



# BLOCKCHAIN BASED E-COMMERCE ONLINE APPLICATION

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## ABSTRACT

*In existing E-commerce application all customers and product details will be stored and managed in single centralized server and if this server crashed due to too many requests and or if server is hacked then services will not be available to other customers and to overcome from this problem, we are migrating E-commerce application to Blockchain which will maintain data at multiple nodes/servers and if one node down then customers can get data from other working nodes. Another advantage of Blockchain is inbuilt support for data encryption and immutability (data cannot be altered by unauthorized users) and it will consider each data as block/transaction and associate each block storage with unique hash code and before storing new records. Blockchain will verify hash code of previous blocks and if all nodes' blocks verification successful then data is considered as secured.*

**KEYWORDS** – Blockchain, Decentralize, E-Commerce, Smart Contracts, Solidity, Hash code.

## I. INTRODUCTION

Ecommerce is one of the leading industries around the world. Ecommerce platforms require tremendous power and storage to manage large amounts of data and other services. Even though the industry has superior functioning at present, there are ways to enhance it further, which is possible through blockchain technology. Blockchain can help e-commerce businesses to handle data more efficiently. The platforms can store information about users, products, orders, deliveries, manufacturers, sellers, and much more in an organized manner in a blockchain network. Blockchain is well-known for its security features that provide the ecommerce sector with extra layers of security. It cuts down the intermediaries and promotes peer-to-peer transactions. We get many added features like quick transactions, reduced chargeback frauds, customer reviews verification, personalized product offerings. With traceability, blockchain guarantees end-to-end product tracking to the customers.

## II. OBJECTIVES

1. Implement a secure e-commerce system using blockchain to protect customer data and ensure service availability.
2. Utilize blockchain's decentralized nature to prevent single points of failure and enhance system reliability.
3. Ensure data integrity and prevent unauthorized alterations through blockchain's immutable ledger.
4. Create user-friendly modules using Django for product management, orders, and user interactions to streamline e-commerce operations.
5. Design and develop a user-friendly website to host the aforementioned applications, making them accessible to farmers and agricultural stakeholders. The objective is to create an intuitive platform where users can easily input data and receive actionable insights to optimize their farming practices.
6. Adjust the model to make it more accurate and user-friendly.

## III. LITERATURE SURVEY

For a literature survey tailored to the project of migrating an e-commerce application to a blockchain-based system, it's essential to focus on scholarly articles, journals, and case studies that provide insights into both the technical and business aspects of such a migration. This survey will cover foundational concepts, technical implementations, benefits, challenges, and real-world applications relevant to integrating blockchain technology into e-commerce platforms.

[1] Crosby, M., et al. (2016). Blockchain Technology: Beyond Bitcoin. Applied Innovation Review, Issue 2. These works introduce the concept of blockchain as a decentralized ledger, explaining the technology's fundamentals, including its encryption, immutability, and consensus mechanisms.

[2] Christidis, K., & Devetsikiotis, M. (2016). Blockchains and Smart Contracts for the Internet of Things. IEEE Access. These



works introduce the concept of blockchain as a decentralized ledger, explaining the technology's fundamentals, including its encryption, immutability, and consensus mechanisms.

[3] Wüst, K., & Gervais, A. (2018). Do you need a Blockchain? 2018 Crypto Valley Conference on Blockchain Technology (CVCBT). This paper critically evaluates scenarios where blockchain is a suitable solution, discussing the challenges in migrating existing applications to blockchain, including scalability, transaction costs, and regulatory issues.

[4] Iansiti, M., & Lakhani, K. R. (2017). The Truth About Blockchain. Harvard Business Review. This article provides an in-depth look at the strategic value of blockchain technology, including its impact on trust, efficiency, and transparency in business transactions, with implications for e-commerce

[5] Zhu, H., & Zhou, Z. Z. (2018). Analysis and Outlook of Applications of Blockchain Technology to Equity Crowdfunding in China. Financial Innovation. While focusing on equity crowdfunding, this study offers insights into how blockchain technology has been applied in real-world scenarios, serving as inspiration for e-commerce applications. It discusses the practical benefits and lessons learned from these early adopters.

