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(57) Abstract :

Brain tumors represent a critical health issue that requires timely and accurate diagnosis. This research presents a hybrid approach combining EfficientNet and CNN for the automatic detection of brain tumors using MRI scans. The model is trained on a publicly available dataset that includes four categories: no tumor, pituitary tumor, meningioma tumor, and glioma tumor. To enhance data integrity and security, deep learning is integrated with blockchain technology, ensuring secure and tamper-resistant storage of medical data. The classification model delivers high accuracy, positioning it as a dependable tool for medical diagnosis. For enhanced protection, the system leverages the InterPlanetary File System (IPFS) for decentralized MRI storage and uses Ethereum smart contracts for secure on-chain hash storage. A user-friendly Flask-based web interface enables MRI uploads, real-time tumor predictions, and blockchain-based verification. Experimental evaluations show that the model achieves high precision and recall in tumor classification. By incorporating blockchain, the solution guarantees data immutability and security, addressing key concerns in medical imaging and healthcare data management. Overall, this work introduces a robust, scalable, and secure framework for brain tumor detection, uniting the benefits of deep learning and blockchain technologies.

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