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FAKE PRODUCT IDENTIFICATION SYSTEM USING BLOCKCHAIN

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Abstract : For the cause that advent of Blockchain technology in 2008, it's been executed in excessive fields to guarantee high statistics reliability and safety, from the usage of Bitcoin to BaaS (Blockchain as a service), a cutting-edge blockchain fashion that competencies as a form of cloud-primarily based community for organizations who broaden blockchain-primarily based apps. Severe apps had been superior the use of the blockchain, that's gaining recognition. The well known Blockchain - based totally forex not simplest solves the double-spending trouble however additionally independently confirms the accuracy of transactional facts. For the reason that Blockchain era serves as the foundation of all applications, the integrity of their statistics is assured. This have a look at applies a decentralized Blockchain technology and supply chain technique to illustrate that forestall customers in a supply chain do no longer definitely rely upon buyers or other one third parties to decide whether or not a product is counterfeit or not. This influences a commercial enterprise agency's income, brand, and backside line. Actual and fake products may be determined thru allotted ledger. We gift an anti-counterfeiting decentralized Blockchain solution that manufacturers can use to deliver actual items and not using a need to oversee right now owned shops. This will be accomplished by manner of authenticating the products at each level of the supply chain. For each product introduced by manner of the admin which creates particular QR code using SHA256 QR Code era set of regulations and stores into the database.

IndexTerms - Blockchain, supply Chain, cryptocurrency, bitcoin, decentralization, Counterfeited Product identification, safety.

I. INTRODUCTION

The promoting and profitability of the bothered companies are stricken by the developing alternate in faux items. For the primary time, a studies proposed a completely operational blockchain system to save you product counterfeiting and verify the authentication and traceability of proper merchandise across the supply chain. For every product that the administrator provides, a special QR code is generated and saved in the database. The system is built on a blockchain, and businesses that use it will just have to spend the necessary sums of money to create and modify their contracts. Anyone may readily establish the legitimacy of a business and the consumer's purchase of goods using fully revealed smart contract information. Using this anti-counterfeit blockchain technology, companies can demonstrate that the products they offer are real, eliminating the need to compete with low-cost imitations.

1.1 BLOCKCHAIN

In its maximum primary shape, a blockchain is a community of computers that copies and disseminates a digital log of transactions. Every time a brand new interest legitimately takes at the ledger, a file of its miles added for each man or woman's ledger. Each blockchain has a number of transactions. The decentralized ledger that would be managed through numerous participants is called to as disbursed ledger (DLT).

A blockchain [13] is a developing series of documents, or "blocks," that are related collectively via cryptography. The timestamp, a cryptography hashing of the chain earlier than it, and transaction records are all blanketed in every block (commonly represented as a Merkle tree). Its design, a blockchain is proof against information amendment. This is due to the fact as soon as records have been recorded; it cannot be changed back without affecting the blocks that come after.

If you want to feature as a shared database, a blockchain is frequently controlled by using a peer-to-peer network that abides with the aid of a standard governing inter-node communications and certifying genesis block. Even though data on the community can nevertheless be modified, Blockchain is an example of a disbursed computing device with top notch Byzantine fault tolerance. Described as "an open, distributed ledger that may report transactions among two parties fast and in a verifiable and permanent shape," the blockchain is a decentralized database.

1.2 ETHEREUM

Programmer and co-founder of Bitcoin mag Vitalik Buterin first delivered Ethereum in a white paper in overdue 2013 with the intention of creating decentralized packages. Buterin counseled that Bitcoin and blockchain technology can be used for more than just monetary transactions and that a scripting language changed into essential for the advent of apps. This can result in the addition of actual-international belongings like shares and actual property to the blockchain. Buterin produced the colored cash challenge's white paper explaining capability use cases for blockchain generation in 2013 whilst working briefly with eToro CEO Yoni Assia at the venture. He recommended the introduction of a new platform with a greater universal scripting language, which might ultimately turn out to be Ethereum, however after failing to at ease settlement on how the assignment ought to move ahead.