[6] Croman, K., et al. (2016). On Scaling Decentralized Blockchains. In 3rd Workshop on Bitcoin and Blockchain Research. This work addresses the technical limitations of current blockchain technology, such as scalability and performance issues, which are critical to consider when developing a blockchain-based e-commerce platform.

#### IV. METHODOLOGY

During this project work the approach followed can be described in the following steps. They are

1. User Authentication
2. Model Development
3. Website Development
4. Integration
5. Testing
6. Deployment
7. Monitoring & Maintenance

##### User Authentication

Signup: This module enables users, both consumers and suppliers, to create their accounts on the e-commerce platform. During signup, users provide their essential information such as name, email, and password. After successful signup, they can log in using their credentials.

Login: The login module allows registered users to access their accounts by entering their username and password. Successful login provides access to the platform's features and functionality.

##### Model Development

We have two users suppliers and consumers.

In supplier modules we have

- *Add Product*: this module allows suppliers to list their products on the platform. They can provide details such as product name, description, price, and upload product images. This module ensures that new products are seamlessly added to the e-commerce platform.
- *Update Quantity*: This module allows suppliers to manage their product inventory efficiently. They can update the quantity of each product listed on the platform. This ensures that customers see accurate stock information when browsing products.
- *View Orders*: This module provides a summary of the orders placed by consumers for the supplier's products. Suppliers can track order status, delivery details, and other relevant information.

So, in consumer modules we have

- *Browse Products*: Within this module, customers can search and view product listings. They can filter products based on various criteria, helping them find the items they want to purchase.
- *Place Order*: Here, consumers are provided by a click here link. By clicking on it they can place the orders

##### Website Development

Developed the frontend using HTML, CSS, and JavaScript frameworks like React.

Implement responsive design techniques to ensure optimal performance across devices and screen sizes.

Integrate blockchain-related features into the frontend, such as Solidity and ethers payment options and real-time transaction tracking.



**Integration**

Integrate the trained machine learning and deep learning models into the website's backend. Develop APIs or scripts to handle user inputs, invoke the appropriate models, and generate recommendations or diagnosis results.

