Bill of Materials (AIBOM) is used for security management, guaranteeing its data integrity remains a challenge. Furthermore, the manual regulatory approval process for Medical AI is a significant barrier due to excessive time and cost. This paper proposes a blockchain-based governance system integrating Decentralized Identifiers (DID) and the InterPlanetary File System (IPFS) to address these issues. The system uses DID for authentication and stores AIBOMs on IPFS, recording their transactions and Content Identifiers (CIDs) on-chain to ensure integrity. A key feature is an automation module that generates regulatory submission documents based on the verified AIBOM and official guidelines. These documents, final regulatory approvals, and post-market vulnerability reports are also immutably recorded on the blockchain. The proposed framework enhances AI supply chain security via AIBOM integrity and streamlines the complex regulatory process, providing a transparent, efficient, and auditable governance solution.

(Pt9)Keyword— Blockchain, AI Bill of Materials (AIBOM), Decentralized Identifier (DID), Integrity, IPFS

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