MILK DELIVERY: ENHANCING TRANSPARENCY AND FAIR PAYMENTS FOR KENYAN STALLHOLDER DAIRY FARMERS

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ABSTRACT

Recent improvements in IoT and software development have made data collecting and immutability easier for the agri-food supply chain. A variety of frameworks and applications have been introduced recently to enable traceability in the agri-food industry through the use of distributed ledger technologies (DLT), such as Blockchain technology. However, another study has not yet shown a Blockchain-based traceability solution that has a lower environmental impact and cheaper cost for each transaction given by the supply chain. This article presents a Green Blockchain-based traceability technology that is used as part of the EU-funded "Typicalp" project to monitor the Fontina PDO cheese supply chain. The recommended traceability approach is based on the Algorand Blockchain, which uses the Pure Proof-of-Stake mechanism. It is extremely scalable, low-resource computer-intensive, and environmentally friendly. The whole production chain has been digitalized thanks to proven traceability technology, which gives Fontina consortium operators and end users instantaneous access to irreversible data. There are also economical and environmental benefits to this.

Keywords: Milk Delivery, Dairy Farmers,Blackchain, Agri -Food Sector,Distributed Ledger Technologies

1. INTRODUCTION

Information and communication technology (ICT) has established a reputation as a crucial instrument for successfully and efficiently producing, organising, storing,and sharing information. ICT has been used to give farmers timely information on topics like weather forecasts, market information and prices, diseases and pest control, among other things, in order to boost agricultural productivity. For instance, ICT is associated with enhanced agricultural productivity, food crop diversification, employment creation, and improved access to cash crop markets. ICT has the ability to reach the underprivileged and create livelihood prospects as a way to increase agricultural productivity even in the most isolated rural locations. These ICTs include contemporary blockchain-like ICTs that are widely employed in the business, industrial, and economic realms. Blockchain is viewed as a diversion. a novelty, too. This is because distributed transactions built on transparent and reliable infrastructure may be supported by blockchain technology. Because they rely on

cryptographic hash functions in hash-chain trading (also known as blocks) on the blockchain network, blockchain actions are by nature trustworthy and irreversible. On the blockchain, records cannot be altered or changed. After the agreement system has solved and verified the complicated numerical problem, the following block of exchanges is only added. The data from the previous block is used to establish a distinct cryptographic key for every new block. Blockchains are utilised as a loosely distributed record and are periodically audited by a single organisation. Most centres follow the norm of passing over and approving new blocks. . Blockchains can be regarded as safe by design and provide an extended processing architecture with great adaptability to non-critical failures, even though blockchain records are not immutable because forks are possible. Decentralisation, adaptability, and security are the three fundamental issues that the majority of blockchain projects address. In order to ensure that nobody is in danger, designers are continually adjusting these angles. Future research will contain a thorough investigation of the structure and structure of the blockchain.

2. LITERATURE SURVEY AND RELATED WORK

Awuor, Fredrick, et al. [1] The importance of ICT to food security and the sustainability of agriculture in developing nations is illustrated in this study. The use of ICTs in agriculture could make information more accessible and encourage or promote knowledge sharing. It is crucial for offering any important data production, management, storage, and retrieval. The data is saved in a targeted oriented database. Rizka In order to permit and further improve the seriousness of dairy farmers, TauriaNuryadi et al.'s research plans to comprehend the network of dairy production, particularly the conditions that dairy farmers and dairy farmers were looking at. To comprehend what was occurring upstream of the dam, they conducted optional information study.In order to get client support for a new dairy improvement action plan, the dairy chain and collaborativeresearch will be used as justification. In this article, ShuvamShinghet al.[3] have attempted to outline how blockchain innovation is being used in the dairy industry. It focuses on utilising blockchain innovation to improve the foundation for the dairy supply chain. The utilisation of this invention within the milk production network is discussed in this article, along with its anticipated advantages for each partner and the dairy sector as a whole. Using a blockchain-based milk production network structure has a number of predicted benefits, but there are also a number of challenges. Because blockchain technology is a new discovery, business owners are unsure about their chances of success.greater payments to cover the outrageous cost of utilising it. In this article, Andreas Kamilaris, Agusti Fonts, and others[4] examine the effects of blockchain technology on the food and agricultural supply chains, present ongoing projects and initiatives, and discuss the broad implications, challenges, and opportunities while taking a critical look at the maturity of these projects. The results show that blockchain is a potential technology for a transparent food supply chain, with numerous current activities in various food items and food-related issues. However, there are still many obstacles and challenges that prevent its widespread adoption among farmers and systems. Technical elements, education, regulations, and regulatory frameworks are all part of these difficulties. Zi-Yu Liu and others[5] Additionally, this article examines how elements of blockchain technology, such as smart contracts,needs for information exchange, tracability, and performance enhancement. In order to optimise and enhance the functionality of the fresh food e-commerce supply chain, the author incorporates the alliance chain into it and suggests a four-layer blockchain information platform model: application layer, contract layer, network layer, and data layer. Additionally, the profit changes in the fresh food e-commerce supply chain before and after the implementation of the blockchain information platform were studied and compared using the Stackelberg game