1.3 COUNTERFEIT

Counterfeit refers to the imitation of something genuine with the purpose of stealing, destroying, or altering the genuine, for use in nefarious transactions, or in any other way to inspire people to believe that the fake has an equal or higher value than the genuine article. Fake or illegal copies of the genuine product are considered counterfeit products. Products that are counterfeit are frequently created with the intention of profiting from the better worth of the mimicked goods. The term "counterfeit" is widely used to refer to forgeries of money and official papers as well as imitations of goods such jewelers, handbags, shoes, cosmetics, drugs, unapproved aircraft parts (which have been responsible for numerous mishaps), watches, electronics (both components and completed goods), software, works of art, toys, and movies.

II. LITERATURE SURVEY

"ARMOR: An anti-counterfeit security Mechanism for low cost Radio frequency identification systems, Yildiran Yilmaz, Viet-Hoa Do and Basel Halak, Published in: IEEE Transactions on Emerging Topics in Computing, Volume: 9, Issue: 4, Oct.-Dec. 1 2021".

The worldwide economy loses masses of billions of dollars yearly because of counterfeit gadgets. Radio frequency identity (RFID) generation gives a capability solution to this problem with using at ease, hard-to-forge tags affixed to each product. But there's severe safety risks connected to RFID technology. As an illustration, if the verbal exchange channel between the reader and the tag is compromised, a cunning adversary might be capable of get right of entry to the sensitive facts saved on the device. The demonstration of tag cloning attacks as additionally being feasible have seriously undermined the functionality of RFID era to prevent counterfeiting. One approach to address the problem is by means of the usage of an authentication protocol, but present solutions lack mutual authentication and are nevertheless vulnerable to tag cloning [1].

"Comparative Analysis of Bitcoin, Ethereum, and Libra, Wenzheng Li and Mingsheng He , year 2020, IEEE 11th International Conference on Software Engineering and Service Science (ICSESS), INSPEC Accession Number: 20131326".

The blockchain era that powers cryptocurrencies like Bitcoin and others has step by step acquired prominence in latest years as a result of their growing reputation. Following the legitimate launch of facebook's cryptocurrency [2] assignment Libra and the publication of the Libra white paper, Libra generated massive international dialogue.

The traditional banking device is greatly being impacted by using Libra, which has boosted humans's belief of open financing. In this essay, we meticulously have a look at and explain blockchain era and emphasize Libra's improvements within the consensus set of rules, overall performance, and application situation. We examine Libra, Bitcoin, and Ethereum. We finish with the aid of outlining the challenges that Libra will face [2] within the destiny.

"Block-Supply Chain: a New Anti-Counterfeiting Supply Chain Using NFC and Blockchain, Naif Alzahrani, Nirupama Bulusu, year-2019, MobiSys '18: The 16th Annual International Conference on Mobile Systems, Applications, and Services."

The modern supply chains for fighting counterfeit items depend upon a centralized authority. This structure has issues with unmarried factor processing, failure, and garage. The development brand new blockchain era offers a potential solution to those issues. On this paper, we endorse the block-supply chain, a new decentralized supply chain [3] that present day near discipline verbal exchange (NFC) era and blockchain to locate efforts at counterfeiting. Block-supply chain replaces the centralized supply chain design and contemporary a recently recommended consensus protocol this is absolutely decentralized, as opposed to different protocols, and reveals stability among efficiency and protection. Our simulations show that, in contrast to the state of the art consensus protocol [3] soft mint, the proposed protocol affords excellent performance with a first rate degree today's safety.

"An ADS-B Anti-counterfeiting System Based on TDOA, Hao Shen1, Keren Liu1, Yuxuan Yao, Jun Wang, IEEE International Conference on Signal, Information and data Processing in 2019".

The ADS-B signal is not encrypted in any form, and traditional receivers cannot verify the authenticity of the ADS-B signal, which poses a potential risk to aviation safety. Considering the insecurity of ADS-B, this paper proposes a fourstation passive multilateration ADS-B [4] anti-counterfeiting system based on TDOA. A reference station is used to synchronize the clock of each station, and the Chan Algorithm is used for solving TDOA equations. We have built the system and tested it in the real-world with several flights near Beijing Capital International Airport. The system can track the plane route in real time and compare it with the positions claimed by ADS-B messages to achieve the purpose of ADS-B anti-counterfeiting and pseudo signals localization [4].

