Product Anticounterfeiting in Supply Chain Using Blockchain Technology

Dr.Seshaiah Merikapudi[1]

Assistant Professor
Department of Computer Science
and Engineering
S J C Institute of Technology
Chickaballapur

Pavan Kalyan Y[2]

Department of Computer Science
and Engineering
S J C Institute of Technology
Chickaballapur

Harshitha G L[3]

Department of Computer Science and Engineering
S J C Institute of Technology
Chickballapur

Mushaffiq Ahmed Mujale[4]

Department of Computer Science
and Engineering
S J C Institue of Technology
Chickaballapura

Lavanya V S[5]

Department of Computer Science
and Engineering
S J C Institute of Technology
Chickaballapura

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Abstract— Blockchain innovations have noninheritable interest within the course of the foremost recent years. one in every of the foremost talked regarding problems is currency exchange, however its application isn't restricted solely to Digital currency. thus it's the potential to influence totally different business sectors. Blockchain technology has brought bigger transparency and ease in massive transactions. we are able to sight counterfeit merchandise mistreatment blockchain technology. The question that arises once shopping for any item in today's world is whether or not it's faux or not. and therefore the lack of those things has been shown an enormous impact on economic progress. Therefore, so as to curb all counterfeit merchandise, it's vital to bring transparency regarding the products to the notice of the customers. The growing presence of counterfeit and unsafe product within the world could be a cause for concern and blockchain technology has taken following step towards its complete annihilation. Not solely the utilization of technology can scale back the assembly of counterfeit merchandise, however everybody must bear in mind of this. By manufacturing and packaging the correct things every of these things must tend a digital code with its own identity. The package implementation method in which the product code is scanned mistreatment this application then verify if the given product is counterfeit or not.

Keywords— Blockchain, Hashing, QR codes, Anticounterfeiting, Transparency.

I. INTRODUCTION

Blockchain is a methodology to store cryptographically associated records across parties in a common association to hinder modifying of records. The blockchain was devised to work with bitcoin trades. A "block" includes a lot of confirmed trades or records, a timestamp, and a hash code. The hash still up in the air from the substance in the square and the previous square (i.e., "chain"). Business runs on information. The faster it's gotten and the more exact it is, the better. For is extraordinary for conveying that information since it gives speedy, shared and absolutely clear information set away on an unchanging record that can be gotten to just by permissioned network people. A blockchain association can follow orders, portions, records, creation and extensively more. Besides in light of the fact that people share a singular viewpoint on the real world, you can see all nuances of a trade beginning to end, giving you more noticeable sureness, as well as new efficiencies and expected entryways.

Blockchain can engage more direct and correct beginning to end continuing in the store organization: Organizations can digitize genuine assets and make a decentralized super durable record, taking everything into account, making it possible to follow assets from creation to movement or use by end client. This extended store network straightforwardness gives more noteworthy detectable quality to the two associations and clients.

Today, in this state of the art time frame, our life is stacked with advancement. It is no huge amazement that online shopping is creating by hop and cutoff points as a general rule. While there may be a couple of negatives of advancement, one reality stays in salvageable shape that development has improved on our life. A few decades back, who can imagine how one can buy anything, while without going out. Who may have accepted that sending gifts to a relative or buddy at a far distance would be so profitable, just by clicking a button. Nevertheless, notwithstanding the extraordinary improvement of online shopping recently, world's electronic business industry is at this point in its beginning phase. Web shopping addresses shy of what one percent of the hard and fast shopping in the country, but has a huge load of potential to shoot up.

Blockchain can drive extended store network straightforwardness to help with diminishing blackmail for high worth product like gems and medication drugs. Blockchain could help associations with perceiving how trimmings and finished product are gone through each subcontractor and decrease benefit adversities from phony and dull market trading, as well as addition trust in end-market clients by lessening or discarding the impact of phony things.
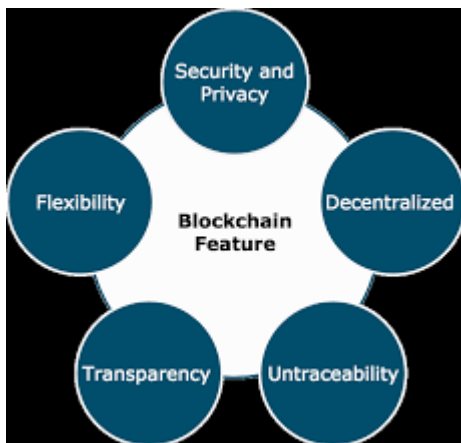

Figure 1 Characteristics of Blockchain

Basically, blockchain possesses a certain characteristics that provides a huge and wide variety of applications in order to develop and design a useful products in the society.

