**A Blockchain Based System for Safe Food Supply & Supervision**

**ABSTRACT**

The global food supply chain industry has embraced digitalization and has changed consumer’s day-to-day lives in many aspects. Efficient tracking of food products when within the supply chain ensures the safety of the end consumers. However, today’s food supply chain industry falls short of providing dependable tracing of food products due to a lack of visibility and transparency in tracking the food production, processing, distribution, transportation, and movement when with the supply chain, which poses a serious threat to the quality of processed food and the safety of consumers. In this paper, we propose a blockchain and IoT-based framework to regulate and monitor the processed poultry food supply chain industry’s functioning and improves the safety and quality of food products delivered to end-consumer. Our proposed solution utilizes Ethereum smart contracts to develop a transparent, reliable, and tamper-proof food supply chain framework, and ensure the integrity of supply chain transactions by eliminating a central authority. The smart contract regulates and monitors the transactions between the entities in the network and keeps all of the parties, within the network, well informed about transactions. This proposed aims to identify and eliminate food adulteration and contamination; enhance quality and safety in the food industry’s supply chain, improve the transparency of transactions, and legal culpability, which ultimately has a positive impact on consumer trust and the overall brand value.

**SYSTEM ANALYSIS**

**EXISTING SYSTEM**

The current food supply management system relies on a centralized server, where all product details are stored. This centralized approach is vulnerable to manipulation by corrupt employees who can alter product details or expiry dates for bribes. Fake products can also be registered, leading to customer dissatisfaction and health risks. Additionally, there is no tool to detect such tampering or unauthorized changes in the database. If the server is hacked, all data could be lost, as the system depends entirely on a single server. These flaws harm public trust, reduce business revenue, and hinder national growth.

**Disadvantages**

1. Centralized Server Vulnerability
2. Data Manipulation
3. No Tamper Detection
4. Hacking Risks
5. Customer Dissatisfaction
6. Reduced Trust
7. Impact on Business Revenue

**PROPOSED SYSTEM**

The proposed system uses blockchain technology to manage food supply chain data. Blockchain stores information in a decentralized manner across multiple nodes, ensuring data availability even if one node fails. It secures data through encryption and links each record using a unique hash code, making it tamper-proof. Changes in data are impossible without altering the entire chain, ensuring the authenticity of records. This decentralized setup prevents manipulation and eliminates reliance on a single server, making the system more secure and reliable.

**Advantages:**

1. Decentralized Architecture
2. Tamper-Proof Records
3. Enhanced Security
4. Transparency
5. Smart Contracts
6. Reliability
7. Detection of Fake Products
8. Boost to Business and National Growth

**Module Description:**

In propose work to manage supply chain data we have designed following modules

1. Admin: admin can login to system by using username and password as ‘admin’ and ‘admin’. After login admin will add details of all supply chains partners (stakeholders) and give login details to each partner. This partner can be raw material suppliers or farmers, Manufacturer, Retailers and Distributors. Admin will generate orders for required supply and can run ML algorithms to predict or forecast demand of particular product in future. Admin can view details of all available partners and can view all tracing details of product processing in the map.
2. Stakeholder Raw Material Supplier login: Raw material supplier will receive order from admin and then forward all raw materials to ‘MANUFACTURER’ and all this trace details will be updated in Blockchain.
3. Manufacturer Login: can login to system and receive raw material and can manufacture product and supply to distributor
4. Distributor Login: can login to system and can distribute product to Retailer
5. Retailer Login: can login to system and then sale product to N consumer
6. Consumer or any government official: by using product ID can trace all details of the product.
7. Recommendation: any consumer can run this module to get recommendation of particular purchase items. If he purchases beef then he will enter BEEF and system will recommend ‘Chicken’ as he may purchase chicken also.

**SYSTEM REQUIREMENT:**

**HARDWARE REQUIREMENTS:**

* **Processor - Intel i3(min)**
* Speed - 1.1 GHz
* RAM - 4GB(min)
* Hard Disk - 500 GB

**SOFTWARE REQUIREMENTS:**

* Operating System - Windows10(min)
* Programming Language - Python(3.7.0)