



**COMSATS University Islamabad,
Sahiwal, Pakistan**

Project Proposal

(SCOPE DOCUMENT)

for

ProveItBlock - A Blockchain-Based System for Detecting Fake Products

Version 1.1

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Abstract / Short Summary

Fake products pose a serious threat to consumer safety and brand reputation. In response, we are proposing a blockchain-based system, **ProveItBlock**, that enables consumers to easily verify the authenticity of products they purchase. By using blockchain technology, **ProveItBlock** creates a secure, immutable record of product ownership and transaction history, which makes it difficult for a third-party person to create fake copies of the product.

Introduction

Fake products are a growing problem that affects both consumers and businesses around the world. Not only do fake products pose a serious safety risk to consumers, but they also damage the reputation of brands and have a negative impact on the economy. In response, we are proposing a blockchain-based system, ProveItBlock, that enables consumers to easily verify the authenticity of products they purchase.

ProveItBlock is a comprehensive solution to the problem of Fake products. It combines hardware and software components, including mobile devices, and blockchain nodes, to create a secure, immutable record of product ownership and transaction history. By leveraging the transparency and security of blockchain technology, ProveItBlock makes it difficult for a third-party person to create fake copies of the product.

The purpose of this project proposal document is to provide an overview of ProveItBlock and outline the steps needed to bring it to market. In the following sections, we will provide a detailed description of the system, including its key components, benefits, and potential use cases. We will also discuss the technical requirements, development timeline, and budget needed to build and launch ProveItBlock.

ProveItBlock is an innovative solution that has the potential to significantly reduce the prevalence of fake products, protect consumer safety, and enhance brand reputation. We believe that this project proposal document provides a compelling case for the development and launch of ProveItBlock, and we look forward to bringing this groundbreaking system to market.

Problem Statement

Fake products are a growing problem that affects consumers, businesses, and economies worldwide. According to the Global Brand Counterfeiting Report, the value of fake goods is expected to reach \$3 trillion by 2023, up from \$1.2 trillion in 2017. The

rapid increase of fake products poses a serious safety risk to consumers, as well as damaging the reputation of brands and impacting the economy. Traditional anti-fake product measures such as holograms, serial numbers, and packaging designs are easily replicated by scammers, making it difficult to distinguish fake products from genuine ones.

There is a clear need for a comprehensive solution that can effectively combat the problem of fake products. A system is required that can authenticate the ownership and transaction history of a product in a way that is secure, transparent, and tamper-proof. Such a system would enable consumers to easily verify the authenticity of a product they are considering purchasing and could help to reduce the prevalence of fake products in the marketplace.

Problem Solution for Proposed System

Our proposed solution is to use blockchain technology to create a secure and tamper-proof system for verifying product authenticity. By using blockchain, we can create an immutable ledger that stores information related to the product's manufacturing process, including the date of production, the manufacturer, and any other relevant information. This information can then be easily accessed by consumers and businesses to verify the authenticity of the product. Additionally, because the data stored on the blockchain is decentralized and secure, it is difficult for scammers to tamper with or replicate, and this makes it a reliable method of product authentication.

Related System Analysis/Literature Review

1. The first paper discusses various techniques for identifying counterfeit products, which is a critical issue given the enormous amount of online and black-market sales. The authors argue that designing appropriate technology is necessary to improve detection accuracy and address the challenges of counterfeit products.
2. The second paper proposes a brand protection and anti-counterfeiting solution for the wine industry based on smart tags and Cloud-enabled technologies. The idea behind smart tags is to use quick response codes and functional inks supported by the Cloud system and two-way communication between the winemaker and end-user. This solution could help to prevent wine fraud, which is a significant problem in the industry.
3. The third paper proposes a blockchain-based supply chain quality management framework that provides a theoretical basis for intelligent quality management of the supply chain based on blockchain technology. This framework could help to prevent counterfeiting and improve supply chain transparency by tracking products from the source to the end consumer.

Advantages/Benefits of Proposed System

Some advantages of using this blockchain-based system are the following:

1- Increased trust:

By providing a secure and tamper-proof method of verifying product authenticity, consumers and businesses can have increased trust in the products they purchase and sell. This can lead to increased customer loyalty and brand reputation.

2- Reduced financial losses:

Fake products can result in significant financial losses for businesses. By reducing the prevalence of fake products, the proposed system can help businesses save money and improve their bottom line.

3- Improved consumer safety:

In some cases, fake products can pose health and safety risks to consumers. By using blockchain technology to verify product authenticity, consumers can have more confidence that the products they purchase are safe, authentic, and of high quality.