Additionally, associations can stay aware of more control over re-appropriated understanding delivering. Blockchain gives all parties inside a singular creation network permission to comparable information, possibly diminishing correspondence or moving data botches. Less time can be spent endorsing data and more can be spent on conveying work and items either dealing with quality, decreasing expense, or both.

Finally, blockchain can streamline definitive cycles and decrease costs by enabling a feasible survey of store network data. Processes including manual checks for consistency or acknowledge purposes that may at this point require weeks can be accelerated through a scattered record of every appropriate datum.
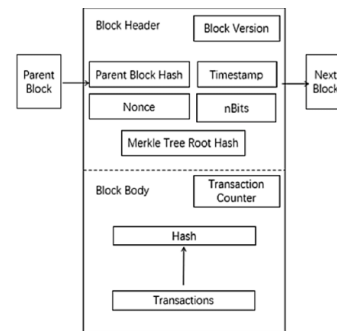

Figure 2 Structure of Block in Blockchain

Blockchain has a typical structure where the block numbering starts from block one, and every block has it is own unique has values and these hash values are generated using an SHA-256 algorithm. The SHA-256 algorithm is the most generally used algorithm in blockchain for hashing and it contains a head node where the address of the next node is stored and the Transaction counter stores all the transactions that have happened. The nonce is also a part of block where it is widely known as "Number used only once" it is a random number that usually varies for each transaction moreover it provides security where one cannot modify the transaction once the data is entered inti blockchain.

SHA-256 Algorithm

Secure Hashing Algorithm (SHA) - 256 is the hash capacity and mining calculation of the Bitcoin convention, alluding to the cryptographic hash work that yields a 256 pieces in length esteem. It directs the creation and the executives of addresses, and is likewise utilized for exchange check. Bitcoin utilizes twofold SHA-256, implying that it applies the hash capacities two times.

The calculation is a variation of the SHA-2 (Secure Hash Algorithm 2), created by the National Security Agency (NSA). SHA-256 is likewise utilized in well known encryption conventions, for example, SSL,TLS, SSH and open source working frameworks like Unix/Linux.
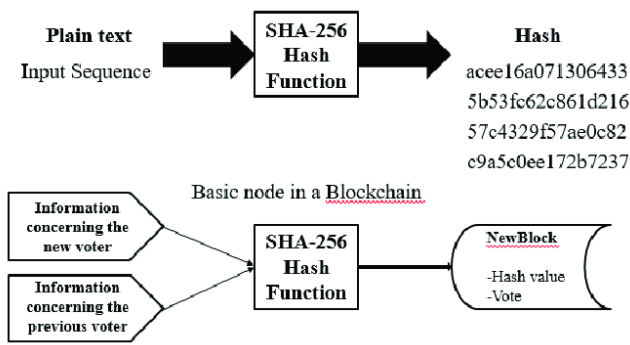
Figure 3 Usage of SHA-256 Algorithm in Blockchain

The hash calculation is very secure and its functions aren't known in the public area. It's utilized by the United States government to safeguard touchy data, because of its capacity to confirm a substance of information without uncovering it because of the utilization of computerized marks. Moreover, it is likewise used for secret phrase check, since it helpfully doesn't need the capacity of precise passwords, as the hash values can be put away and coordinated with the client section to confirm on the off chance that it's right or not.

As a matter of fact, it is almost difficult to uncover the underlying information from a hash esteem itself. In addition, a savage power assault is incredibly improbable to succeed on account of the galactic number of possible blends. Furthermore, it's additionally seriously impossible that two information values (known as impact) have a similar hash.

II. LITERATURE SURVEY

Barcodes were broadly utilized for computerized item distinguishing proof purposes for a wide scope of ongoing applications. Holograms are utilized to battle fakes and lessen phony. Joining the possibility of standardized tags into Holograms offers two Protections against counterfeiting. In a paper, the creator presented recognizable proof by utilizing strategic standardized tags that increment the wellbeing and dependability of the item. Client characterized item recognizable proof code that is remarkable and conveyed to each is changed over to Product Quick Response (QR) code. QR-produced code is then changed over into a multidimensional image to give higher security to the item. The creator has centered on holographic scanner tags utilizing PC-produced Holograms are carried out utilizing Matlab. The Barcode interpreting gives the reproduced from the visualization the item ID number relegated to the item. At last, it provides an idea about will assist with expanding security and credibility in item recognizable proof and to forestall duplicating of items. Notwithstanding, the creator has thought about just the PC-created standardized tag utilizing Matlab and has not thought of imitation of QR code. [1]

