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# **Blockchain Empowered: Revolutionizing Agro-Based Supply Chain Management**

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# ABSTRACT

Agriculture, which provides jobs to 70% of rural India, faces supply chain inefficiencies causing losses up to 5.99% in cereals and 60% yield losses for farmers. Current supply chains often suffer from a lack of visibility, with only 6% of businesses .Inefficient processes and potential delays in order completion can lead to customer dissatisfaction and losses. Blockchain allows all stakeholders to access and verify the movement of goods, enhancing customer trust and satisfaction. Blockchain optimizes inventory management and logistics, reducing waste and increasing productivity, leading to cost savings.

# OBJECTIVE

- The main objective of this project is to harness the power of blockchain technology to transform India's agricultural supply chain, with the aim of reducing inefficiencies, decreasing losses, boosting farmers' income, and enhancing the consumer experience.

# EXISTING SYSTEM

- In the existing manual supply chain system for product sales, the process typically involves multiple intermediaries and manual record-keeping. Farmers or producers sell their products to middlemen or wholesalers, who in turn sell to retailers, and finally, the products reach the end consumers.
- Each step of this process relies heavily on paperwork, phone calls, and physical inspections to track products, negotiate prices, and facilitate transactions. This manual method is prone to errors, delays, and inefficiencies, leading to challenges such as lack of transparency, difficulty in tracing product origins, and increased risk of fraud or mismanagement.
- In this is RFID technology based agricultural products traceability scheme has been implemented .
- QR based scheme has been implemented for product traceability .

# DISADVANTAGES

- Less secure
- High maintainable cost
- High traceability cost.
- Increased risk of fraud

# PROPOSED SYSTEM

- The proposed system envisions a technologically advanced and secure approach to agriculture-based supply chain management through the implementation of blockchain.
- This innovative system aims to streamline and fortify the entire supply chain by leveraging blockchain decentralized and tamper-resistant nature.
- It will facilitate transparent and traceable recording of agricultural data, from cultivation practices to the sale of products. Farmers input data on product quality, quantity, and details into the blockchain network, which is then securely recorded and accessible to all stakeholders.
- The integration of smart contracts will automate and enforce agreements between stakeholders, reducing the need for intermediaries and minimizing inefficiencies.
- In the enhancing data security and ensuring a trustworthy supply chain, the proposed system seeks to empower the agricultural industry with a resilient, efficient, and transparent foundation for sustainable growth.