III. SYSTEM REVIEW

3.1 EXISTING SYSTEM

- Data trading has become a popular research topic in recent years. This forum uses a recurring auction method to achieve greater efficiency in order to improve self-interest behavior among users.
- Login methods are used to achieve WSN accountability. This is a response to invaders of energy theft in the space of smart clouds.
- Shingling and MinHashing have long been used to obtain a copy of the text to obtain the same text.
- This method is used for word-based similarities.

3.2 EVIL

- Unscrupulous buyers may illegally sell data sets purchased from others.
- The previous method is used to monitor the seller's side but it is not appropriate to identify the broker.
- Heavy monitoring system cannot survive because it leads to poor user experience.

3.3 PROPOSED SYSTEM

- Trade Account is proposed to trade with big data among unscrupulous buyers.
- Trade Account achieves the ability to keep accountable and accountable to unscrupulous buyers in all trading of data sets.
- Notification Board is used for the verification process. If the user wants to upload data follow the upload policy.
- Notification Board verifies the user and user-uploaded data. It also verifies sellers' and buyer data.
- Notification Board ensures that sellers do not sell duplicate data.

3.4 BEAUTY

- Consumers cannot sell the same data to multiple users.
- Distributed through a secure channel.
- Brokers and buyers/sellers are approved after verification.

3.5 SCHEDULE ARCHITECTURE

A device's shape, behavior, and different outside characteristics are all described with the aid of a conceptual framework referred to as the device shape. The created machine components and sub-systems in an effort to cooperate to run the entire system may make up the gadget architecture.

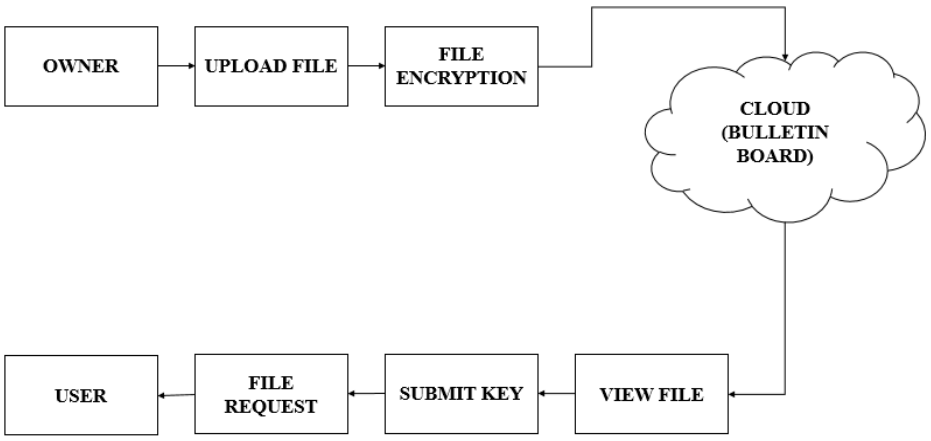


Fig.3.5 Structure of the System

IV. IMPLEMENTATION

4.1 Module List

- Admin Login
- User Registration
- User Login
- OTP Verification
- QR code verification
- Blockchain authentication

4.2 DESCRIPTION OF MODULES

4.2.1 ADMIN LOGIN

- The admin login module allows the admin to login to the blockchain network by entering a username and password.
- By default admin credentials are provided and admin act as a manufacturer itself.
- Admin can add newly manufactured product or available in their store.
- Admin can view the added product list as well as registered users list.

4.2.2 USER REGISTRAION

- The user registration module allows user to provide all necessary basic required details to the blockchain network so that user can login with credentials and can access the network or cloud.
- After registering to the network or a cloud then the user can access services stored in the cloud.