**Testing**

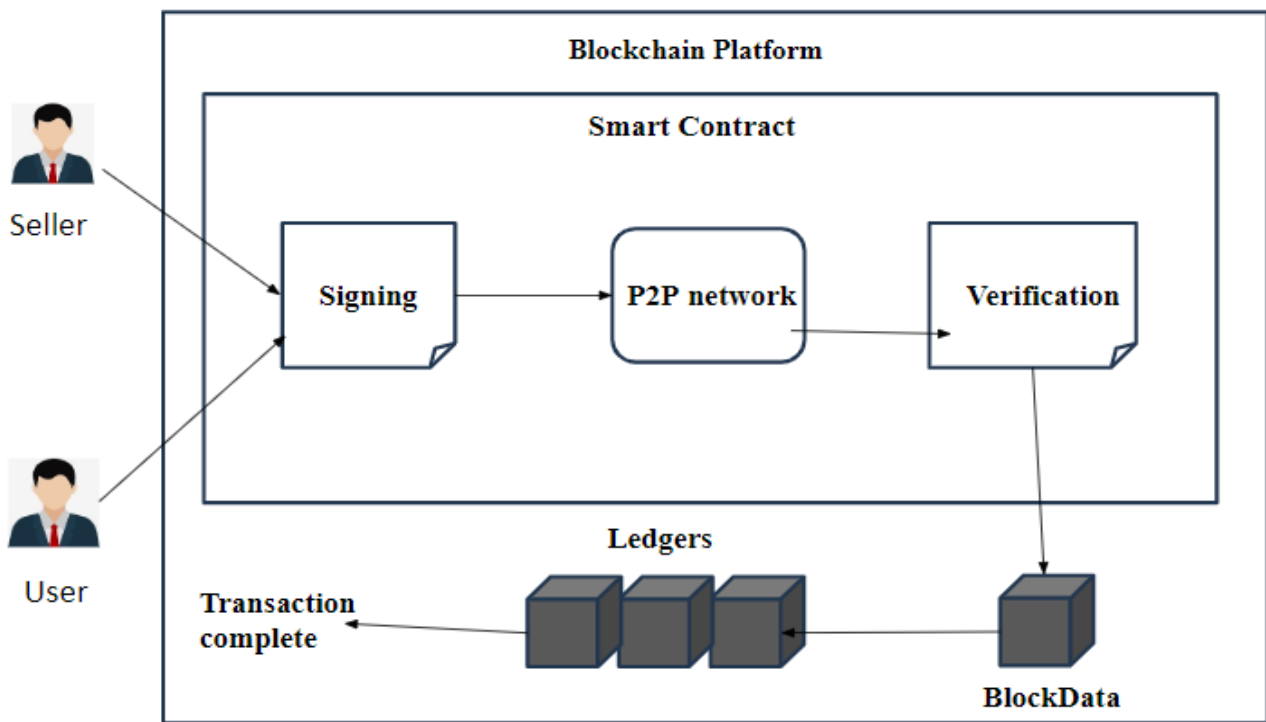
Test the functionality and performance of the website and its applications. Conduct unit tests, integration tests, and user acceptance tests to ensure that the system functions correctly and provides accurate recommendations and diagnoses.

**Deployment**

Deploy the website and its applications on a web hosting platform or server. Ensure that the website is accessible to users over the internet and that it can handle concurrent user requests and data processing tasks.

**Monitoring & Maintenance**

Clean Implement monitoring tools to track website performance, user interactions, and model accuracy over time. Regularly update the models with new data and improvements to ensure the effectiveness of recommendations and diagnoses. Provide ongoing maintenance and support for the website, addressing any issues or bugs that arise and incorporating user feedback for further enhancements.



**Fig.1: System Architecture**



## V. RESULTS

Our output screens are as follows:

