VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"JnanaSangama", Belgaum -590014, Karnataka.

BLOCKCHAIN
AAT REPORT
on

Fake Product Detection dApp

Submitted by

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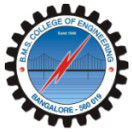
Under the Guidance of
Prof. Rajeshwari Madli
Assistant Professor, BMSCE

in partial fulfillment for the award of the degree of
BACHELOR OF ENGINEERING
in
COMPUTER SCIENCE AND ENGINEERING



B.M.S. COLLEGE OF ENGINEERING
(Autonomous Institution under VTU)
BENGALURU-560019

Feb 2025 to June 2025

B. M. S. College of Engineering,
Bull Temple Road, Bangalore 560019
(Affiliated To Visvesvaraya Technological University, Belgaum)
Department of Computer Science and Engineering

CERTIFICATE

This is to certify that the AAT work entitled "**Fake Product Detection dApp**" is carried out by **Manya Vaid (1BM22CS150), Maria Sayeema(1BM22CS151), Nallabothula Sai Sruthi Chowdary(1BM22CS170),Naidu Renusree(1BM22CS168)** who are bonafide students of **B.M.S. College of Engineering.** It is in partial fulfillment for the award of **Bachelor of Engineering in Computer Science and Engineering** of the Visveswaraya Technological University, Belgaum during the year 2024-2025. The AAT report has been approved as it satisfies the academic requirements in respect of **Blockchain (23CS6PEBLC)** work prescribed for the said degree.

Signature of the Guide
Prof. Rajeshwari Madli
Assistant Professor
BMSCE, Bengaluru

Signature of the HOD
Dr. Kavitha Sooda
Prof.& Head, Dept. of CSE
BMSCE, Bengaluru

B.M.S. COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DECLARATION

We, Manya Vaid (1BM22CS150), Maria Sayeema(1BM22CS151), Nallabothula Sai Sruthi Chowdary(1BM22CS170),Naidu Renusree(1BM22CS168) students of 6th Semester, B.E, Department of Computer Science and Engineering, B. M. S. College of Engineering, Bangalore, hereby declare that, this AAT entitled "Fake Product Detection dApp" has been carried out by us under the guidance of Prof. Rajeshwari Madli, Assistant Professor, Department of CSE, B. M. S. College of Engineering, Bangalore during the academic semester Feb 2025 to June 2025.

We also declare that to the best of our knowledge and belief, the development reported here is not from part of any other report by any other students.

Signature

Manya Vaid (1BM22CS150)

Maria Sayeema(1BM22CS151)

Nallabothula Sai Sruthi Chowdary(1BM22CS170)

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Chapter 1

Introduction

1.1 Problem Statement

Counterfeit products are a major global issue across industries like pharmaceuticals, electronics, and consumer goods. They harm customer trust, pose health risks, and lead to significant economic losses.

To address this issue, our project implements a Fake Product Detection dApp on the Ethereum blockchain, enabling manufacturers to register genuine products and allowing users to verify authenticity using a unique product ID.

Platform and Technology Used

- **Smart Contract Language**: Solidity
- **Frontend**: HTML + JavaScript
- **Blockchain Platform**: Ethereum (using Web3.js)
- **Wallet**: MetaMask (for interacting with the blockchain)

Ethereum was chosen due to its decentralized nature, smart contract support, wide adoption, and availability of development tools.

Chosen Algorithm and Structure

The smart contract uses a mapping-based data structure to store product information against unique product IDs. The verification process is decentralized, allowing multiple stakeholders to add their verification to a product's history. Product authenticity is checked based on whether it exists on the blockchain and who has verified it.

1.2 Motivation

The increasing prevalence of counterfeit products has highlighted the need for more secure, transparent, and trustworthy systems for verifying product authenticity. Traditional systems depend on centralized databases, which are not only vulnerable to attacks and manipulation but also lack transparency for consumers.

Blockchain technology offers a decentralized and tamper-proof solution, ensuring data integrity and transparency. By recording the product life cycle and verifications on-chain, stakeholders and consumers can trace the origin and authenticity of a product without relying on intermediaries.

This project aims to build a **Fake Product Verification dApp** as a proof-of-concept for how blockchain can be effectively used to solve real-world problems.

1.3 Work Highlights

1. Developed a smart contract named ProductAuth in Solidity to register and verify products on the blockchain.

2. Incorporated decentralized verification by allowing multiple entities to contribute to the product's verification trail.

