A Survey on Agriculture Supply Chain Management Using Block chain Technology

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Abstract

Block chains are now firmly established as a digital technology that combines cryptographic, data management, networking, and incentive mechanisms to support the verification, execution, and recording of transactions between parties. While block chain technologies were originally intended to support new forms of digital currency for easier and secure payments, they now hold great promise as a new foundation for all forms of transactions. Agribusiness stands to become a key beneficiary of this technology as a platform to execute 'smart contracts' for transactions, particularly for high-value produce. First it is important to distinguish between private digital currencies and the distributed ledger and block chain technologies that underlie them. The distributed and cross-border nature of digital currencies like Bit coin means that regulation of the core protocols of these systems by central banks is unlikely to be effective. Monetary authorities are focused more on understanding 'on-ramps' and 'off-ramps' that constitute the links to the traditional payments system rather than being able to monitor and regulate the currency itself. In contrast to the digital currency feature of block chain, the distributed ledger feature has the potential for widespread use in agribusiness and trade financing, especially where workflows involve many different parties with no trusted central entity.

Keywods: *Block chain, Agreeculture , Cyptography, Bit coin*

Introduction :

An adding demand in society for lesser information about food reflects the need for further translucency and the lack of trust. At the same time, further and further food . products and potables are ingrained and accompanied by a variety of instrument schemes, with an adding threat of fraud (dealing unqualified product with highquality markers or claims) and contamination. In the current situation, much of the compliance data and information is checked by trusted third parties and stored either on . paper or in a centralised database and these approaches are known to suffer from

numerous instructional problems similar as the high cost and inefficiency of paper- grounded processes and fraud, corruption and error both on paper and in IT systems. These information problems, indicating that current translucency and trust systems have .not been suitable to break or at times indeed have aggravated the problems of low translucency and trust in agrifood chains, pose a severe trouble to food safety, food quality, . and sustainability. In particular, food integrity has come a major concern. Food integrity refers to the fairness and authenticity of food in food value chains both at the physical subcaste and the digital subcaste, where the digital subcaste should give dependable and secure information on the origin and provenance of food products in .the physical subcaste. Blockchain technology provides a means to insure permanence of records and potentially to grease the sharing of data between distant actors in a food value chain. This eventuality may lead to an instigative paradigm shift easing translucency and trust in food chains that ensures food integrity.

PROBLEM DEFINITION AND OBJECTIVES

To develop an agricultural supply chain management system with BCT using java as a programming language.

Objectives:

1.To implement a java based web application.
2.To implement AES.
3.To implement visual cryptography.
4.To implement block chain.
5.To implement distributed database system using WLAN.

Liturature Survey :

Paper 1: A model in Agri-food Supply Chain Costing using ABC Costing: A empirical research for Peruvian coffee supply chain Andrea Villalva-Catan˜o, Edgar Ramos-Palomino, Kelsey Provost, Eduardo Casal DOI 10.1109/IESTEC46403.2019.00009 2019 7th International Engineering, Sciences and Technology Conference (IESTEC) This article examines the fundamental causes of Peruvian coffee's high logistical costs in the supply chain. A cost analysis technique will aid in the exploration, analysis, and development of high supply chain costs in order to stabilise the current coffee crisis. Indeed, the findings were studied in order to improve, assist, and aid small-business growth over time.

Paper 2: A Theoretical Implementation: Agriculture- Food Supply Chain Management using Blockchain Technology S. Madumidha1, P.SivaRanjani2, U.Vandhana3, B.Venmuhilan4 978-1-7281-1034-9/19/2019 IEEE This paper describes a fully decentralised blockchain-based traceability system that can be used to create agricultural building blocks that are continuously integrated with IoT devices from provider to consumer. To do so, we created the "Provider-Consumer Network," a fictional end-to-end food traceability system. The goal is to establish a distributed ledger that is available to all network users and so provides transparency.

Paper 3: Blockchain in Agriculture by using Decentralized Peer to Peer Networks Mrs S.Thejaswini, Ranjitha K R, Department ofCSE, Siddaganga Institute ofTech-nology, Tumkur, Karnataka, India. The distributed ledger, centralised servers, P2P (Peer to Peer) networks, As in [1] [10]RFID (Radio-Frequency Identification) tag, consensus verification, and other features of blockchain technology play a major role in the agriculture industry by improving transparency and food provenance in the supply chain, which is characterised by the distributed ledger, centralised servers, P2P (Peer to Peer) networks, and consensus verification. As a result, the proposed work investigates the various issues that arise in agricultural production and proposes solutions to those issues utilising blockchain technology.

Paper 4 :Blockchain technology in current agricultural systems: from techniques to applications WANG1, HAINING YIN4, DEWEI YI5, AND LAIHUNG YAU6 DOI 10.1109/ACCESS.2020.3014522, IEEE Access We conduct a survey in this research to examine both the methodology and applications of blockchain technology in the agriculture sector. The technical features, such as data structure, cryptographic algorithms, and consensus procedures, are first thoroughly explained. Second, to demonstrate the usage of blockchain techniques, existing agricultural blockchain applications are categorised and assessed. In addition, examples of how practitioners leverage popular platforms and smart contracts to construct agricultural applications are offered. Finally, we highlight the fundamental challenges that many future agricultural systems face, as well as the attempts and potential solutions that have been made to address these issues.