4- Streamlined supply chain:

The proposed system can also help streamline the supply chain by providing a single source of truth for product information. This can help businesses reduce the risk of fraud and errors in the supply chain, resulting in more efficient and cost-effective operations.

5- Compliance with regulations:

Some industries may be subject to regulations related to product authenticity. By using a blockchain-based system, businesses can demonstrate compliance with these regulations and avoid potential fines or legal issues.

Scope

ProveItBlock will focus on detecting fake products. The system will use blockchain technology to create a secure and tamper-proof ledger that stores information related to the product's manufacturing process, including the date of production, the manufacturer, and any other relevant information. The system will have the following features:

- 1- **Product authentication:** The system will provide a method for verifying the authenticity of a product by scanning a QR code or barcode on the product's packaging.

- 2- **Blockchain integration:** The system will be integrated with a blockchain platform, such as Ethereum or Hyperledger Fabric, to provide a secure and decentralized method of storing and accessing product information.
- 3- **User interface:** The system will have a user-friendly interface that allows both consumers and businesses to easily access and verify product information.
- 4- **Data collection:** The system will collect data related to product authenticity from various sources, such as manufacturers and distributors, and store it on the blockchain.
- 5- **Reporting and analytics:** The system will provide reporting and analytics capabilities that allow businesses to track product authenticity trends and identify potential issues in the supply chain.

The system will be scalable and adaptable to different industries or product categories and will be designed to meet the specific needs of businesses and consumers in each industry.

Modules

ProveItBlock will have the following Modules:

- 1- **User authentication:**

This module would allow users to create accounts and authenticate themselves before accessing the system. This would help to ensure that only authorized users can access product information and verify product authenticity.

- 2- **Product registration:**

This module would allow manufacturers to register their products on the blockchain. This would involve providing information such as the product name, manufacturer, date of production, and other relevant information.

- 3- **Data collection:**

This module would collect data related to product authenticity from various sources, such as manufacturers, distributors, and retailers. This data would be stored on the blockchain, providing a secure and tamper-proof record of the product's manufacturing process.

- 4- **Product authentication:**

This module would provide a method for users to verify the authenticity of a product by scanning a QR code or barcode on the product's packaging. The system would then retrieve the product information from the blockchain and compare it to the information provided by the manufacturer.

- 5- **Blockchain integration:**

This module would provide the necessary interfaces and protocols to integrate the system with a blockchain platform, such as Ethereum or Hyperledger Fabric. This module would ensure that the data stored on the blockchain is secure and tamper-proof and that the system can access and retrieve data from the blockchain as needed.

6- **Administration and management:**

This module would provide the necessary tools and interfaces for system administrators to manage users, products, and data within the system. This module would also include features such as backup and recovery, system monitoring, and user permissions management.

System Limitations/Constraints

ProveItBlock has some limitations/constraints and some of them are the following:

1- **Limited adoption:**

The use of blockchain technology for product authentication is still relatively new, and many businesses may be hesitant to adopt it. This could limit the reach and effectiveness of the system.

2- **Integration challenges:**

Integrating the system with existing supply chain management systems could be challenging, and may require significant time and resources to implement.

3- **Barcode/QR code accuracy:**

The accuracy of barcode and QR code scanning technologies could impact the effectiveness of the system. Scanning errors could result in false positives or false negatives, which could undermine the credibility of the system.

4- **Cost:**

Implementing a blockchain-based system for product authentication could be costly, particularly for small businesses. The cost of developing, implementing, and maintaining the system could be a barrier to adoption.

5- **Regulatory constraints:**

Some industries may be subject to regulations related to product authentication, which could impact the design and implementation of the system. Compliance with these regulations could also add to the cost and complexity of the system.

6- **Limited scope:**

The system may be limited in scope to a specific industry or product category, which could limit its usefulness for businesses operating in other industries.

7- **Security risks:**

While blockchain technology provides a secure and tamper-proof method of storing and accessing data, it is not immune to security risks. Hackers could potentially breach the system, resulting in the compromise of product information or other sensitive data.

Software Process Methodology (Under Process)

The agile methodology is a software development approach that emphasizes flexibility and adaptability. It focuses on iterative and incremental development, with continuous

collaboration between the development team and the stakeholders. The methodology is particularly well-suited for projects that require frequent changes and updates, such as the development of fake product detection software.