model between the supplier and the e-commerce platform. Finally, Matlab software quantitatively simulates the outcome of the Stackelberg game. The findings demonstrate that blockchain technology is driving the growth of the fresh food e-commerce supply chain to a greater level.level of overall industrial chain management, coordination, and integration. The performance of each significant part of the fresh food ecommerce supply chain as well as the overall performance can be improved by investing in a blockchain system within a set financial range. According to Aparnna V.P. et al. [6], blockchain technology can be used to improve the value of traditional audit-based systems while providing a more integrated risk management solution across the supply chain. More transparency will be made possible by using blockchain technology to help build an unchangeable contract between supply chain players. A promising new weapon in the struggle to protect consumer food safety is blockchain, according to experts. It is a component of a larger system designed to increase the value.of conventional audit-based solutions while simultaneously enhancing supply chain risk management. Zhang, Xin, et al. In this work, a blockchain-based information security management system for the supply chain of grains is built. Customised Smart Contracts are created to facilitate the interplay of corporate data in an industrial chain. The entire grain supply chain is shown in its entirety. The suggested system may achieve information sharing and exchange along the entire grian supply chain, guarantee the security and dependability of information transmission and storage, and eliminate "information islands" and tampering. Nakasumi, M. [8] They outlined a brand-new blockchain information sharing mechanism in this study. It has numerous advantages for supply chain management. Their platform combines blockchain technology with a homomorphic encryption method to enable this. Usersdo not need to rely on any outside parties, and they are always informed about the information gathered on them and how it is utilised. Additionally, users are acknowledged as the proprietors of their encrypted data by the blockchain. Radmehr P. Monfared and Saveen A. Abeyratne[9] The authors of this paper review some of the key features of the blockchain technology and go through several prospective application areas. The suggested system makes it feasible to gather a significant quantity of information about goods and consumers in the manufacturing sector, which may be useful to many individuals, groups, governments, and researchers. For instance, this enables customers to quickly obtain precise information about any product generated through a blockchain-enabled supply chain, enabling them to make smarter purchasing decisions.decisions. By Satoshi Nakamoto[10]. created a system that does not rely on trust for electronic transactions. They began with the customary architecture of digitally signed coins, which offers good ownership control but falls short without a means of preventing double spending. To address this, they created a peer-to-peer network employing proof-of-work to store a public history of transactions that, if honest nodes hold the majority of the CPU power, quickly becomes computationally difficult for an attacker to alter. The network's unstructured nature makes it robust. Nodes lack coordination and operate simultaneously. There is no need to identify them because communications are just required to be delivered with the best effort and are not addressed to any particular spot. Nodes can split and reunite.taking the proof-of-work chain as evidence of what transpired while they were away, the network at will.

3 PROPOSED WORK

Fig. 2A shows the impact of the running buffer's pH on electrophoretic mobility and suggests that the ideal pH is 7.8. From 100 to 300 mM of Tris, the electrophoretic mobilities of the analytes decreased (Fig. 2B). Tris was at its optimal 200 mM concentration. Fig. 2C shows the impact of perchloric acid on electrophoretic mobilities. In compared to results

obtained after the addition of hydrochloric acid, phosphoric acid, or TFA, it was discovered that perchloric acid considerably altered the resolution of the aconite alkaloids. The findings of the study on 1,4-dioxane's impact on the separation of the aconite alkaloids are presented in Fig. 2D. As time went on, the alkaloids' electrophoretic mobilities became less.1,4-Dioxane concentration went raised from 0 to 50%. 40% of 1, 4-dioxane was used to achieve the best results.

