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QR code Based Blockchain System

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ABSTRACT: Counterfeit drugs and medical supplies endanger patient safety, health, and trust in healthcare. In addition to affecting patient outcomes, these counterfeit products cost manufacturers and healthcare providers dollars. This study introduces a blockchain-based fraud detection system tailored for the medical sector. Utilizing wireless technologies like scanners and QR codes, it verifies product authenticity. Each authorized item receives a unique code stored permanently in a decentralized digital ledger, a blockchain. Upon scanning with a camera, the system instantly retrieves the corresponding identifier from the blockchain, ensuring real-time verification. Matching codes affirm product legitimacy, while mismatches prompt alerts for potential counterfeits. This immediate warning mechanism empowers healthcare professionals and patients to make informed decisions, safeguarding patient safety and curbing the circulation of counterfeit medical supplies.

KEYWORDS: Blockchain-based fraud detection system, Wireless technologies (scanners and QR codes), Product authenticity verification.

I. INTRODUCTION

QR codes have developed into a flexible tool with a wide range of applications, despite being first created to track automobiles. They are essential in marketing, logistics, healthcare, and other fields because of their small coding, which enables speedy data recovery with cell phones or specialized scanners. Different forms of information, including website URLs, contact details, and product details, can be encoded into QR codes, which hold data in a two-dimensional format.

Healthcare organizations use QR codes to incorporate unique codes on medicine packaging in order to prevent this hazard. Encrypted information regarding the medication's origin is contained in each QR code, making authentication simple. Authenticity is confirmed in real-time using verification with centralized or decentralized databases; inconsistencies trigger alarms. Healthcare stakeholders facilitate easy verification of each product's origin and legitimacy by adding distinctive QR codes to its packaging.

II. LITERATURE REVIEW

Y. Zhang et al. (2020) introduced a novel QR code authentication system to combat medicine counterfeiting. Their approach employs encryption algorithms and digital signatures to secure QR code data. Authentication is facilitated through a dedicated mobile application that decrypts and verifies QR code information in real-time enhancing consumer trust and safety.

QR code-based anti-counterfeit system created for drug authentication is presented by Li et al(2016) Their approach uses encrypted data-containing QR codes to confirm legitimacy of products. Customer obtain real-time authentication information by scanning their smartphones. System proved how QR code technology works to combat the problems associated with fake medications.

The work of "Blockchain Based Fake Product Identification in Supply Chain" by Ajay Funde, likely employs blockchain technology to establish a tamper-proof record of product information. It may utilize smart contracts for automated processes and enforce agreements. Implementation involves creating a blockchain network to track transactions throughout the supply chain. Potential benefits include improved traceability, reduced counterfeit products, and enhanced consumer trust.

III. PROPOSED METHODOLOGY

The process begins with the generation and placement of QR codes on medical products, encoding relevant information such as origin and batch number. Subsequently, data collection involves scanning these QR codes using specialized devices or smartphone cameras, extracting the encoded information for further analysis. Upon extraction, the data is integrated into a centralized database or blockchain network, ensuring accessibility and transparency. Prior to analysis, preprocessing techniques are applied to clean and organize the collected data, removing inconsistencies and enhancing its quality. Finally, data analysis methods are employed to derive insights, identify patterns, and detect anomalies, facilitating effective fraud detection and prevention strategies within the medical sector.