3. Deployed and tested the contract using Ganache, simulating a local Ethereum blockchain.

4. Designed functions to:

    a. Register products uniquely with name and origin.

    b. Track which addresses have verified a product.

    c. Confirm the authenticity of a product based on its existence in the blockchain record.

5. Planned to integrate this smart contract into a user-friendly frontend dApp to interact with real users.

Chapter 2

Methodology

Steps in Implementation

1. **Smart Contract Development**
   A ProductVerification contract was created using Solidity to:

   a. Add products (addProduct)

   b. Verify product details (verifyProduct)

   c. Check if a product is fake (isFake)

2. **Smart Contract Deployment**
   The contract is deployed to the Ethereum blockchain using a development environment (Remix).

3. **Frontend Development**
   A web-based frontend allows users to:

   a. Connect MetaMask wallet

   b. Add product (owner only)

   c. Verify product

   d. Check if product is fake

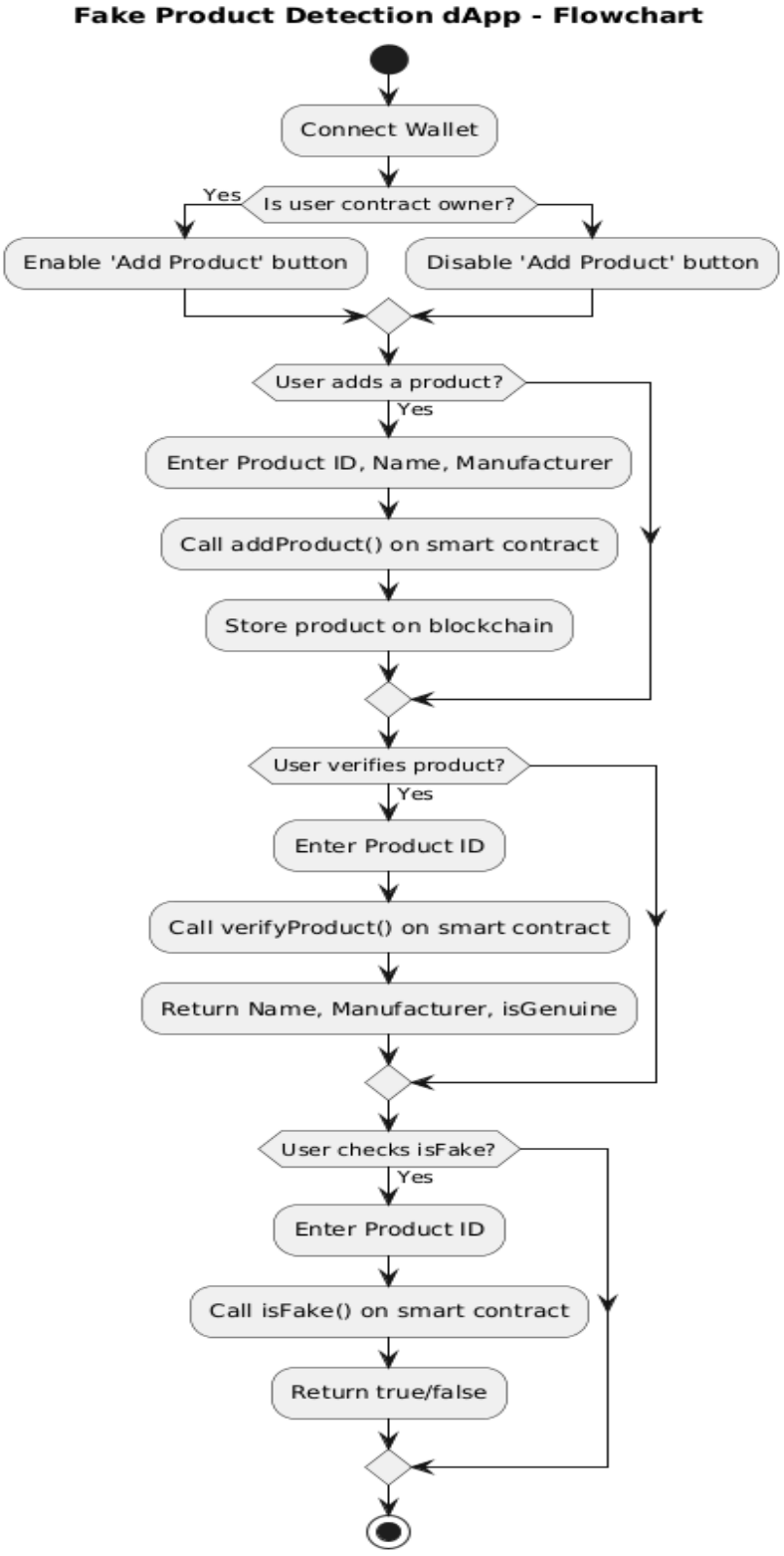
4. **Web3 Integration**
   Using Web3.js, the frontend interacts with the blockchain to:

   a. Read data from the smart contract

   b. Write transactions (adding products)

5. **Testing & Deployment**
   Tested on a local blockchain or testnet (like Sepolia) before moving to the mainnet.

