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Affiliated to VTU, Belagavi & Approved by AICTE, New Delhi, Accredited by NBA , NAAC & IEI



Department of Computer Science and Engineering MINI PROJECT - (BCS586)

Blockchain Based Portable Pair (Electronic) Authentication System

Batch No.: 2025_CSE_13

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PROBLEM STATEMENT

- The electronics industry faces a rising challenge from counterfeit products, resulting in financial losses, safety concerns, and damage to brand reputation.
- Consumers often find it difficult to differentiate between genuine and counterfeit products, particularly in online marketplaces.

OBJECTIVES

Verify Product Authenticity

- Use blockchain to securely store and manage product details, ensuring authenticity.

Build Consumer Trust

- Provide a transparent system to help consumers identify genuine products.

Ensure Data Security

- Leverage blockchain's immutability to prevent tampering or forgery.

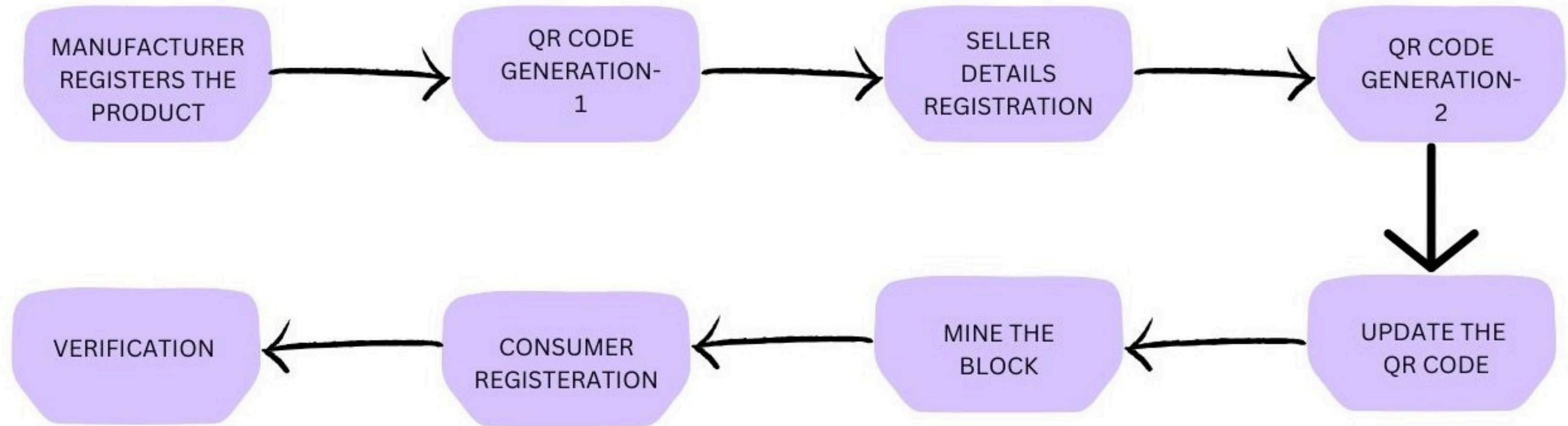
Simplify Product Information Access

- Allow easy access to product details for both sellers and consumers.

Simulating Blockchain with JavaScript

- Use JavaScript to demonstrate blockchain principles for secure product authentication.

WORK FLOW



VERIFICATION

- Scan the QR Code
- Use Block Explorer

By scanning the QR code, users can get all the details, including the Hash ID, Transaction ID. The Hash ID or Manufacturer ID or Transaction ID can be used for further verification on the Blockchain Explorer.

COMPARATIVE ANALYSIS OF BLOCKCHAIN BASED PORTABLE PAIR(ELECTRONIC) AUTHENTICATION SYSTEM AND ADVANCED TOKENIZED PRODUCT AUTHENTICATION FRAMEWORK

Focus on Features	Focuses on core blockchain functionalities like transaction validation, block creation, mining, and product authentication.	Incorporates advanced features such as tokenization, augmented reality and geolocation-based authentication.
Technology Use	Focuses on essential blockchain operations like mining, hashing, and consensus.	Use of object recognition algorithms and integration with IoT devices
Decentralization and Trust	Emphasizes decentralization with a peer-to-peer blockchain network, ensuring that no single entity has control over product data, increasing trust among stakeholders.	While centralized features like AR databases or geolocation systems may reduce trust in the system's decentralization.