Paper 5: Blockchain-based Data Traceability Platform Architecture for Supply Chain Management Yihang Wei The IEEE 6th International Conference on Big Data Security on Cloud (BigDataSecurity), the IEEE International Conference on High Performance and Smart Computing (HPSC), and the IEEE International Conference on Intelligent Data and Security will all be held in 2020. (IDS) Based on the multidisciplinary knowledge and technology of the Fabric Alliance chain architecture, perceptual identification technology, and cryptographic knowledge

Methodology:

BCT Agricultural products are the foundation of the people's survival, and the quality of agrarian products has always been the focus of attention of society and the government; the original agrarian product traceability system is too delicate to tamper with data due to the inordinate attention of data storehouse, it faces the challenge of fraudulent data tracing, and it's delicate for consumers to trust similar traceability results. Also, the centralized storehouse system isn't conducive to the centralized operation of traceable data from numerous enterprises, and there will be problems of low traceability and difficulty in government supervision. The emergence of blockchain technology provides a new result for data security problems of food traceability, its decentralization,anti-tampering and other characteristics and data encryption technology ameliorate the difficulty of data fraud and insure datasecurity.However, the safety of traceable data and the tampering of data can be guaranteed to the topmost extent, the patron's product geste can be regulated, If the blockchain is combined with the traceability of agrarian products. This design substantially proposes a frame of agrarian product traceability system grounded on blockchain technology, it uses blockchain to store the traceability data of agrarian products safely, and proposes a traceability model of agrarian products, which can cover the entire artificial chain of agrarian products, and consumers can query the authentic source of traceability of agrarian products.

System Architecture :

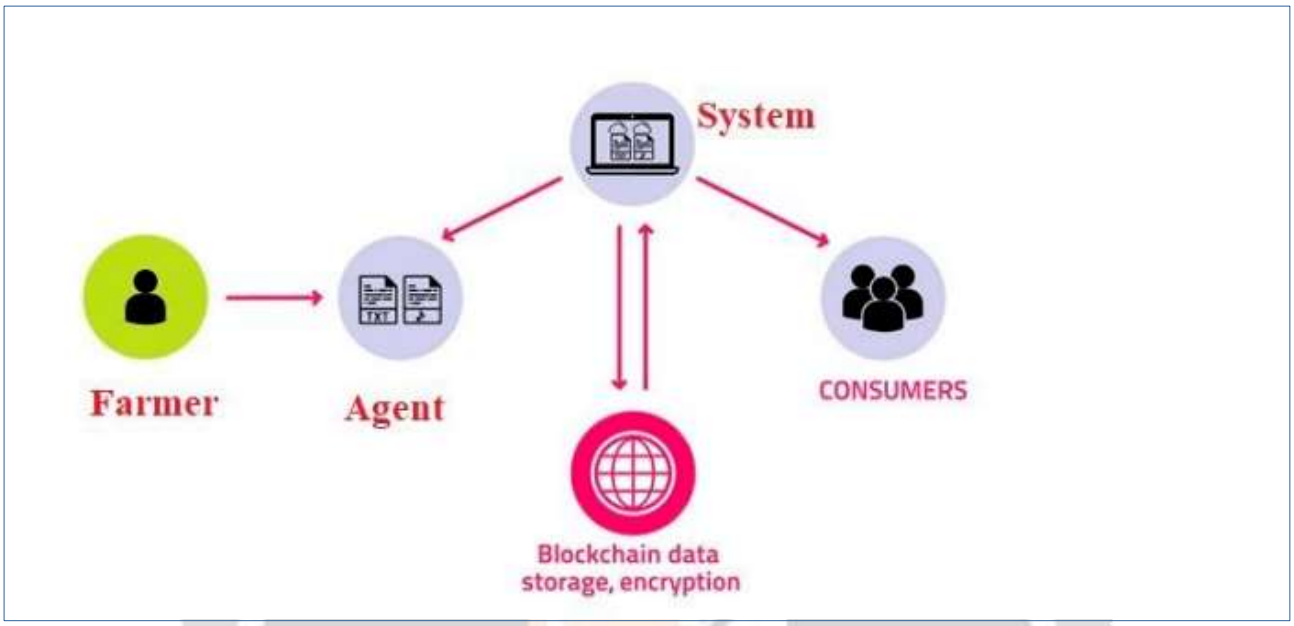

Fig: **System Architecture :**

Whenever any sale will do in the system, the record of that sale is . maintained in the form of hash value in a block. Each coming block will get attached to the former block and in this way a virtual block chain will do. The hash value of a current block is generated using the data of a current block and the hash of the former block. In this way if any of the block is tempered the posterior all the block's hash must be changed. Similar multiple clones are maintained at different waiters, which will assure the data security and confidentiality. As everything is through operation interface, it'll maintain the translucency in the agrarian force chain operation.