Flow Chart


Fake Product Detection dApp - Flowchart
Connect Wallet
Is user contract owner?
Yes
Enable 'Add Product' button
Disable 'Add Product' button
User adds a product?
Yes
Enter Product ID, Name, Manufacturer
Call addProduct() on smart contract
Store product on blockchain
User verifies product?
Yes
Enter Product ID
Call verifyProduct() on smart contract
Return Name, Manufacturer, isGenuine
User checks isFake?
Yes
Enter Product ID
Call isFake() on smart contract
Return true/false

Relevance of Blockchain to the Application

Blockchain provides the core benefits that make this system secure and reliable:

- Immutability: Once data (product details) is added, it cannot be tampered with.
- Transparency: Anyone can verify the authenticity of a product.
- Decentralization: No central authority controls the product data.
- Trustless Verification: Users don't have to trust a third party — they trust the code.

This makes blockchain an ideal solution for counterfeit detection and product authenticity verification.

Implementation details

Smart Contract (ProductVerification)

1. addProduct(string id, string name, string manufacturer)
   Adds a genuine product with a unique ID.

2. verifyProduct(string id)
   Returns the product's name, manufacturer, and if it's genuine.

3. isFake(string id)
   Returns true if the product is not genuine.

Frontend (HTML + JS + Web3.js)

1. Provides a simple interface to:
    a. Connect to MetaMask
    b. Add new products (restricted to owner)
    c. Verify any product