### 1. Welcome Page

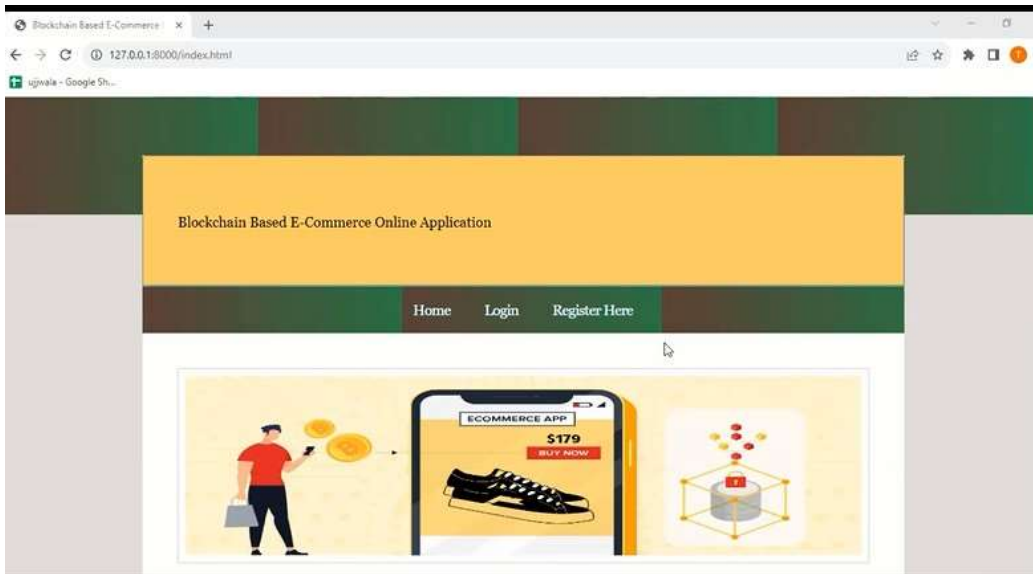


Fig.2: Welcome Page

### 2. User Signup page

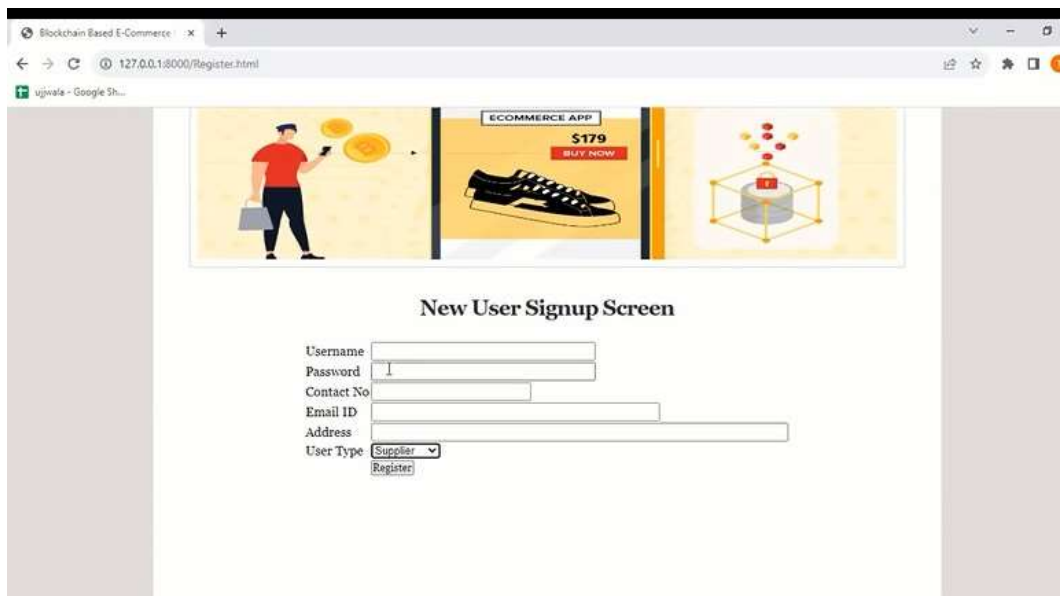


Fig.3: New User Signup page



3. Login Page

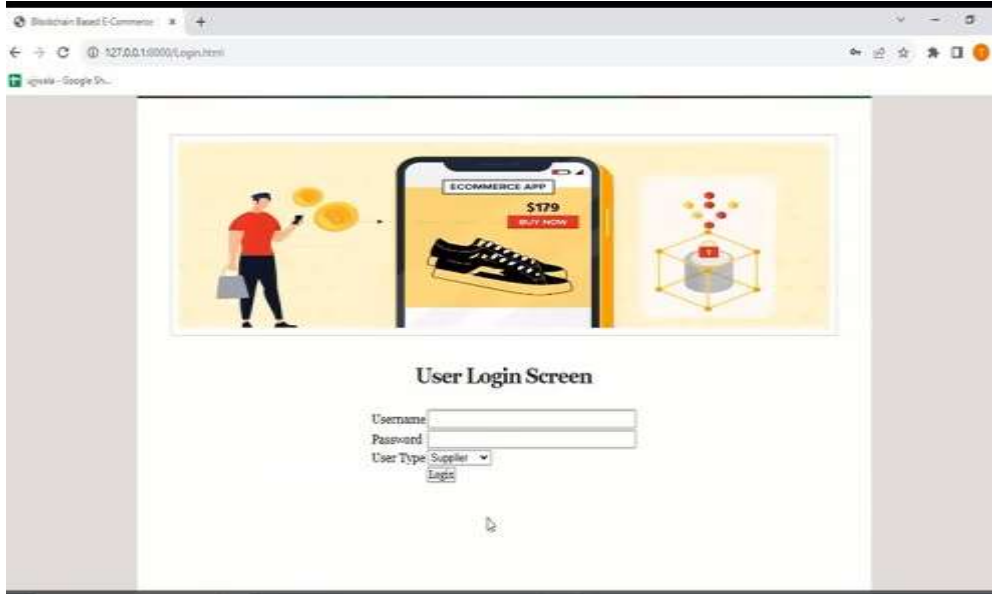


Fig.4: Login Page

4. Products Update Page

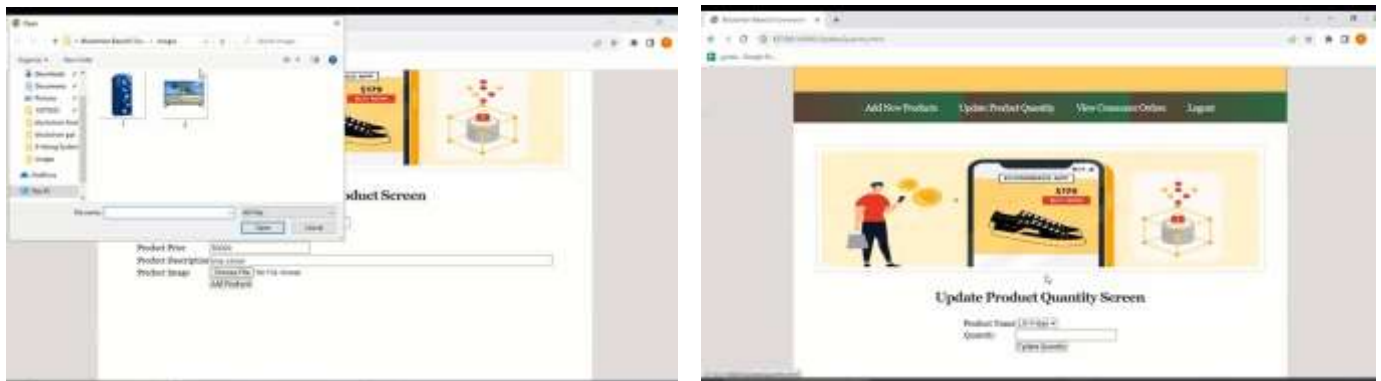


Fig.5: Updating the Product Quantities



5. Products Explorer Page

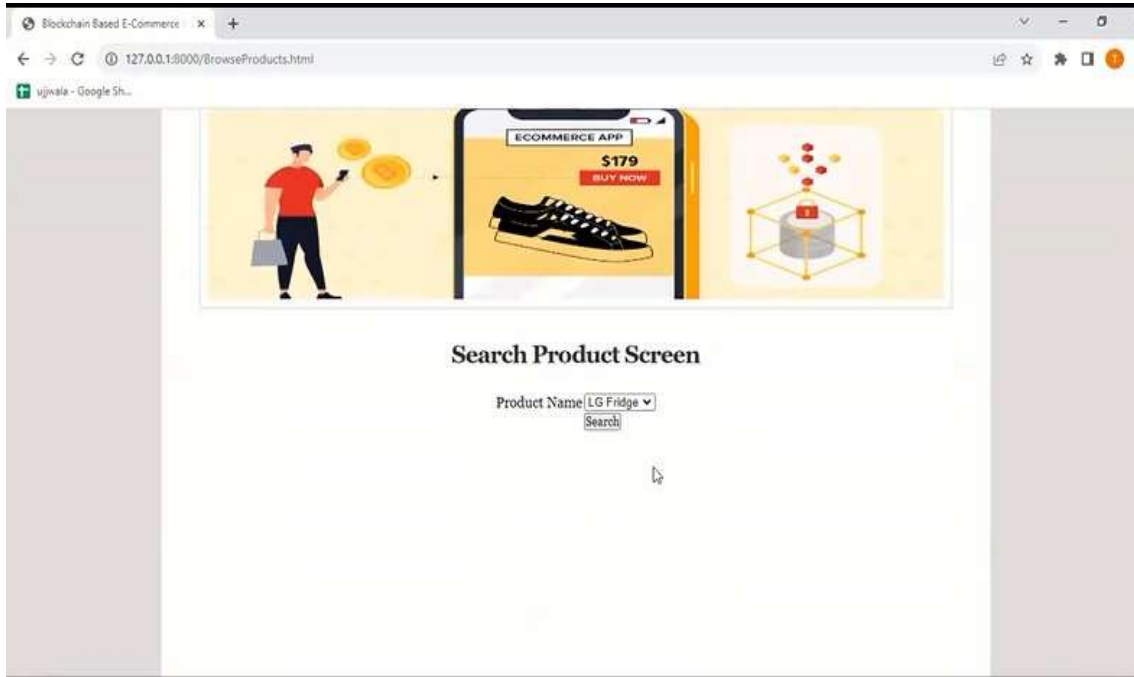


Fig.6: Products Explorer

6. Products Visualization

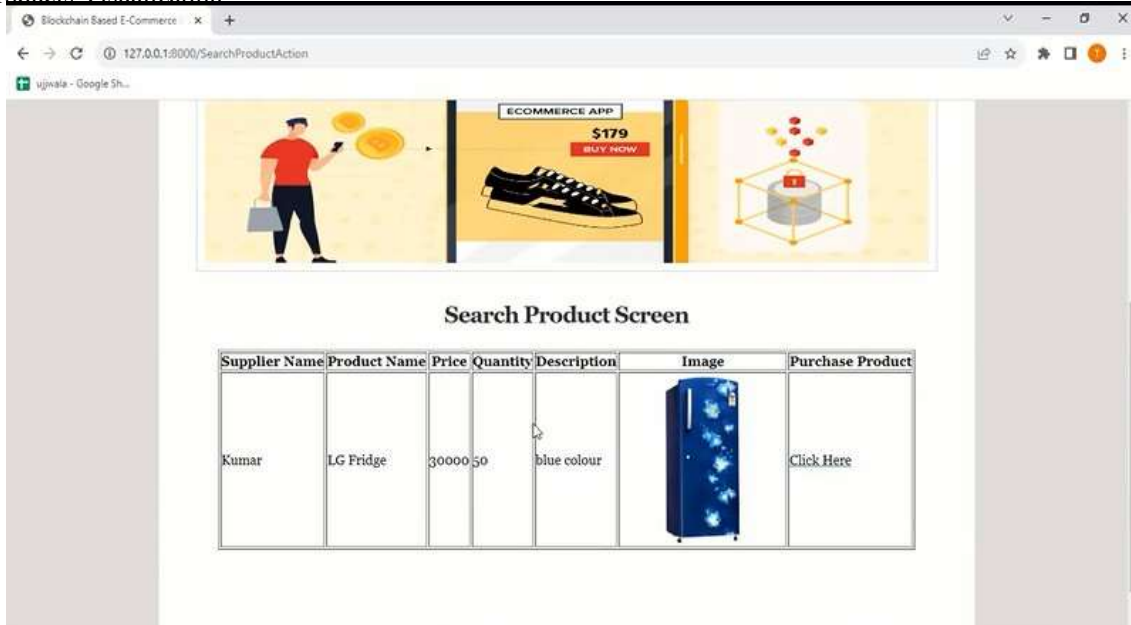