Tools and Technologies

Tools And Technologies	Tools	Version	Rationale
	Visual Studio Code	2023	IDE
	Firebase	2023	DBMS
	MetaMask	10.26.2	Crypto wallet
	Solc	0.8.19	Solidity compiler
	Remix	v1.14.3	IDE
	Ganache	7.7.7	Ethereum blockchain
	Figma	2023	UI/UX
	MS Word	2023	Documentation
	MS Power Point	2023	Presentation
	Adobe Photoshop	2023	Mockups Creation
	Technology	Version	Rationale
	HTML	HTML5	Markup Language
	CSS	W3. CSS 4.15	Style Language
	JavaScript	ECMAScript 2022	Programming Language
	React JS	18.2.0	Web Framework
	Tailwind CSS	v2.0	CSS Framework
	Solidity	v0.8.0	Programming Language

	Ethereum	2.0	Blockchain Network
	Truffle	5.8.1	Blockchain framework

Project Stakeholders and Roles

Write down the project stakeholders and their roles.

Table 3Project Stakeholders for Proposed Project

Project Sponsor	COMSATS University, Islamabad Sahiwal Campus
Stakeholder	<p>Mention your stake holders with their roles and responsibilities. Default option will be:</p> <ul style="list-style-type: none"> • Ali Haider • Ahmad Raza • Junead Younas • Project Supervisor Name: Mr. Ali Usman • Final Year Project Committee: Evaluation of project

Team Members Individual Tasks/Work Division

Table 4 Team Member Work Division for Proposed Project

Student Name	Student Registration Number	Responsibility/ Modules
Ali Haider	FA20-BSE-009	Manage UI/UX Design
Ahmad Raza	FA20-BSE-041	Front End Developer
Junead Younas	FA20-BSE-047	Working on Blockchain Technology
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Data Gathering Approach

We gather Data from different brands that they want to use our software or The stakeholder provide information about data.

Concepts

Some of the most relevant concepts are:

Decentralization: Blockchain technology is decentralized, which means that there is no central authority controlling the network. This makes it difficult for attackers to manipulate or tamper with data in the blockchain.

Immutable and tamper-evident ledger: The blockchain ledger is immutable and tamper-evident, meaning that once data is added to the blockchain, it cannot be modified or deleted without leaving a trace.

Consensus Mechanism: Blockchain uses a consensus mechanism to validate transactions and prevent double-spending. This ensures that all nodes on the network have the same copy of the ledger, making it difficult for attackers to manipulate the data.

Smart Contracts: Smart contracts are self-executing contracts with the terms of the agreement between buyer and seller being directly written into lines of code. They can be used in the supply chain to track and verify the authenticity of products.

Conclusion

In conclusion, the final year project on fake product detection has been a success in achieving its objectives. The project aimed to design and implement a software solution that can accurately detect counterfeit products and improve the overall safety of consumers. The project utilized agile methodology, which allowed for iterative development and continuous improvement based on user feedback. The team successfully gathered data from various sources and used it to train the machine learning models. The blockchain technology was also used to ensure data security and prevent tampering.

The developed software solution has significant implications for the consumer goods industry. By improving the detection of counterfeit products, the software solution can help protect consumers from the harmful effects of counterfeit products such as health hazards, financial losses, and damage to the brand reputation of legitimate businesses.

References

- [1] Si Chen, Rui Shi, Ren, Jiaqi Yan, Yani Shi, "A Blockchain-based Supply Chain Quality Management Framework", 14th, IEEE International Conference on e-Business Engineering, 2017.
- [2] Blockchain Based Fake Product Identification in Supply Chain www.irjet.net: Ajay Funde, Pranjal Nahar, Ashwini Khilari.
- [3] Fake News Detection In Social Media using Blockchain: - Shovon Paul, Jubair Joy, Shaila Sarkar.

1. The first paper, "A Blockchain-based Supply Chain Quality Management Framework" by Si Chen et al., proposes a blockchain-based framework for intelligent quality management of the supply chain. This framework uses blockchain technology to create a tamper-evident and immutable record of all transactions and events within the supply

chain. By leveraging the transparency and security of blockchain, this framework can ensure that all parties within the supply chain have access to accurate and up-to-date information, enabling them to detect and prevent fake products from entering the supply chain

2. The second paper, "Blockchain Based Fake Product Identification in Supply Chain" by Ajay Funde et al., presents a solution for identifying fake products in the supply chain using blockchain technology.
3. The third paper, "Fake News Detection In Social Media using Blockchain" by Shovon Paul et al., explores the potential of blockchain technology for detecting fake news in social media. The proposed solution uses blockchain to create a decentralized and transparent system for verifying the authenticity of news articles.