PROPOSED SYSTEM ADVANTAGES:

1. HIGH ACCURACY
2. HIGH EFFICIENCY

The preceding sections have covered the importance of blockchain technology to the dairy supply chain. We are aware of the issues the Indian dairy industry is having and how the supply chain needs to be revolutionised in order to change. We go over the supply chain model's system architecture in this part. The stages layer, traceability layer, blockchain layer, and application layer are the four levels that make up the system architecture. These four layers are used throughout the supply chain for all operations. The layers, their functions, and how they work together to form a thorough sustainable dairy supply chain are described in the ensuing subsections. gives a thorough description of the system architecture.

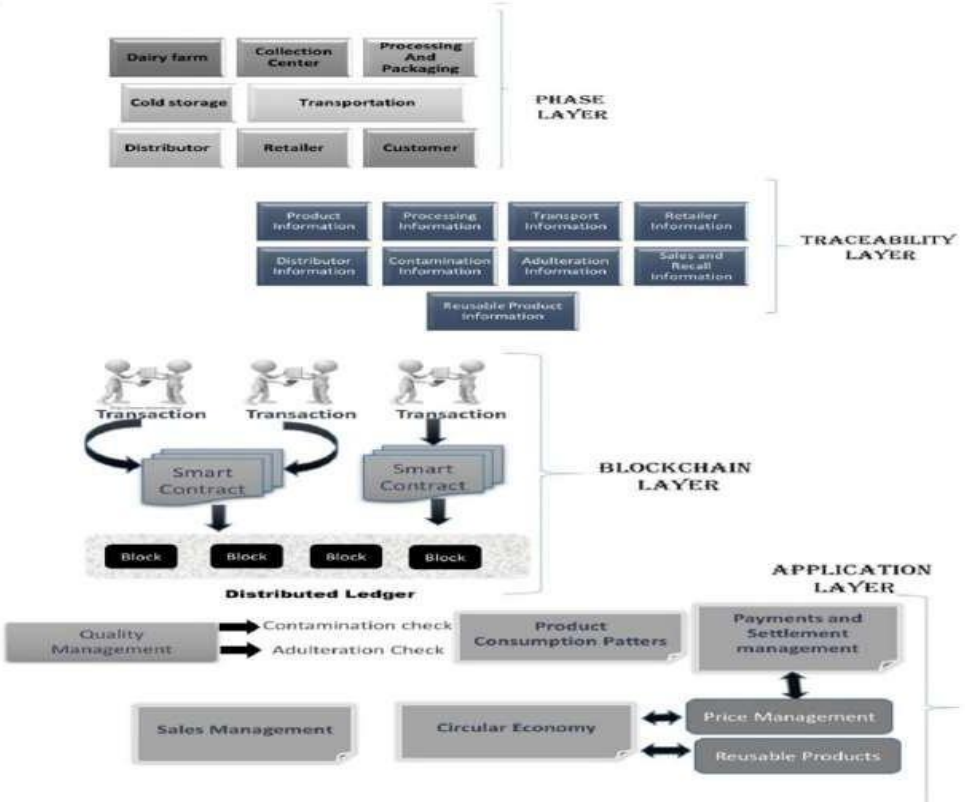


Fig:System architecture

4METHODOLOGIES

A free and open-source software library called TensorFlow is used for differentiable programming and dataflow across a variety of activities. It is a symbolic math library that is

also utilised by neural network applications in machine learning. Google uses it for both research and production.

The Google Brain team created TensorFlow for usage within Google. On November 9, 2015, it was made available under the Apache 2.0 open-source licence.

Numpy

A general-purpose array processing package is called Numpy. It offers a multidimensional array object with outstanding speed as well as capabilities for interacting with these arrays.

It is the cornerstone Python module for scientific computing. A robust N-dimensional array object, sophisticated (broadcasting) methods, and tools for integrating C/C++ and Fortran code are only a few of the features that are included. Practical Fourier transform, random number, and linear algebra skills

In addition to its apparent scientific applications, Numpy is a powerful multi-dimensional data container. Numpy's ability to establish any data-types makes it possible for Numpy to quickly and easily interact with a wide range of databases.