IV. OVERALL FRAMEWORK
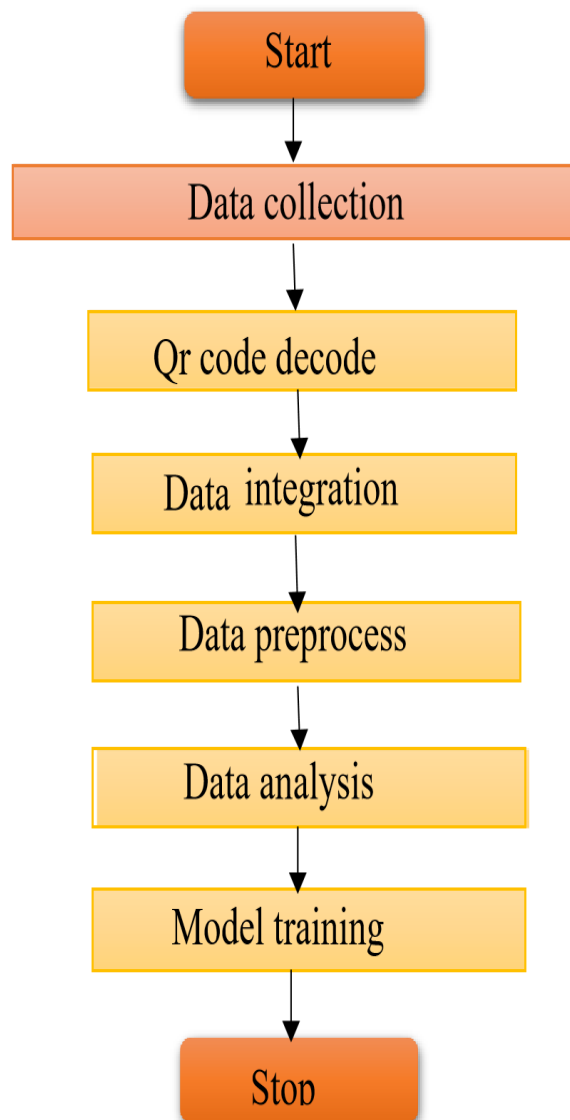
V. SYSTEM ANALYSIS
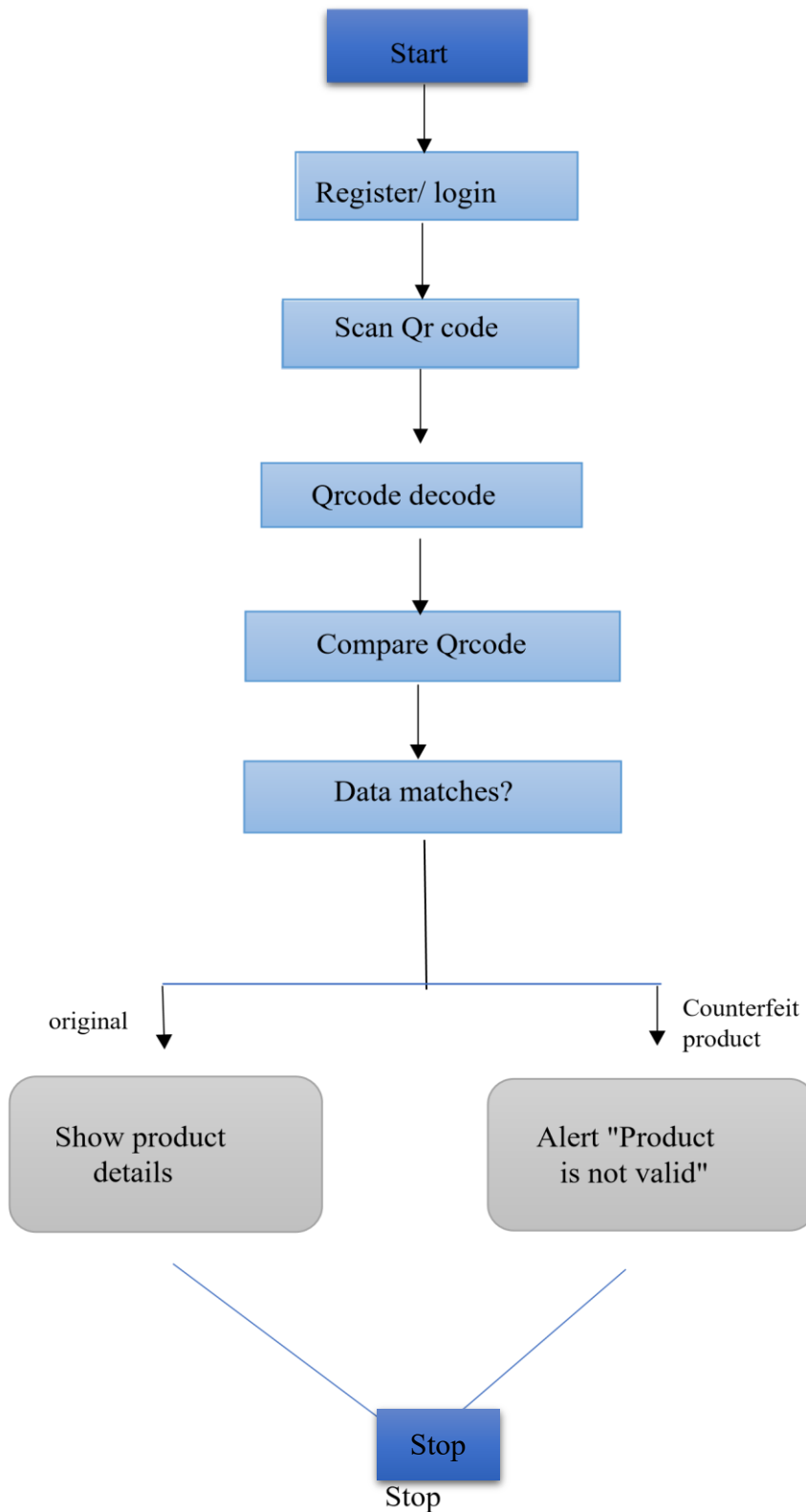
VI. RESULT

The application scans a QR code, extracting features and validating data for compliance with medication standards. Subsequently, the data undergoes verification in the authentication module. A fraud detection model is trained using labeled datasets, typically employing Support Vector Machines. Post-training, the model's performance is evaluated, providing classifications and confidence scores. In the result, the system accurately classifies a scanned QR code as genuine, signifying high confidence in medication data authenticity, while potential fraud instances prompt further investigation by medical professionals

VII. CONCLUSION

In conclusion, integrating QR codes for fake product detection offers a promising solution against counterfeit goods. Utilizing QR technology enables consumers to easily authenticate products, ensuring they receive genuine items and avoiding potentially harmful counterfeits. This not only preserves consumer trust but also enhances brand reputation and revenue by deterring counterfeiters and maintaining the integrity of legitimate products. Additionally, QR-based authentication systems provide a cost-effective and scalable solution applicable across industries and regions. As technology advances, QR codes remain a dependable tool in combating counterfeit products, promoting marketplace transparency, accountability, and consumer safety.

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