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Direct Delivery of Agriculture Product from Farmer to Consumer then Processed Food to the NGO using Block-chain

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ABSTRACT: The restoration of the complete supply chain for agriculture and food (agri-food) on the blockchain. It uses smart contracts and other fundamental aspects of blockchain technology, both of which are prevalent in blockchain networks. The workings of blockchain technology, its potential applications or effects on present SCM Registry systems, as well as the function of legal experts, are detailed in this article. The growth of blockchain is negative for everyone involved in the trust industry, especially for government entities that are considered reliable enough to handle transactions. As a result, the Agri-Food supply chain requires a reliable system to guarantee traceability, confidence, and distribution methods. The major goals are to describe how blockchain might transform these type of systems

KEYWORDS: Agricultural product, food delivery, consumer, NGO, web application

I. INTRODUCTION

The bulk of the population of India lives in rural areas and is employed in agriculture. Unfortunately, it is true that Indian ranchers—whether or not we refer to them as a nation of ranchers—are frequently disregarded, even though we constantly need food, which is produced by ranchers' and homesteaders' labour because there is nothing useful for their advancement in the modern world. Mechanical importance has been a huge aid in overcoming this.
The major objective of this framework is to satisfy ranchers' needs and grant them financial freedom. E-horticulture can help ranchers improve their goods. All ranchers who want a clear return for their rural commodities as well as end customers who require a predetermined price for each item would gain from this. Additionally, it will make it easier for those in need to get food through an organisation focused on administration, and purchasers who want to share their extra food to reduce food waste may do so at this stage. The goal of the information science-based architecture for a web-based store presented in this paper is to help ranchers sell agricultural products to customers who need to buy them regularly in a straightforward and user-friendly application. By precisely estimating an item's value and offering fresh, direct delivery of goods up to a certain distance, we want to enhance the interaction between ranchers and customers.

II. RELATED WORK

The bulk of the population of India lives in rural areas and is employed in agriculture. Unfortunately, it is true that Indian ranchers—whether or not we refer to them as a nation of ranchers—are frequently disregarded, even though we constantly need food, which is produced by ranchers' and homesteaders' labour because there is nothing useful for their advancement in the modern world. Mechanical importance has been a huge aid in overcoming this.

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III. PROPOSED ALGORITHM

Algorithm 1: Protocol for Peer Verification
Input : User get IP address, User Transaction TID,
Output : Enable IP address or current query if any connection is valid
Step 1 : User generate the any transaction DDL, DML or DCL query
Step 2 : Get current IP address
If (connection(IP) equals(true))
Flag true
Else
Flag false
End for
Step 4 : if (Flag == true) Peer to Peer Verification valid
Else
Peer to Peer Verification Invalid
End if
End for
8.3.2 Algorithm 2:Hash Generation
Input : Genesis block, Previous hash, data d
Output : Generated hash H according to given data
Step 1 : Input data as d
Step 2 : Apply SHA 256 from SHA family
Step 3 : Current Hash= SHA256(d)
Step 4 : Return Current Hash
8.3.3 Algorithm 3: Mining Algorithm for valid hash creation
Input : Hash Validation Policy P[], Current Hash Values hash Val
Output : Valid hash
Step 1 : System generate the hash Val for i th transaction using Algorithm 1
Step 2 : if (hash Val. valid with P[])
Flag =1
Else
Flag=0
8.3.4 Algorithm 4: Recover Block Chain Data
Input : User Transaction query, Current Node Chain CNode[chain], Old NodesChain [Nodeid]
Output : Recover if any chain is invalid else execute current query
Step 1 : User generate the any transaction DDL, DML or DCL query
Step 2 : Get current server blockchain
Cchain ← Cnode[Chain]
Step 3 : Foreach (read I into NodeChain)
If (!.equals NodeChain[i] with (Cchain))
Flag 1
Else Continue Commit query
Step 5 : if (Flag == 1)
Count = Similary NodesBlockchian()
Step 6 : Calculate the majority of server
Recover invalid blockchain from specific node
Step 7: End if End for End for

IV. PSEUDO CODE

```
Initialize Blockchain

# Farmer sells agricultural products to consumers directly
function directDeliveryToFarmersToConsumers():
    for each agricultural_product in farmer_inventory:
        transaction = createTransaction(agricultural_product, farmer_address, consumer_address)
        if transactionIsValid(transaction):
```

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```
            addTransactionToBlockchain(transaction)
            updateInventory(farmer_inventory, agricultural_product)
            notifyFarmer("Your product was sold to consumer successfully.")