COMPARATIVE ANALYSIS OF BLOCKCHAIN BASED PORTABLE PAIR(ELECTRONIC) AUTHENTICATION SYSTEM AND FAKE PRODUCT DETECTION USING BLOCKCHAIN TECHNOLOGY

Technology Stack	The system is developed using the principles of consensus mechanisms, auto-replication, and a decentralized network architecture, implemented with JavaScript.	Uses Ethereum for blockchain, Solidity for smart contracts, Firebase for backend support, and Android Studio for a consumer-friendly mobile app
User Interfaces and Interaction	Provides a web interface for product verification and transaction submission, for supply chain manufacturers, sellers and consumers	Consumer-Focused Mobile App: Consumers can scan serialized QR codes via an Android app to check authenticity
Counterfeit Prevention Approach	Prevents counterfeiting by recording immutable product details and transaction history on a decentralized blockchain.	Actively identifies counterfeiting using serialized QR codes, location-based tracking, and automated alerts, offering a more proactive solution

PROJECT SPECIFICATION AND TOOLS

SRS

FUNCTIONAL REQUIREMENT

- Product Authentication
- Transaction Handling
- Blockchain Mining and Consensus
- User Interface

NON-FUNCTIONAL REQUIREMENT

- Security
- Scalability
- Reliability
- Performance

SDS

SYSTEM ARCHITECTURE

- Blockchain Network

COMPONENT DESIGN

- Blockchain Class
- Network Communication

TOOLS

FRONTEND

- HTML
- CSS
- JavaScript

BACKEND

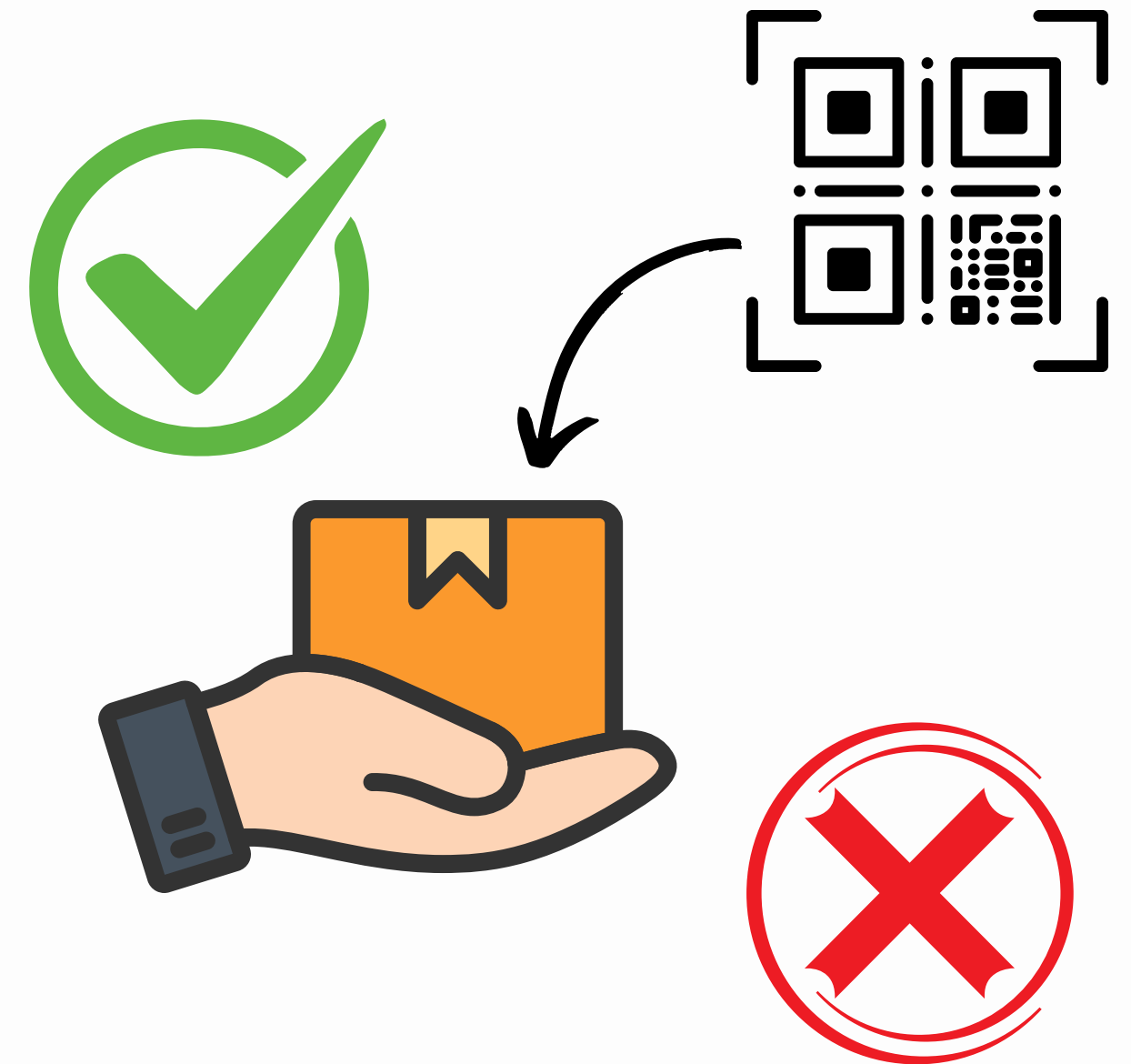
- JavaScript

TOOLS

- Postman

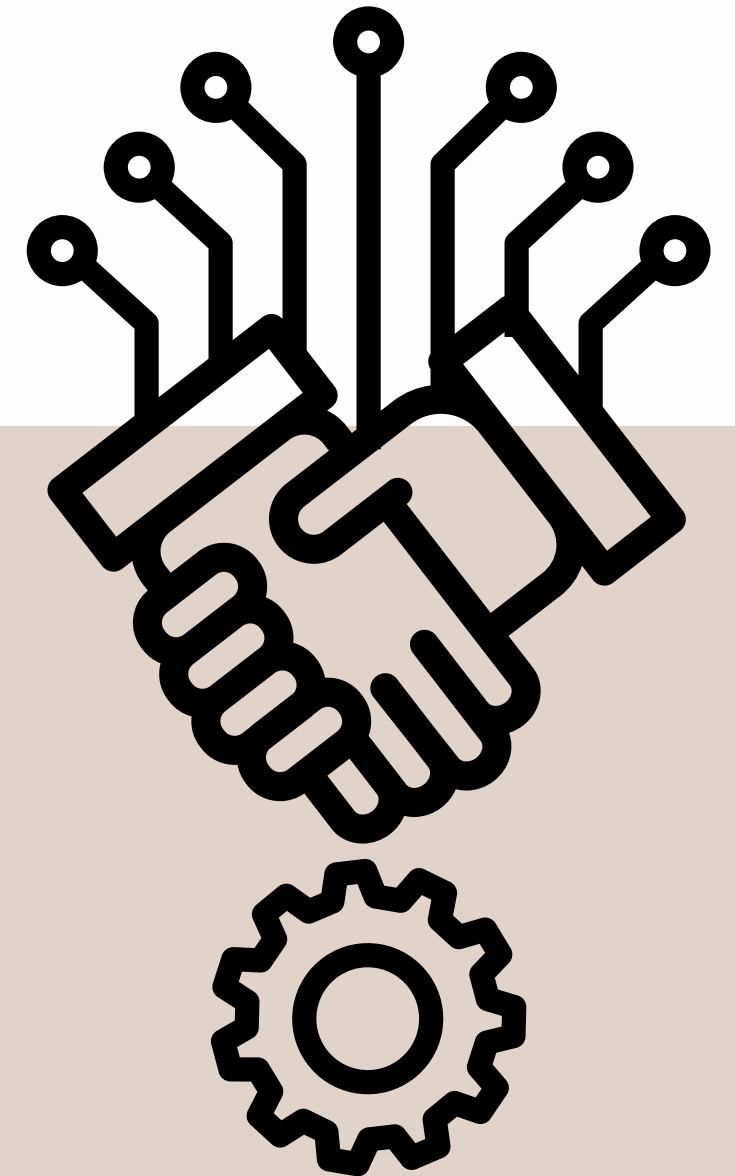
