Supply Chain Management System for Groundnut and Black Gram Cultivation using Python Web Framework

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***Abstract* - Groundnut and black gram cultivation are vital components of agricultural production in many regions. However, the existing supply chain management processes for these crops often involve manual and fragmented systems, leading to inefficiencies and wastage. This project proposes the development of a comprehensive supply chain management system leveraging Python web frameworks to address these challenges. The system will provide features for crop monitoring, inventory management, order tracking, and collaboration among stakeholders.**

***Key Word :* Supply Chain,Groundnut and Blackgram,Development,Monitoring,Tracking and Collabration.**

I. INTRODUCTION

This project aims to develop an integrated system for the efficient processing, grading, packaging, and management of groundnuts and black grams, encompassing the entire supply chain from farm to consumer. Groundnuts and black grams are staple crops with significant economic importance, and optimizing their processing and supply chain management can enhance productivity, quality, and market reach.

The proposed system will consist of modules designed to streamline each stage of the production and distribution process. The processing module will facilitate cleaning, sorting, shelling, grading, and packaging of groundnuts and black grams, incorporating quality control measures and batch traceability to ensure product integrity. A grading module will utilize algorithms and criteria to assess product quality based on parameters such as size, color, moisture content, and purity. Packaging options tailored to the specific needs of groundnuts and black grams will be provided, allowing users to select packaging preferences and customize labels for branding purposes. The supply chain management module will enable seamless coordination and collaboration among stakeholders, including farmers, processors, distributors, retailers, and consumers. Key features of the system include real-time inventory management, order tracking, payment processing, and communication tools to facilitate efficient decision-making and address supply chain disruptions promptly. The website will offer a user-friendly interface accessible from desktop and mobile devices, ensuring convenience and accessibility for all stakeholders. The development process

will involve thorough research, stakeholder engagement, and iterative testing to refine functionality, usability, and performance. Compliance with food safety regulations and industry standards will be ensured to maintain product quality and consumer trust.

2.LITERATURE SURVEY

1.Tribis, Y., El Bouchti, A., Bouayad, H.: Supply chain management based on blockchain: asystematic mapping study. In: International Workshop on Transportation and Supply ChainEngineering

Blockchain technology (BCT) has gained widespread acceptance and importance in the last few years. Implemented in different areas of applications such as social and legal industries, finance, smart property, and supply chain networks. This technology assures immutability and integrity of data without the need of a third trusted party. Furthermore, BCT could guarantee a transparent and decentralized transaction system in businesses and industries. Even though general research has been done in the BCT, however, there is a lack of systematic analysis on current research challenges regarding how BCT is effectively applicable in supply chain management (SCM). A systematic literature review (SLR) of SCM based on blockchain does not exist yet. This work aims to explore and analyse the state-ofthe-art on the BCT applications for SCM. We synthesize existing evidence, and identify gaps, available in the literature.

2.The blockchain: opportunities and challenges for agriculture.04/the-blockchainopportunities-and-challenges-for-agriculture/. Accessed 22 Nov 2018

blockchain and distributed ledger technologies in the agriculture sector. It aims to facilitate a better understanding of the opportunities and benefits of blockchain in agriculture, as well as the technical and institutional barriers to its adoption. The paper analyses how blockchain and smart contracts can increase efficiency, transparency and traceability in agricultural supply chains and improve rural development interventions; as well as be an impetus to achieve the SDGs. Blockchain-based technologies have the potential to promote more sustainable agriculture supply chains, better facilitate trade and provide a more inclusive trading system. Blockchain can be a powerful engine for economic growth, inclusive trade and provide new market opportunities for micro, small and medium-sized enterprises (MSMEs).

Currently, there is limited literature that looks at how this technology can affect the agriculture sector, and there is limited knowledge on how blockchain works and its applications in agriculture and rural development.

3.Supply chain management in Indian agriculture, management-in-indian-agriculture/. Accessed 22 Nov 2018

The groundnut and Blackgram sells his produce to a distributor who in turn, stocks it across his various warehouses and supplies it to the retailers. The distribution network takes care of linking the farmer and retailer via a supply chain. This supply chain network has the geographical reach, as well as the scale up capability to take care of fluctuating supply and demand.

3.METHODS

3.*1 Existing System:*

Existing supply chain management systems in agriculture generally lack specificity for crops like groundnut and black gram. Most systems are either generic or focused on major crops, neglecting the unique requirements and challenges of smaller-scale cultivations. This project will build upon existing research and technologies in supply chain management and adapt them to the specific needs of groundnut and black gram cultivation.

3.*2 Proposed System:*

The proposed work involves the design and implementation of a supply chain management system using Python web frameworks. Key features will include: Crop Monitoring: Real-time monitoring of groundnut and black gram cultivation parameters such as soil moisture, temperature, and pest infestation. Inventory Management: Tracking of seed, fertilizer, and other input materials, as well as harvested crop stock. Order Tracking: Monitoring orders from distributors, retailers, and consumers, and managing the delivery process. Collaboration Tools: Facilitating communication and collaboration among farmers, suppliers, distributors, and other stakeholders.