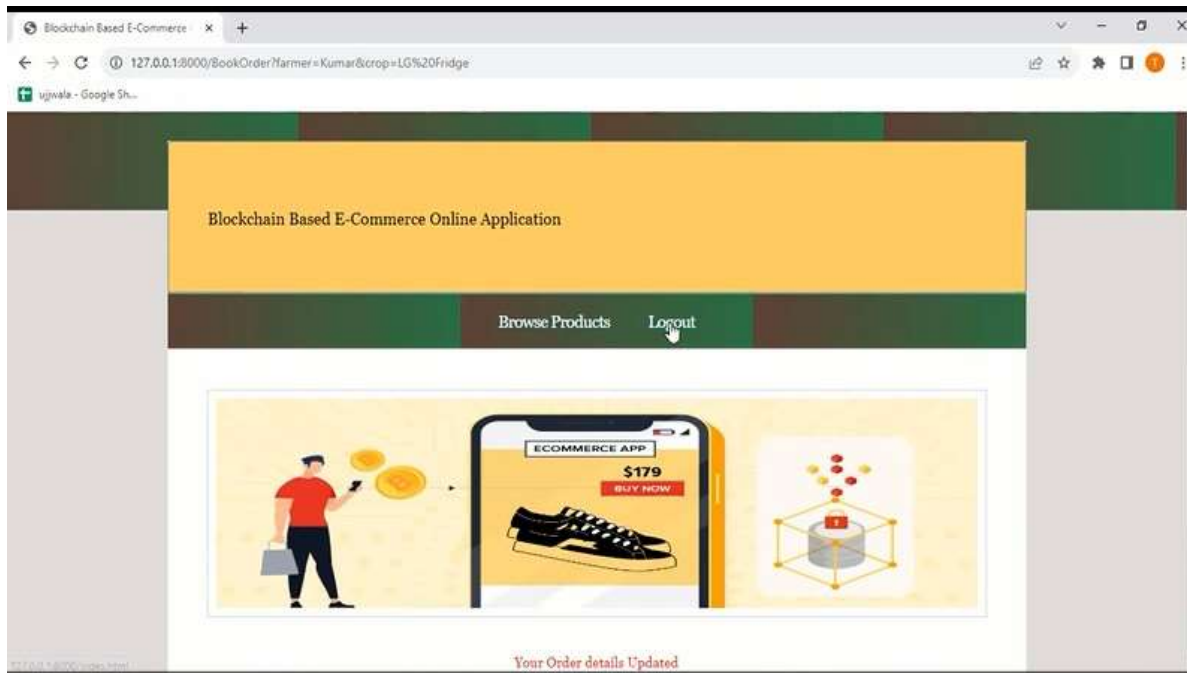


Fig.7: Visualizing the products





## 7. Product Cart Page



**Fig.8: Product Cart Page**

## VI. CONCLUSION

The project successfully implements blockchain technology to significantly enhance security by preventing single points of failure and ensuring data integrity through immutable transactions. The adoption of blockchain's decentralized nature results in a highly reliable e-commerce system that remains available even in the face of server crashes or security threats. User-friendly modules for product management, orders, and interactions streamline e-commerce operations, improving the overall efficiency of the platform. By integrating blockchain and IPFS for data storage and retrieval, the project lays the foundation for a secure and scalable e-commerce ecosystem that is well-prepared for future advancements in technology and security.

## VII. FUTURE SCOPE

Implement blockchain-based reward systems and loyalty programs to incentivize customer engagement and retention. Tokenized rewards can be seamlessly integrated into the e-commerce platform, providing users with tangible benefits for their participation. Store product reviews and ratings on the blockchain to ensure their immutability and authenticity. This can help combat fake reviews and provide consumers with reliable information when making purchasing decisions.

Utilize smart contracts to automate various processes such as payments, order fulfillment, and dispute resolution. Smart contracts can facilitate trustless transactions, reducing the need for intermediaries and streamlining operations.

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