Many factors affect a student's academic performance. Student achievement depends on teachers, education programs, learning environment, study hours, academic infrastructure, institutional climate, and financial issues [1,2]. Another extremely important factor is the learner's behavior. H.K. Ning and K. Downing believe that major constructs of study behavior, including study skills, study attitude, and motivation, to have strong interaction with students' learning results. Students' perceptions of the teaching and learning environments influence their study behavior. This means if teachers can grasp the bad attitudes of students, they can make more reasonable adjustments to change the learning environment for the students. To conclude whether good or bad behavior for a particular student is not an easy problem to solve, it must be identified by the teacher who has worked directly in the real environment. The teacher can track student behavior by observing and questioning them in the classroom. This process is not difficult in a classroom that has few students, but it is a big challenge for a classroom with a large number of students. It is valuable to develop an effective tool that can help teachers and other roles to collect data of student behavior accurately without spending too much human effort, which could assist them in developing strategies to support the learners to performances could be increased. [2]

In the have analyzed with respect to counterfeit things are filling significantly in the online market. The square market is the biggest test in-store organization. The government has introduced a couple of guidelines and rules against fake things regardless of the way that the government can't deal with counterfeit things. Consequently, a system needs to be designed for recognizing counterfeit things and giving security techniques to alert both maker and purchaser underway organization. Creators may use the square chain the leader's system to store critical thing bargains information inside the square chain, which is accessible to all. The total number of arrangements the dealer can sell and the rest left behind by the seller are clear. The client can perform a vendor-side check using an encryption computation. In this paper, we proposed blockchain the chiefs system institutes the client and undertaking merchant to follow and perceive the real thing using a PDA. It will recognize counterfeit things as well as the authenticity of the producer for both end client and adventure vendor. [3]

In further reviews, the author proposes an RFID procedure for perceiving counterfeit things and ensuring thing authenticity. The author has proposed an RFID system containing two parts; there are mark approval show and informational collection modification show. The mark check show to confirm names without revealing their critical information and its licenses the client to scrutinize the tag openly. The RFID mark information use to prevent the spread of phony things. Meanwhile, the informational index correction show ensures the rightness of the mark

status. Finally, the phony structure is outstandingly safeguarded against phony and the name affirmation show is satisfactory to do it in RFID-based applications. The maker has focused the RFID name development simply applies to expensive things yet doesn't sensible for sensible things [4]

Author of paper [5] paper disusses how the traditional cloud storage model runs in a centralized manner, so single point of failure might lead to the collapses of system. Th system is a combination of the decentralized storage system, IPFS, the Ethereum blockchain and the attribute-based encryption technology. Based on the Ethereum blockchain, the decentralized system has keyword search function on the cipher text solving the problem in traditional storage systems where cloud server returns wrong results.

In this paper the author proposes a system that provides a solution to the originality and authenticity of published and posted online digital content like music, books, etc. The system utilizes emerging technologies that primarily include blockchain and (interplanetary file system) IPFS. The solution is focused on the authenticity of online books, but the solution in terms of architecture, design, logic, smart contract code is generic enough to be easily extended and is used to provide the originality, authenticity, and integrity to all the other forms of digital assets. The author considered two scenarios based on the approval results provided by the author for every publication requesting an attestation or validation before uploading the content.[6]

In further surveys we studied that, we propose a blockchain-based framework. This framework will provide a theoretical basis for intelligent quality management of the supply chain based on blockchain technology. Furthermore, it provides a foundation to develop theories about information resource management in distributed, virtual organizations. A fake commercial center can influence the improvement of a country. Fake items are fakes or unapproved copies of the genuine item. Fake items are regularly created with the expectation to exploit the prevalent estimation of the imitated item. Pretty much every organization faces a fake danger since it's influencing an organization's income as well as harms the brand's standing. While technology offers several solutions to authenticate the original product, some technological tools, particularly artificial intelligence help create clones, blockchain technology creates chaining and tracing. What is required is consistent up-gradation and development to remain in front of the forgers. Therefore, it is important that we have regulations for the marketplace.[7]

This system proposes a solution that relies on machine learning-based technology which enables end-consumers to identify and verify products without any special equipment. By using image and text recognition. For identification, the end-consumers take photos of an item packaging, which contains product text information, logos, and perhaps accreditation marks/logos. These photos will be sent in a solicitation to the worker for processing and confirmation. Afterward, the detection result will be returned to the end-consumer to make a further decision. In the case of fake product detection, the end-consumer has the ability to report this counterfeit product to the government system, such as the Safety Gate - EU's Rapid Alert System[8]