d. Check if a product is fake

Deployment

1. Contract deployed on testnet (or mainnet)
2. dApp hosted via GitHub Pages or IPFS

Chapter 3

Results and Discussion

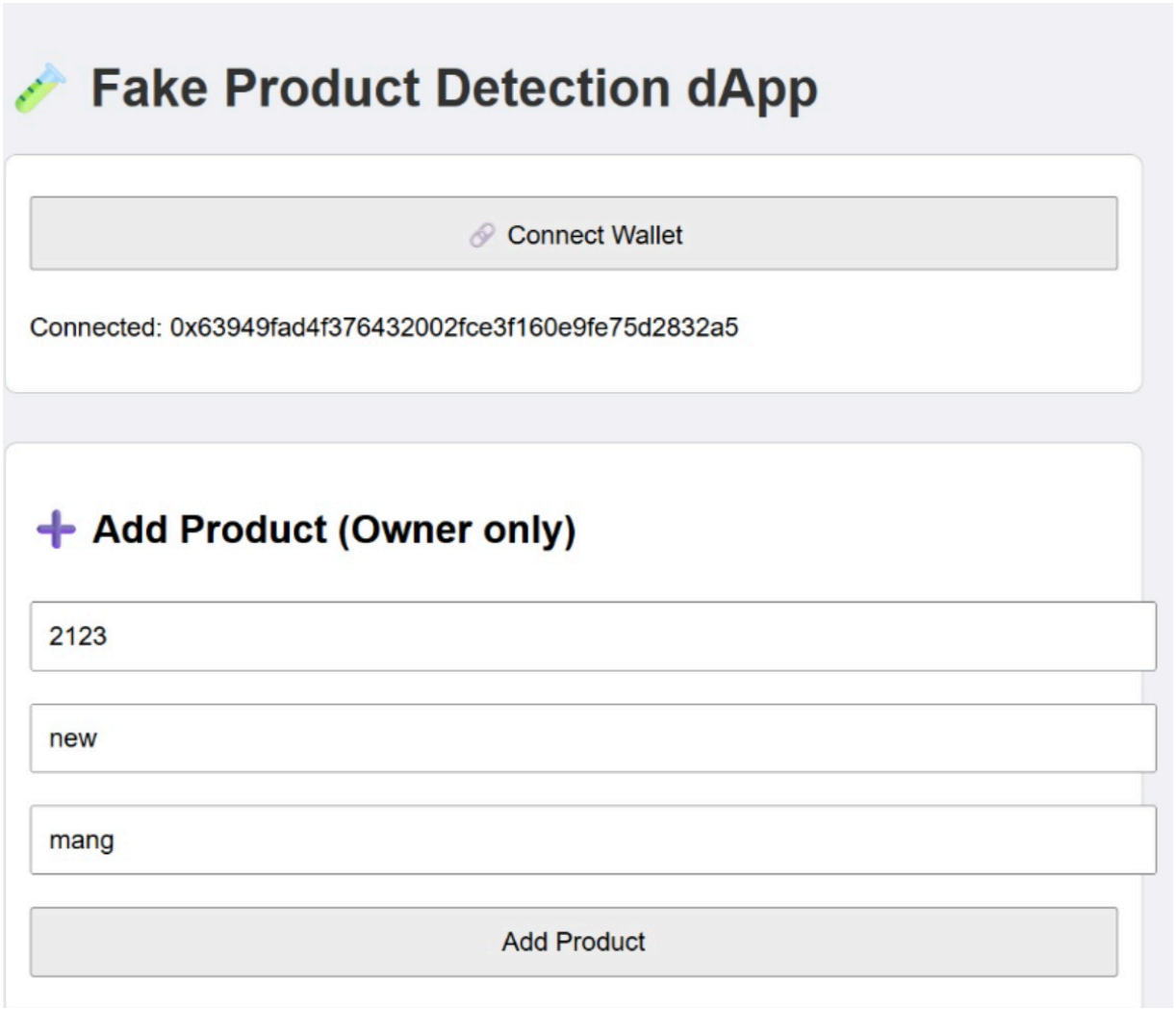


fig 3.1 Interface for owner to add new product

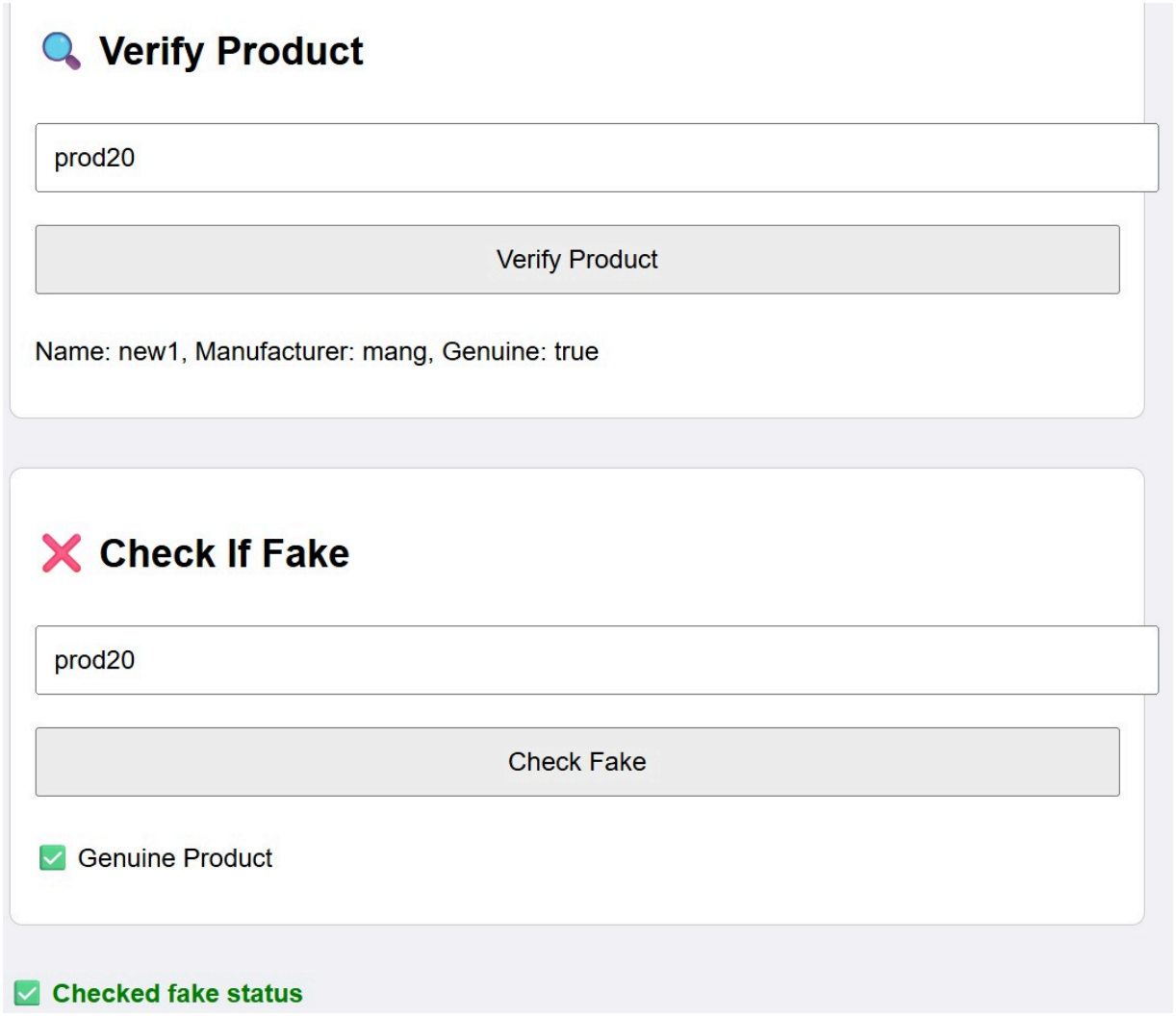


fig 3.2 Interface for user to verify product and check if product is fake

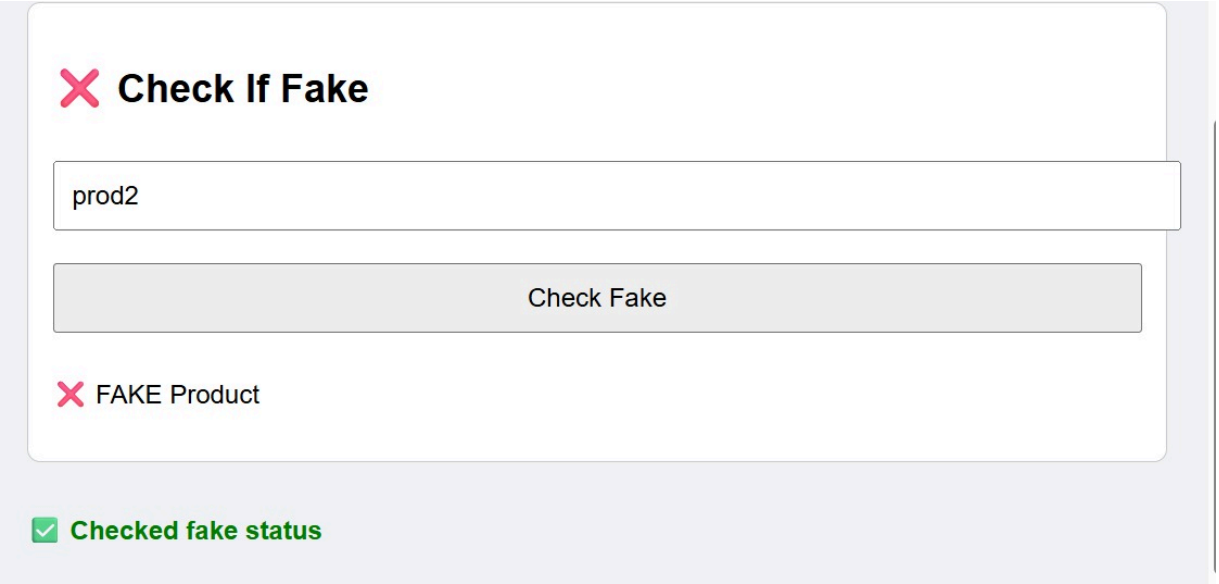


fig 3.3 Interface for user to check whether a product is fake or real using product ID

Chapter 4

Conclusion and Future Work

4.1 Conclusion

In this project, we successfully designed and implemented a blockchain-based decentralized application (dApp) for fake product detection. The smart contract stores product data immutably on the Ethereum blockchain, ensuring transparency and trust. Users can verify a product's authenticity in real time, and only the contract owner is permitted to add products, preventing unauthorized modifications. The frontend, integrated with Web3.js, provides a user-friendly interface to interact with the contract.

This solution enhances consumer protection by reducing the risk of counterfeit goods in the market, particularly in industries like pharmaceuticals, electronics, and luxury items where product authenticity is critical.

Future Work:

- **Integration with QR/Barcode Scanning:** Enable automatic verification by scanning product labels.
- **AI-Powered Authenticity Scores:** Add a machine learning module to score product authenticity based on historical data.
- **Multi-Role Access:** Introduce different user roles (e.g., manufacturers, regulators) with permission control.
- **NFT-based Product Tokens:** Represent each product as a non-fungible token for better traceability and resale verification.
- **Mobile dApp Support:** Extend the application for mobile platforms via React Native or Flutter integration.

References:

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2. Detection of Counterfeit Products using Blockchain

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3. Mastering Blockchain- Imran Bashir