# ADVANTAGES

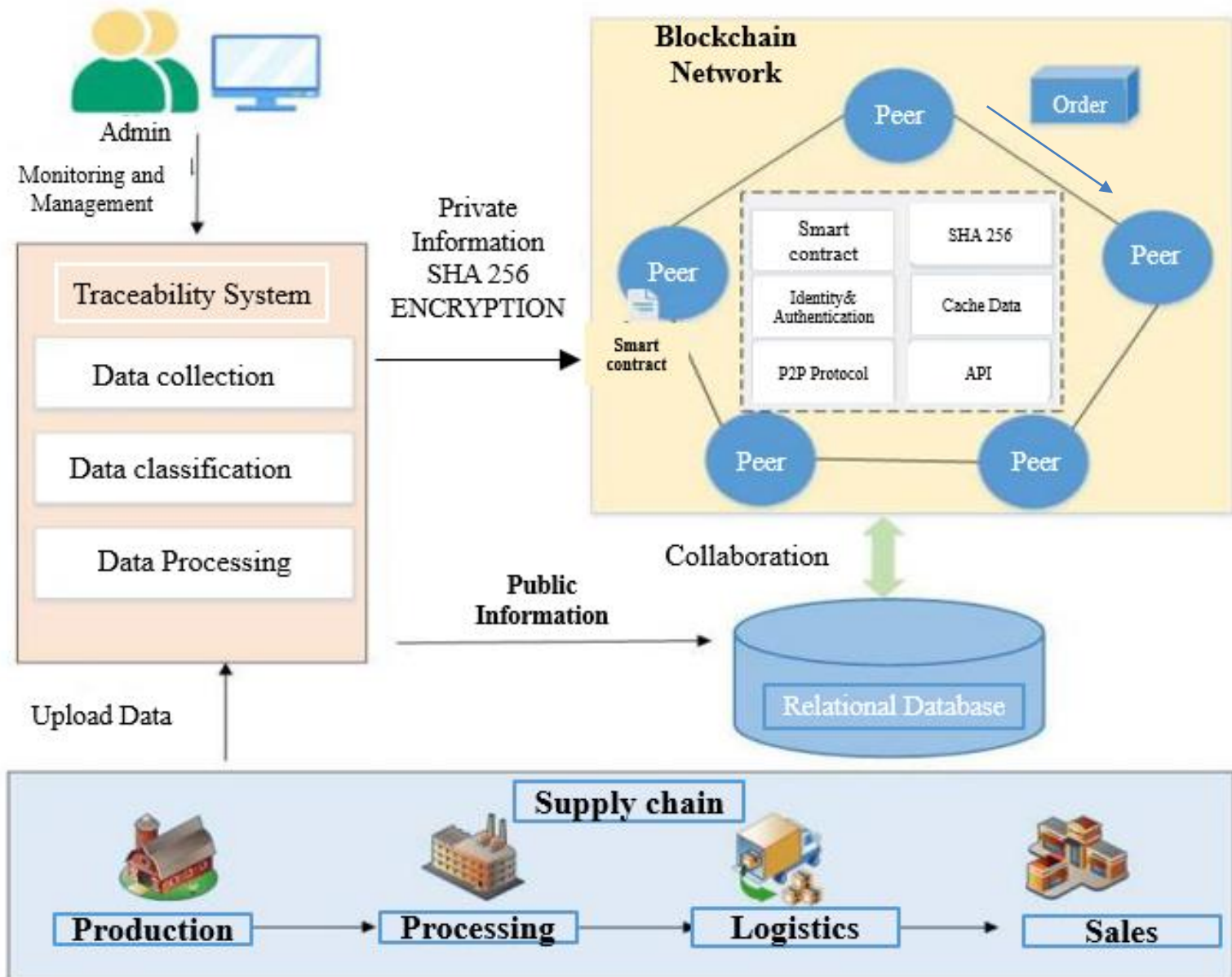
- Increased Efficiency: Blockchain can streamline logistics and optimize inventory management, leading to increased efficiency.
- Reduced Risk: Blockchain's decentralized and immutable nature can reduce risks associated with sourcing and transportation.
- Enhanced Trust: Blockchain offers unprecedented transparency and traceability, fostering trust among all stakeholders.
- Improved Collaboration: Blockchain can improve collaboration among various entities involved in the supply chain.
- Data encryption and security

# **LITERATURE SURVEY**



S.No	TITLE	AUTHORS NAME &YEAR	METHODOLOGY	LIMITATIONS
1	Blockchain in the Electronics Industry for Supply Chain Management: A Survey	Shruti Jadon, Anagha Rao, Thanushree R., Netra Jagadish, and Prasad B. Honnavalli- 2024	The implementation of blockchain technology and smart contracts to provide a decentralized and secure architecture for supply chain management in the electronics industry	This method may not be able to handle complex or dynamic scenarios that require human intervention or judgment.
2	Securing Sensing in Supply Chains: Opportunities, Building Blocks, and Designs	Jan Pennekamp, Fritz Alder, Lennart Bader, Gianluca Scopelliti, Klaus Wehrle, and Jan Tobias Mühlberg-2024	The framework for securing supply chains consists of four components: secure sensing, data storage, data sharing, and data processing. It explores four scenarios for end-to-end security in IoT-based supply chains.	The methodology may face issues in complex supply chains, challenges in trust management among actors, and potential performance and cost limitations, especially with blockchain-based solutions.
3	Blockchain Technology to Support Agri-Food Supply Chains: A Comprehensive Review	Marco Fiore and Marina Mongiello-2023	The paper uses a systematic literature network analysis (SLNA) to review blockchain technology's application in agri-food supply chains. It explores the use of blockchain for traceability, transparency, and trust	The challenges including policy and regulations, scalability, less skilled human resources, high investment, interoperability, lack of training for industries and stakeholders, and absence of developer tools.
4	Blockchain and Smart Contracts for Telecommunications: Requirements vs. Cost Analysis	Nima Afraz, Francesc Wilhelmi, Hamed Ahmadi, and Marco Ruffin-2023	The paper uses blockchain technology and smart contracts for telecommunications networks. It employs cost analysis and performance evaluation methodologies to study two use cases: 5G slice brokering and federated learning	The main limitation is the need for more resources for high-throughput use cases. Also, factors like cost, performance, and scalability of blockchain infrastructure deployment are often not adequately considered.
5	Cross-Border E-Commerce Supply Chain Decision-Making Considering Out-of-Stock Aversion Risk and Waste Aversion Risk	XIN XU AND SHAOJIE ZHOU-2023	The paper uses prospect theory to analyze risk preferences in cross-border e-commerce supply chains. It conducts a numerical analysis to examine the impacts of these risk preferences on decision-making	The model's assumption of perfect information and accurate estimation of risk preference coefficients, which may not reflect real-world behavior.