Holograms have been utilized to fight against fakes and to diminish forgery. Incorporating the possibility of standardized identifications into holograms give two level protection from forging. This framework acquaints a technique with increased security and genuineness in item distinguishing proof by utilizing holographic standardized identifications. The unique and client characterized item distinguishing proof code accommodated every item is changed over into Quick Response (QR) Code. The QR Code created is then changed over into a 3D image, hence giving a prominent security to the item. In this framework, Holographic standardized tags utilizing Computer created visualizations are actualized utilizing MATLAB. The decoding of the barcode recreated from the holograms gives the corresponding product recognizable proof number assigned for the product.[9]

III. PROPOSED METHODS FOR PRODUCT ANTI-COUNTERFEITING USING BLOCKCHAIN

The main aim of this paper We propose an associate degree inimitable and complete product anti-counterfeiting system, that relies on Blockchain. In our theme, makers will use this method to store relevant info on product sales in Blockchain that is accessible to anyone. the whole quantity of sales that may be oversubscribed by the vendor and therefore the variety of merchandise presently left by the vendor square measure clear to users. The user will use the functions provided by our system to immediately perform vendor-side verification, and this verification cannot be created
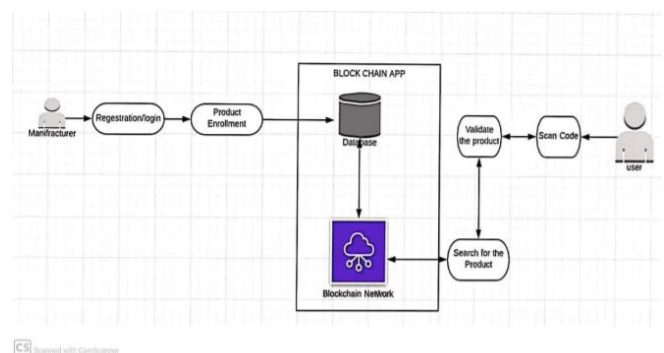

Fig 1: Product Anticounterfeiting Block Diagram

In the above diagram, we show the details of the design of our system, including a full description of the user interface of the system. Our goal is to use the Blockchain features to provide a more complete, convenient, and low-cost product anti-counterfeiting solution for manufacturing, sellers, and consumers.

There is no correct resolution before effort his drawback. As barcodes are derived simply there is no guaranteed system after either, nor an honest resolution to differentiate the faux product from original products. Blockchain technology is one of the promising technologies that is rising in recent years that may be useful to tackle such a tangle. Blockchain Technology is accustomed to monitoring and regulating the merchandise provide chain within the market thus users will solely get the original product. The project's main goal is to deliver folks original products and facilitate people to spot whether or not the product they are shopping for is ingenious or faux simply. The system example is a distributed application (Dapp) with a supporting blockchain network. The network is developed on hyper-ledger cloth that is AN open supply Blockchain development tool and uses DPos/PBFT agreement rule by default.

Execution Stages:

Step-1: Product Enrolling in Blockchain Network

The first step is to bring all manufacture into the blockchain community and acquire their huge product database. The manufacture authentication is carried out via registration and giving them a proper identification and password. producer might be the number one owner of the item. producer will request the administrator to add a product on the network on the time QR code will get assigned to that product. Administrator will join the product and manufacturer on the network if the requestor is a authentic manufacturer. After the product is recorded in a community it will create a smart agreement and a unique QR code of the product wherein the info of the product is cited in an encrypted text form. To at ease the QR code from copying there's a duplicate touchy virtual photo in QR code.

Step-2: Retailer Acknowledgement

In the next step the manufacturer will send the merchandise to the distributor and standing is regarding as shipped. It'll not amendment the possession of the merchandise till missive of invitation from each parties is approved to shop for and sell the merchandise. As presently as each parties approve reciprocally, its possession within the blockchain network are going to be transferred within the variety of good contract mechanically once the payment is eminent.

Step-3: User Can Verify The Product

In this stage clients will be given an android application and buyers can scan QR code allocated to the item utilizing android application. The Scanner scans the product and decrypts the encrypted text in a given algorithm and gets the detail about the product that is the manufacturer and current owner of the product and can conclude if to purchase the item or not.

IV. CONCLUSION

This paper is the main Blockchain framework that proposes a completely functional fake item forgery framework. Without paying any transaction charge, clients of our framework at this point should not be worried about the chance of obtaining a counterfeit item. Accordingly, the proposed framework is valuable for end clients to identify counterfeit items in the inventory network. End client can check QR code allotted to an item and can get all the data like exchange history, current proprietor dependent on which end client can check if the item is counterfeited or not.

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