4.2.3 USER LOGIN

- The User Login module allows a user to login to the blockchain network by entering a username and password.
- User can see their own profile and can update basic details which are already filled.
- User can view the products updated or added by the admin or manufacturer.
- User can select the product to add into the cart so that user can get an alert message to user email about the product whether the product is original or duplicate.

4.2.4 OTP VERIFICATION

- By way of imparting an OTP security code on login, Pass code confirmation confirms email accounts and speaks to variety for users.
- Moreover, the OTP verification plug-in verifies whether or not the person's emails cope with or cell variety is already in use.

4.2.5 VERIFICATION OF QR CODE

A paper titled ‘faux Anti-Fraud era technologies based totally on QR Code photograph Watermarking set of rules explains how to embed an image of a network enterprise in a QR code in order that we can tag an image with a QR code. It’s far a watermarking algorithm primarily based on DWT and SVD firm. n. Experiments have tested that this method can resist the onslaught of pressure, circular assaults, noise assaults and greater.

4.2.6 BLOCKCHAIN CERTIFICATION

The user requests a transaction on the blockchain, the asked transaction is transferred to the P2P network wherein it is broadcast on nodes within the community. After this, the credentials within the network verify the transaction with the user fame. This is executed using some well known algorithms. Proven hobby might also contain records on cryptocurrencies, contracts, or different information. After success verification the transaction is united through added transaction statistics and a brand fresh records block is created. A new block is then brought to the blockchain and a blockchain reproduction of every node inside the community is updated.

V. SYSTEM REQUIREMENT

Table 4.1: System Configurations

H/W CONFIGURATION OF THE SYSTEM	S/W SYSTEM CONFIGURATION
Pentium IV processor is required	Windows 7 or 8 as the windows OS
Memory - 4 GB (min)	Python Idle is a piece of software
Hard Drive: 20 GB	Apache server and MySql

5.1 IMPLEMENTATIONS

Reference implementation

The standard Python translation is known as CPython. it's miles written in C and includes some particular C89 and C99 talents. It converts Python scripts into intermediate bytes of code which might be later run with the aid of its digital gadget. A big widespread library created in a combination of C and local Python is protected with the distribution of CPython. Numerous systems, together with home windows and the general public of contemporary Unix-like structures, assist it. Numerous of its primary dreams were device mobility.

Other implementations

Python 2.7 and 3.five may be speedy and correctly interpreted using PyPy. Even though it is far faster than CPython way to its just-in-time compiler, it does no longer work with some of C-written libraries. Stackless as it doesn't use the C memory stack and gives microthreads, Python—a vast offshoot of CPython—lets in for vastly concurrent programming. There may be also a

stackless version of PyPy. The Python 3 subsets MicroPython and CircuitPython were designed with microcontrollers in mind. Lego Mindstorms EV3 is one instance of this. A translator for Python three evolved in Rust is called RustPython.

VI. SYSTEM TESTING

6.1 Use Case Diagram

A use case diagram is a selected sort of behavioral graph inside the Unified Modeling Language (UML) that comes from and is described with the aid of a use-case assessment. Its purpose is to provide a graphical illustration of an assignment's actors, their desires (represented as use instances), and any dependencies between those use cases. The number one intention of a use case diagram is to decide whether or not a given actor's movements are finished by way of the usage of the tool. Duties can capabilities representations of the machine's actors.