# ARCHIECTURE DIAGRAM



# MODULES

- Admin module
- Agro-based data collection
- Blockchain network
- Data encryption and security
- Supply chain management
- Buyer module

# MODULES DESCRIPTION

## **Admin Module (Login/Register):**

- This module provides authentication and authorization features for administrators.
- Administrators can log in securely to access the system's functionalities, such as data management and monitoring.
- New administrators can register to gain access to the system.

## **Agro-based Data Collection:**

- This module is responsible for gathering agricultural data, including information on quality standards, quantity produced, and product details such as name, type (e.g., rice, fruit, vegetable), and any other relevant attributes.
- Data may be collected from various sources such as farmers, producers, and distributors.

## **Blockchain Network:**

- This module establishes and maintains the blockchain network, utilizing its decentralized and immutable nature for secure data storage and transaction processing.
- Each transaction related to agricultural products, from production to sale, is recorded on the blockchain, ensuring transparency and traceability.

## **Data Encryption and Security:**

- This module focuses on encrypting sensitive agricultural data to protect it from unauthorized access or tampering.
- Encryption techniques are applied to ensure data security both during storage and transmission within the blockchain network.

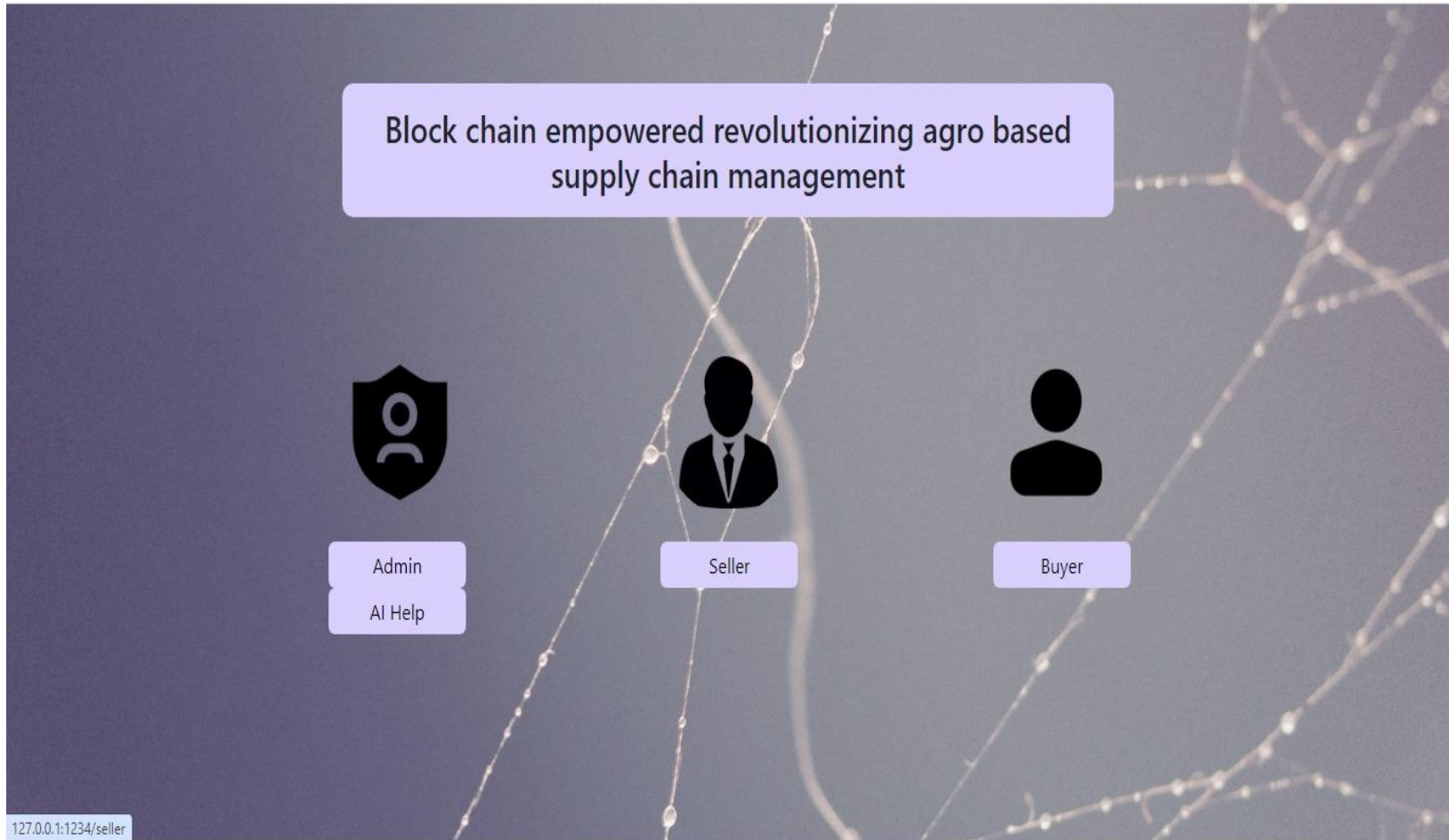
## **Supply Chain Management:**

- This core module manages the entire lifecycle of agricultural products within the supply chain.
- It tracks the movement of products from production to distribution, recording each transaction and process step on the blockchain.
- Smart contracts embedded in the blockchain automate and enforce agreements between stakeholders, facilitating seamless transactions and reducing inefficiencies.

## **Buyer Module:**

- This module provides a platform for buyers, including wholesalers and retailers, to access information about available agricultural products.
- Buyers can view details such as product origin, quality standards, quantity available, and pricing transparently through the blockchain-powered system.
- They can initiate purchases securely, confident in the integrity and traceability of the products offered.

# SCREENSHOTS



## Add Products

Product Name

Product Type

Product Image

Quality score

Price

Description



[View Buyer](#)   [View Seller](#)   [Logout](#)