BCT: First and foremost, blockchain is a public electronic ledger built around a P2P system that can be openly shared among disparate users to create an unchangeable record of transactions, each time-stamped and linked to the previous one. Every time a set of transactions is added, that data becomes another block in the chain (hence, the name). Blockchain can only be updated by consensus between participants in the system, and once new data is entered it can never be erased. It is a write-once, append-many technology, making it a verifiable and auditable record of each and every transaction. Famer will transfer the products to the agent through the application interface, agent in turn will transfer any product to another agent through application interface only. Also the record of each and every transaction will be maintained at different places which will maintain transparency also the database is secured through AES. System login is secured through visual cryptography.

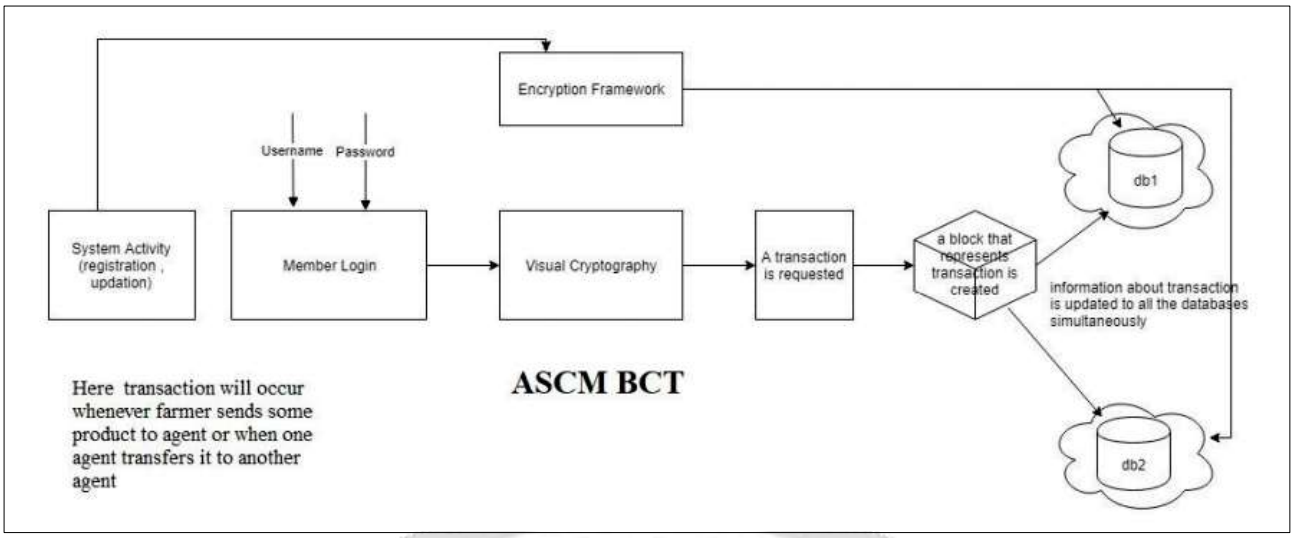

Fig: System Flow

Future Scope:

In future we will try for sponsorship from government and will implement a project on large scale with some domain and hosting space online.

Mathematical Model:

Let
S be Closed system defined as,
S = Ip, Op, Ss, Su, Fi,
A To select the input from the system and perform various actions from the set of actions A so that Su state can be attained.
S=Ip,Op,Ss,Su,Fi,A
Where,
IP1=Username,Password, image
Set of actions=A=F1,F2,F3,F4
Where
F1= Send Mail
F2= Merge Images
F3= Encrypt Database
F4= Generate Hash
S=Set of users
Ss=rest state, registration state, login state Su- success state is successful analysis
Fi- failure state
Objects:
1) Input1: Ip1 = Username, Password
2) Input2 : Ip2= image from mail
1) Output1 : Op1 = Transaction Record
2) Output2 : Op2 = Encrypted Database
3) Output3 : Op3 = Hash Codes.

System Requirments:

MySQL Database :MySQL is on open source database which is mainly a RDBMS i.e. relational database management system. As a database server, primary function of this software is to storing and retrieving data as requested by other from end software applications like java which may Or may not run either on the same computer or on different computer. This can be across the network either in internet or intranet.
Software Requirements
1. Operating System: Microsoft Windows 7 andAbove
2. Programming Language: Java
3. IDE: Netbeans
Hardware Requirements
1. Processor: Intel Core I3 orHigher
2. RAM: 4 GB or Higher

3. Hard Disk: 100 GB(min)

Applications:

1. Farmers
2. Government Organizations
3. Banking Sector.

Conclusion :

Thus we are going to implement a prototype web based software application in Java for application of BCT in supply chain management . We have will implement block chain features such as: •Decentralization
•Visual Cryptography
•Hash Algorithm
•Encrypted Database. using java programming language.
Thus it is possible to track agricultural supply chain and to give minimum price for agricultural products.

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