RESULTS

- Enhanced Product Authentication
- Consumer Confidence
- Efficient Product Tracking
- Secure Data Management
- Scalable Prototype
- Ease of Access
- Improved Brand Protection



FUTURE ENHANCEMENT

- Integration with a Fully Decentralized Blockchain
- Advanced Product Tracking
- Mobile Application Development
- AI-Based Counterfeit Detection
- Smart Contract Automation
- Multi-Industry Adoption
- Enhanced Security Features
- Cross-Platform Compatibility
- Consumer Education Programs
- Environmental Sustainability



SNAPSHOTS

Manufacturer



Manufacturer ID:

Product ID:

Product Name:

Batch Number:



"Quality means doing it right when no one is looking."

Seller



Seller ID:

Seller Name:

Product Cost:



"Selling is a sacred trust between consumer & seller."



Consumer



Customer ID:

Customer Name:



"It takes months to find a customer, seconds to lose one"



Product Verification

Enter the Product ID:

Phone-1234

GET QR CODE



OPEN BLOCK EXPLORER



localhost:3001/block-explorer

b0da67f0ba9d11efa285ff182af6b79b

Transaction ID

Search

Transaction

Manufacturer ID	Manufacturer-Phone-1234
Seller ID	Batch-no-123
Product Cost	100\$
Product ID	Seller-1234
Product Name	Phone-1234
Batch Number	ABC Phone

COURSE CERTIFICATION



Certificate no: UC-ceb0ad1f-97bf-4b35-a270-b3be5acfd30b
Certificate url: ude.my/UC-ceb0ad1f-97bf-4b35-a270-b3be5acfd30b
Reference Number: 0004

CERTIFICATE OF COMPLETION

Ethereum Blockchain Developer Bootcamp With Solidity (2024)

Instructors **Ravinder Deol, Thomas Wiesner, Haseeb Ali**

