POULTRY FARMER AIDING SYSTEM USING BLOCKCHAIN

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Abstract: *Poultry production in our state is still at meager development as proper updated information regarding the existing farms, feed availability and stock is not available properly. A need for a system that monitors these requirements and aids both farmers and customers in carrying out proper trading arises. Hence, we propose an application for the same based on blockchain technology which shall ensure data transparency and provenance tracking by ensuring legibility of data and keeping up proper updated information. The function of this application is mainly aimed to encourage the poultry famers of Kerala and fulfill their basic needs. Through this system the farmers will get to know about availability of feeds and ensure the quantity of the same. We also intend to provide the information about the total number of poultry farms or chicken centers and poultry feeding shops in Kerala along with details of each farm like the number of stocks to produce meats or eggs for food; the location of these farms and shops aiding in faster purchasing; the price of meat, eggs and feeds ensuring that price is not overruled by any one producer. Users shall rate the quality of shops as feedback to help identify quality shops and shall also promote good service. The availability of stock of feed/products can be monitored timely so as to cope with sudden unavailability or any adverse situation. Moreover, by checking these data the government can verify whether the farmers as well as their services are in a state of emergence or not. Thus, they can identify issues and bring about solutions to overcome the current scenario. Gradually, we can increase the number of farms in Kerala. Using blockchain, a distributed ledger for handling data rather than centralized methods will help in having a secure and tamper proof way of maintenance. The chance of overriding data and deleting or modifying data to create redundant or wrong information can be avoided by this.*

Index Terms **- Blockchain, Ethereum, Smart-Contract.**

I. INTRODUCTION

Poultry farming being one of the areas that needs more attention in reaching self-sufficiency, requires systems that help in dealing with the requirements of poultry farms. The Poultry farmers often face many problems regarding unprecedented price hike, artificial scarcity of feed stock for farms and lack of quality feed and other requirements. This led farmers to drop off from their business. A system that helps farmers to help track quality and quantity of feeds is hence demanding.

A supply chain is a network between a company and its suppliers to produce and dis tribute a specific product to the final buyer. As a solution to above problem, we could implement a traceable application upon supply chain network of farm feed production. Blockchain is one of the key innovative technologies revolutionizing supply chain managements. Supply chain usually involves different entities and hence maintaining the data exchange among them requires a faster and trust-able system. Implementing blockchain based supply chain shall hence make system transparent, controlled, audit-able and reliable.
The proposed system shall also keep a record of the poultry farm details including farm name, stock data and price range to help other customers find quality farms/centres near them. Users could also rate the services and products thus helping to identify best resource as well encourage all producers to maintain standards and quality of their products.

II. BACKGROUND

A 'blockchain', originally block chain, is a growing list of records, called 'blocks', that are linked using cryptography. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data. By design, a blockchain is resistant to modification of the data. It is "an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way". For use as a distributed ledger, a blockchain is typically managed by a peer-to-peer network collectively adhering to a protocol for inter-node communication and validating new blocks. Once recorded, the data in any given block cannot be altered retroactively without alteration of all subsequent blocks, which requires consensus of the network majority. Blockchain was invented by a person (or group of people) using the name Satoshi Nakamoto in 2008 to serve as the public transaction ledger of the cryptocurrency bitcoin. The two types of Blockchain referring to the process by which it is validated: Permission-less (or anonymous) blockchain and Permissioned blockchain.

Supply chain involves people, resources, activities, and organizations that play role in transforming raw materials into finished products. The most concerning factor for customers is always quality and legibility of the products available. But it is challenging to track the provenance of data and maintain its trace-ability throughout the supply chain network. The traditional supply chains are usually centralized. Hence, they depend on a third party for handling supply chain handling. These centralized systems lack

transparency, accountability and auditability as they are modifiable and logs are not visible. Blockchain based end to end tracking of supply chain network shall help build a trust-able system. Thus, we can avoid manipulated data or information regarding stocks and hence ensure no artificial scarcity occurs and quality products are available timely.