Pandas Pandas is a strong open-source Python library that offers high-performance data analysis and manipulation tools. Python was mostly utilised for data preprocessing and munging. It did not make much of an impact on data analysis. Pandas figured out the solution. Regardless of the source of the data input, we may complete the five standard processes of data processing and analysis using Pandas: prepare, modify, model, and analyse. Many different applications use Python with Pandas. academic and professional disciplines, including as finance, economics, statistics, analytics, and others.

Matplotlib

A Python 2D plotting toolkit called Matplotlib creates publication-quality graphics in a range of physical formats and in cross-platform interactive settings. Four graphical user interface toolkits, the Python and IPython shells, the Jupyter Notebook, web application servers, and Python scripts can all make use of Matplotlib. Matplotlib aims to make difficult things feasible and simple things easy. With just a few lines of code, you can create plots, histograms, power spectra, bar charts, error charts, scatter plots, and more. See the sample plots and thumbnail galleries for examples.

Particularly when used in conjunction with IPython, the pyplot package offers a MATLAB-like interface for basic plotting. For the power user, complete command over line styles, font characteristics, axis characteristics, etc. using an object-oriented interface or by a set of MATLAB-friendly functions.

The Scikit-Learn

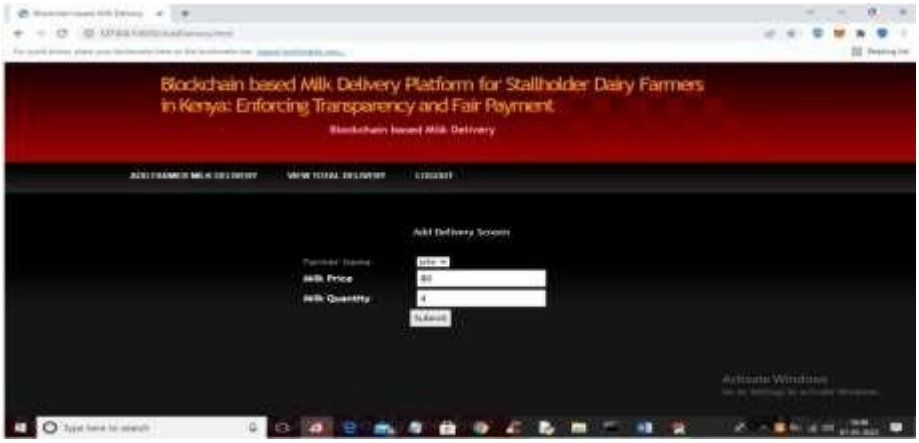
Through a standardised Python interface, Scikit-learn offers a variety of supervised and unsupervised learning techniques. It is distributed under several Linux distributions and is available under a liberal simplified BSD licence, which promotes both academic and commercial use.

5. RESULTS AND DISCUSSION SCREENSHOTS

In above screen admin is login and after login will get below screen

In above screen 'admin' can click on 'Add New NADAFA staff' link to add staff details and get below output

In above screen staff member will select farmer name from drop down box and collect milk from farmer



In above screen staff member selected farmer name and entre milk price and quantity

and then press button to store milk delivery details in Blockchain and get below output

In above screen we can see milk delivery details added and now click on 'View Total Delivery' link to view all deliveries from farmers

In above screen select farmer name and then press button to view all his deliveries like below screen

6. CONCLUSION

We developed a blockchain-based milk delivery system for rural farmers in order to advance fairness and transparency in the compensation of dairy producers. Using blockchain technology, the system allows farmers and local milk collection facilities to compile documents that are unchangeable or rescindable. Farmers can estimate the future of their dairy business and prove its viability by using these data as security for loans. New blocks can be added to the network, and the platform is managed. Future research on dairy products can be improved, and farmers and laborers will have access to a variety of areas. Sticks and farmers can sign in using multiple identity documents. There could be confirmation. to sign up. Another alternative is to shop online. Method of Integrated Registration: One advanced

level lowers errors and forgeries, generates more obvious proficiency, and gets rid of bureaucratic silos.

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