#	Name	Gender	Mail	Phone	Password
1	salamon	male	summacreation15@gmail.com	9874563210	1234
2	raj	male	raj@gmail.com	9698035498	1234

[Add Products](#)   [View Products](#)   [Account](#)   [Logout](#)

Bal: 0.00

#	Name	Type	Quality	Price	Hash ID
1	apple	Fruits	A	0	6c455f5e6343aad487017e00afd6e0b8ba5b3f2adc65ed8d9de409844a7def13
2	apple	Fruits	A	0	6c455f5e6343aad487017e00afd6e0b8ba5b3f2adc65ed8d9de409844a7def13

#	Account No	Branch Name	Balance
1	6365984536	trichy	0.00

#	Seller Name	Buyer Name	Product Name	Price
1	salamon	admin	apple	0.00
2	salamon	admin	apple	0.00
3	salamon	admin	apple	0.00

#	Name	Gender	Mail	Phone	Password
1	admin	buyer	male	rajan@gmail.com	9071008822
2	raja	buyer	male	rajan@gmail.com	9360809634

# CONCLUSION

- In conclusion, the integration of blockchain technology into agriculture-based supply chain management presents a transformative solution marked by transparency, security, and efficiency.
- The decentralized and tamper-resistant nature of blockchain, the system ensures the trustworthy recording of agricultural data, fostering transparency throughout the supply chain.
- With the added benefits of enhanced security, automated processes through smart contracts, and reduced risk of fraud, this innovative approach not only strengthens the integrity of the agricultural supply chain but also paves the way for a sustainable and technologically advanced future in agriculture.
- The adoption of blockchain stands poised to revolutionize how stakeholders engage in and benefit from the agricultural ecosystem, marking a significant leap towards a more resilient and efficient industry.

# FUTURE ENHANCEMENT

- Implementation of digital technologies, including the Internet of Things (IoT), big-data analytics, artificial intelligence (AI), and related information and communications technologies (ICT), are key enablers in modern industries.
- They provide valuable insights, enhance decision-making, improve operational efficiency, and facilitate communication and information sharing, thereby revolutionizing various sectors, including the agro supply chain management.
- These technologies, when integrated with blockchain, can make the supply chain more efficient, transparent, and resilient.

# SYSTEM REQUIREMENTS

## HARDWARE REQUIREMENTS

- processor : Pentium – IV
- RAM : 4 GB (min)
- Hard Disk : 5 GB

## SOFTWARE REQUIREMENTS

- Operating System : Windows 7 or 8
- Frontend :HTML,CSS
- Backend : PYTHON ,MYSQL

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**THANK YOU**