4.FLOWCHART

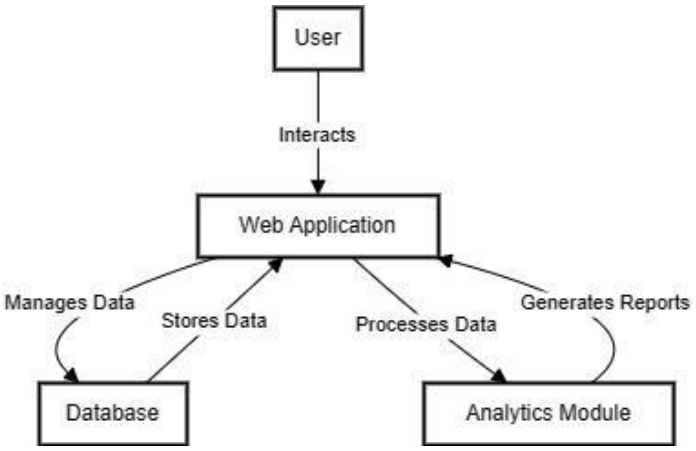

Fig.1 Flowchart

5.MODULES:

The modules proposed for the integrated groundnut and black gram processing, grading, packaging, and supply chain management system.

5.1Processing Module:

- Cleaning: Facilitates the removal of impurities and foreign particles from raw groundnuts and black grams.
- Sorting: Automatically sorts the cleaned produce based on size and other physical characteristics.
- Shelling: Automates the shelling process to separate nuts/seeds from their shells efficiently.
- Grading: Assesses the quality of processed groundnuts and black grams based on predefined criteria such as size, color, and purity.
- Packaging: Prepares the graded produce for packaging, ensuring proper handling and presentation.

5.2 Grading Module:

- Quality Assessment: Evaluates the quality of groundnuts and black grams based on parameters like size, color, moisture content, and purity.
- Automated Grading: Utilizes algorithms to automate the grading process, providing consistent and accurate results.
- Grading Criteria Customization: Allows customization of grading criteria to meet specific requirements or standards

5.3 *Packaging Module:*

- Packaging Options: Provides various packaging options suitable for groundnuts and black grams, considering factors such as product protection, shelf life, and branding.
- Customization: Enables users to select packaging materials, sizes, and designs according to their preferences.
- Labeling: Allows for customizable labeling to incorporate branding elements and product information.

5.4 Supply Chain Management Module:

- Inventory Management: Tracks the stock levels of processed products, raw materials, and packaging materials in real-time.
- Order Management: Facilitates the processing of orders from customers, including order placement, fulfillment, and tracking.
- Payment Processing: Integrates secure payment gateways to enable online payment transactions.
- Shipment Tracking: Provides tools for tracking the status of shipments in transit and estimating delivery times.
- Communication Tools: Enables seamless communication and collaboration among stakeholders, including farmers, processors, distributors, and retailers.

5.5 User Management Module:

- User Registration and Authentication: Allows users to register accounts and authenticate their identities securely.

- Role-based Access Control: Assigns different roles and permissions to users based on their responsibilities and privileges within the system.

5.6 Reporting and Analytics Module:

- Data Analysis: Generates reports and analytics on key performance indicators (KPIs) such as production output, quality metrics, inventory levels, and sales.
- Insights: Provides actionable insights to optimize operations, improve efficiency, and identify areas for improvement.

These modules work together to streamline the entire process of groundnut and black gram production, grading, packaging, and supply chain management, ultimately enhancing efficiency, quality, and profitability for stakeholders across the value chain.

.TECHNOLOGY USED:

Python Web Framework (Flask) Flask is a micro web framework written in Python. It is classified as a microframework because it does not require particular tools or libraries.[2] It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. However, Flask supports extensions that can add application features as if they were implemented in Flask itself. Extensions exist for object-relational mappers, form validation, upload handling, various open authentication technologies and several common framework related tools.HTML/CSS/JavaScript for frontend development HTML defines the structure of your content, CSS determines the style and layout, and JavaScript makes the content interactive; therefore, it makes the most sense to learn them in that order. JavaScript incorporates valuable skills such as object-oriented, functional, and imperative styles of programming Database (MySQL) MySQL has stand-alone clients that allow users to interact directly with a MySQL database using SQL, but more often, MySQL is used with other programs to implement applications that need relational database capability. MySQL is a component of the LAMP web application software stack (and others), which is an acronym for Linux, Apache, MySQL, Perl/PHP/Python.

CONCLUSION:

Ultimately, this project aims to empower stakeholders in the groundnut and black gram value chain with a comprehensive digital solution that enhances efficiency, transparency, and profitability. By leveraging technology to optimize processing, grading, packaging, and supply chain management, the system seeks to drive innovation and sustainability in the agricultural sector.

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