Himashwetha.K.G

Date **Nov. 22, 2024**
Length **26 total hours**



Certificate no: UC-6be8fe4a-0eef-472f-bace-94f6c3be03bc
Certificate url: ude.my/UC-6be8fe4a-0eef-472f-bace-94f6c3be03bc
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Certificate no: UC-896737b4-909b-4d66-9022-1dafc1211f85
Certificate url: ude.my/UC-896737b4-909b-4d66-9022-1dafc1211f85
Reference Number: 0004

CERTIFICATE OF COMPLETION

Ethereum and Solidity: The Complete Developer's Guide

Instructors **Stephen Grider**

Divyashree S

Date **Oct. 23, 2024**
Length **24 total hours**



COURSE COMPLETION CERTIFICATE

The certificate is awarded to
Surabhi Rao
for successfully completing the course
Blockchain & Hyperledger Fabric: An Overview of Blockchain Technology
on December 15, 2024






Congratulations! You make us proud!


Thirumala Arohi
Executive Vice President and Global Head
Education, Training & Assessment (ETA)
Infosys Limited

Issued on: Monday, December 16, 2024
To verify, scan the QR code at <https://verify.onwingspan.com>

REFERENCE

- Nakamoto, S. (2008). Bitcoin: A Peer-to-Peer Electronic Cash System. Retrieved from <https://bitcoin.org/bitcoin.pdf>
- Buterin, V. (2013). A Next-Generation Smart Contract and Decentralized Application Platform. Ethereum White Paper. Retrieved from <https://ethereum.org/en/whitepaper/>
- Wood, G. (2014). Ethereum: A Secure Decentralized Generalized Transaction Ledger. Ethereum Yellow Paper Retrieved from Paper. <https://ethereum.github.io/yellowpaper/paper.pdf>



THANK YOU