# Processed food delivery from farmers to NGOs
function processedFoodDeliveryToNGO():
    for each processed_food_item in processed_food_inventory:
        transaction = createTransaction(processed_food_item, farmer_address, NGO_address)
        if transactionIsValid(transaction):
            addTransactionToBlockchain(transaction)
            updateInventory(processed_food_inventory, processed_food_item)
            notifyNGO("Processed food received from farmer successfully.")
# Blockchain functions
function createTransaction(product, from_address, to_address):
    transaction = {
        'product': product,
        'from_address': from_address,
        'to_address': to_address,
        'timestamp': getCurrentTime(),
        'transaction_hash': generateHash(product, from_address, to_address)
    }
    return transaction

function addTransactionToBlockchain(transaction):
    blockchain.add(transaction)

function transactionIsValid(transaction):
    # Check if the transaction is valid (e.g., verify hash, addresses, etc.)
    # Return True if the transaction is valid, else False
    return isValid(transaction)

# Other helper functions
function updateInventory(inventory, item):
    inventory.remove(item)
function notifyFarmer(message):
    # Send notification to the farmer
    sendNotification(farmer_address, message)

function notifyNGO(message):
    # Send notification to the NGO
    sendNotification(NGO_address, message)

# Main execution
directDeliveryToFarmersToConsumers()
processedFoodDeliveryToNGO()
```

V. SIMULATION RESULTS

- Supply Chain Management Model:
  Define the various stages in the supply chain, starting from the farm to the consumer and subsequently to the NGO.

- Identify key entities involved:
  Farmers, logistics providers, consumers, processors, NGOs, etc.

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- Blockchain Integration:
  Implement a blockchain network (e.g., Ethereum, Hyperledger) to track and record transactions, ensuring transparency, security, and traceability.
  Design smart contracts for various stages in the supply chain to automate transactions and enforce agreed-upon rules between participants.

- Data Collection and Tracking:
  Simulate data collection mechanisms to gather information at each stage of the supply chain.
  Include data like product origin, quality assessments, transportation details, processing information, etc.
  Utilize IoT devices, QR codes, or RFID tags for real-time tracking and tracing of products.

- Logistics and Transportation Simulation:
  Model transportation logistics considering various factors like distance, modes of transport, time, and costs.
  Simulate the movement of agricultural products from farms to consumers and processed food from processors to the NGO.

- Quality Assurance and Compliance:
  Implement quality checks and compliance measures at different checkpoints.
  Simulate quality assessments, certifications, and compliance with food safety regulations.

- User Interface and Interaction:
  Develop a user interface to visualize the supply chain flow for different stakeholders (farmers, consumers, NGOs).
  Allow stakeholders to track product movements, view transaction histories, and access relevant information through a user-friendly dashboard.

- Performance Metrics and Analysis:
  Define key performance indicators (KPIs) such as delivery time, cost-effectiveness, transparency, and traceability.
  Analyze simulation results to measure the efficiency and effectiveness of the blockchain-enabled supply chain compared to traditional systems.

- Scenario Testing and Optimization:
  Conduct simulations under various scenarios (e.g., changes in demand, transportation disruptions, quality issues) to assess the resilience and adaptability of the supply chain.
  Optimize the supply chain model based on simulation outcomes to improve its performance.

- Documentation and Reporting:
  Document the simulation process, including assumptions, methodologies, and results.
  Generate reports summarizing the simulation outcomes, highlighting strengths, weaknesses, and recommendations for improvement.
  Building a comprehensive simulation for this scenario involves integrating technology, supply chain management principles, and data analytics. It aims to demonstrate the potential benefits of using blockchain in enhancing transparency, efficiency, and trust in agricultural supply chains while ensuring the timely delivery of quality products to end consumers and NGOs

VI. CONCLUSION AND FUTURE WORK

In this project, we're leveraging blockchain to develop an online system allowing farmers to directly supply agricultural products to consumers and non-profit organisations. It aids in safety and accurate cost estimates. The use of blockchain will safeguard all data. Due to the size of this sector and the demand for more reliable and efficient information management solutions, there are a number of research suggestions for incorporating blockchain technology into agri-food supply chain transactions.

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