III. PROPOSAL

This section explains our blockchain based proposal; poultry farmer aiding system using blockchain which shall ensure data transparency and provenance tracking by ensuring legibility of data and keeping up proper updated information. Supply chain usually involves different entities and hence maintaining the data exchange among them requires a faster and trust-able system. Implementing blockchain based supply chain shall hence make system transparent, controlled, audit-able and reliable. The proposed system shall also keep a record of the poultry farm details including farm name, stock data and price range to help other customers find quality farms/centres near them.

Fig1. shows the architecture of the poultry farmer aiding system. The system will allow users to trace the supply chain of Feed available in markets. Each feed product shall be identified by unique product code assigned during manufacturing. A barcode corresponding to the product code will be generated by the system at the time when manufacturer updates the production details. Using this barcode visible on packages user can view all the details regarding production of feed and thus ensure the quality and quantity of feed. User can also check the stock available in a region for each product available. User rating shall also be there to ensure the balance and maintenance of quality production. Additional to this, system shall also maintain a database of details of all registered poultry farmers and stock available at farms aiding other users to identify and support nearby farms.

We shall be using the Solidity language for the implementation and deployment of the smart contract on the Ethereum ledger for building our system. The Web3.js library, which is a collection of modules that contain unique functionalities for the Ethereum framework will be used to develop a user-friendly interface that allow users to easily interact with the smart contract. For local Ethereum network we shall use the tool Ganache. The Truffle, a tool that is a part of Ganache shall be used to test and deploy contracts. Metamask, a browser plugin that manages wallets and also enables web systems to connect with the Ethereum networks will be used to deploy the system interface
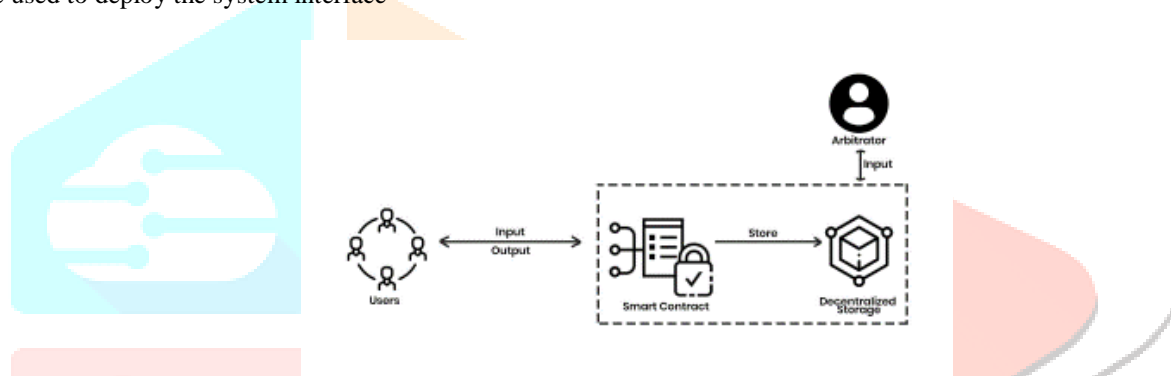

Fig1. Architecture of Poultry Farmer Aiding System

3.1 The Decentralized Storage

The system relies on blockchain as a decentralized ledger to store all the details of poultry farms including farm name, stock data and price range to help other customers find quality farms/centres near them.

3.2 Smart Contract

Ethereum integrates Solidity, a smart contract-oriented language, that makes Ethereum the most popular choice for smart contract deployment. In addition, third generation blockchains are still beginning to mature enough to support the development of smart contracts.

