Title: AgroTrust: A Blockchain-Enabled AI-Powered Organic Product Certification System

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Abstract: The organic agriculture sector in Bangladesh faces significant challenges due to the absence of a national organic product certification system. As a result, local producers are often forced to rely on expensive international certification agencies, creating barriers to market entry, increasing costs and limiting consumer trust. To solve this, our proposed system is a blockchain-enabled, AI-powered web platform designed to establish a secure, transparent, and efficient organic product certification system tailored for the Bangladeshi context. A key innovation is its hash-based file verification to minimize gas fees to store data on the chain. Farmers or producers submitted product data like images, videos, and documents, which are encrypted (AES-256) and stored locally, while cryptographic hashes (SHA-256) are saved on-chain. Any alteration in a file changes its hash, and QR-code scanning will instantly flag tampering, ensuring product integrity. It also integrates tokenized payment systems using ERC-20 tokens alongside SSLCOMMERZ payment gateway, ensuring secure, traceable, and accessible transactions for all stakeholders. Key features include smart contract automation, real-time certification tracking, a decentralized dispute resolution mechanism, and QR code-based traceability for consumers. This project, therefore, aims to democratize organic product certification, lower operational costs, and build consumer trust, while aligning with global trends in digital food supply chains.

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