Developing the smart contract using Solidity provides code that can be executed in any blockchain based on Ethereum Virtual Machine. Our smart contract mainly has these functions defined in it:

- newItem - This function takes as parameters the product category, product name, manufactured quantity, manufacturer name, and date of manufacture. It creates a new item object whenever a new Poultry feed item is added to the system by the manufacturer. Item count is tracked within using a counter variable and based on successful execution of this function product id is generated to be included in the barcode created.
- addState - This function accepts as parameters product id, the quantity of stock, and stakeholder name. It updates the state of the function with these parameters whenever a distributor/ retailer purchased that product.
- searchProduct - It accepts as parameters the product id. It then searches for an id match in the mapping between product id to product object.

The above function mainly acts upon structure Product that represents a poultry feed of real world and its properties namely creator address, manufacturer name, quantity manufactured, product name, product category, product id, date of manufacture, and total states indicating an update to the product as per purchasing. There is also a structure State that has the quantity of stock, stakeholder address, and stakeholder name that hold the state change information in it.

3.3 Users

The three main entities in our application includes Farmers, Distributors/Retailers and Manufacturers. The functions performed by each of these entities are:

- Farmer: The farmer can search and view the product details of different farms.
- Distributor/Retailer: The Distributor/Retailer can update the stock details and can also search for the product details.
- Manufacturer: The Manufacture can add, update the product details and can also perform search functions.

The users other than the above three can search for the nearest farm locations and their contact details. In order to access more such functions they have to register themselves in the application.

3.4 Arbitrator

The arbitrator is a person or an entity who can control or maintain the whole application. The arbitrator can also be called as an admin who can decide which all entity can perform what all functions.

IV. IMPLEMENTATION

In our proposed system i.e., in the Decentralized Application we use Ethereum blockchain and smart contracts to implement a traceable and provenance tracking of supply chain of resources needed in poultry farming. The decentralized application provides us a clear overview of poultry feed supply chain from manufacturing unit to retailers. The system also allows users to trace the supply chain of Feed available in markets. Each feed product shall be identified by unique product code assigned during manufacturing. A barcode corresponding to the product code will be generated by the system at the time when manufacturer updates the production details. Using this barcode visible on packages user can view all the details regarding production of feed and thus ensure the quality and quantity of feed. User can also check the stock available in a region for each product available. User rating shall also be there to ensure the balance and maintenance of quality production. Additional to this, system shall also maintain a database of details of all registered poultry farmers and stock available at farms aiding other users to identify and support nearby farms.

V. EVALUATION

The existing system for aiding poultry farmers only includes a centralized database of information on farm details. This system neither provide any kind of help to new farmers to identify and purchase quality resources for their farms nor aid existing farmers in getting to know availability of products. This scenario creates area for artificial scarcity of resources and price hike. Thus, we are introducing the concept of supply chain monitored under blockchain based system for aiding farmers to get trust-able information on quantity and quality of resources like farm feed. The existing systems also use centralized database that are prone to trust-ability issues as the data can be modified and doesn't provide prior security to data.

VI. CONCLUSION

In this paper, we have proposed a solution using the Ethereum blockchain and smart contracts to help trace supply chain of resources requires in Poultry farming, specifically farm feed. Here We have shown the details related to the Poultry Farmer Aiding System overview and design. The System using Blockchain based supply chain indeed provide provenance data tracking and hence trustability thus ensuring neither producers nor sellers create artificial scarcity or price hike for resources. Moreover, the availability and genuinity of resources can be monitored timely. The system shall also help cope with sudden unavailability or any adverse situation. Usage of decentralized database for system will prevent modification and overwriting of correct data. Currently system is implemented only for feed tracking. However, the presented aspects and details are generic and can be applied to provide trusted and decentralized traceability to any resource and hence establish a more transparent environment. Having a transparent system will promote quality product availability and hence aid in growth.

VII. FUTURE WORK

In future the system could be expanded to deal with tracing of similar potential needs of poultry farm. Also, to track the chicks from hatchery and thus ensure the quality of chicks. The Feedback and Rating system would be implemented for ensuring quality services. An extended feature for farmers to present their farm details including location - map facilities with geocoding and to expand the implementation for provenance tracking of other products in market.

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