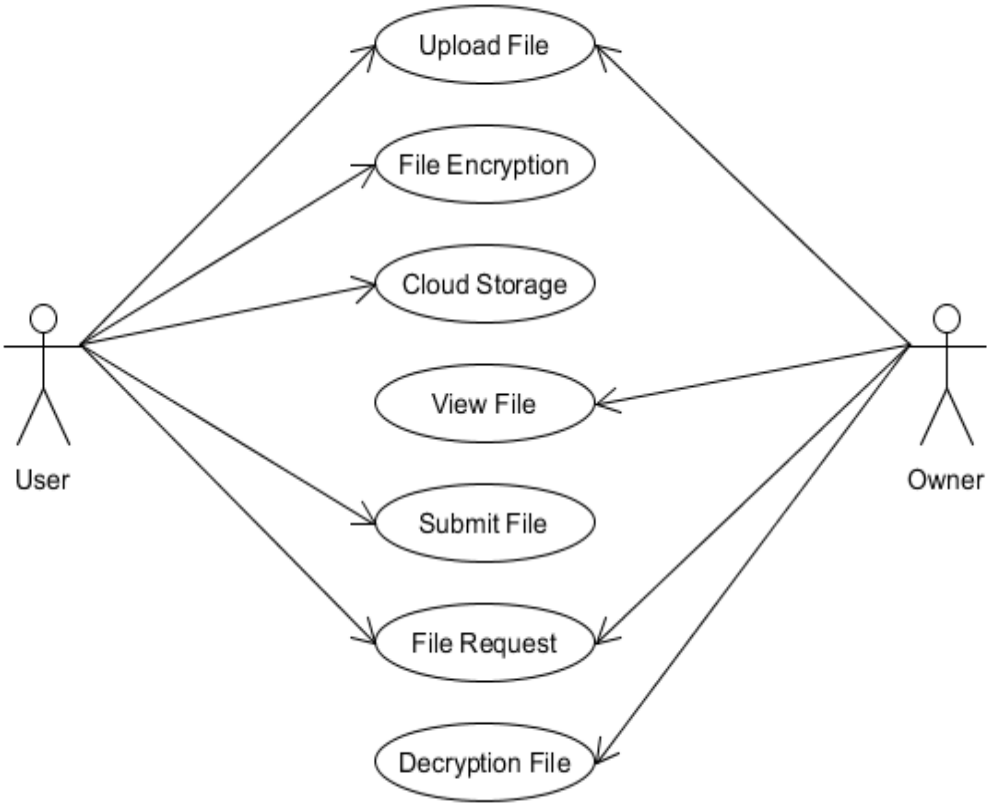


Fig. 6.1 use case diagram

6.2 SEQUENCE

Developers often utilize graphical representations to model the interactions among gadgets in a unmarried use case. They show the relationships between the various components of a device and the collection in which the ones relationships increase all through the execution of a sure use case.

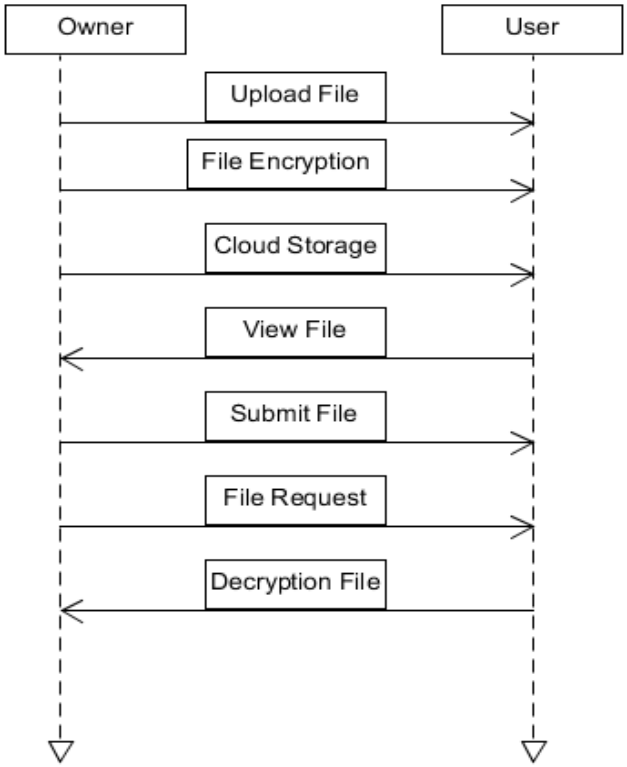


Fig. 6.2 sequence diagram

6.3 DEPLOYMENT

Element diagrams are used to describe the additives and deployment diagrams indicate how they are deployed in hardware. UML is in most cases made to pay attention on the software components of a device. Those diagrams, however, are specific ones that highlight the hardware and software.

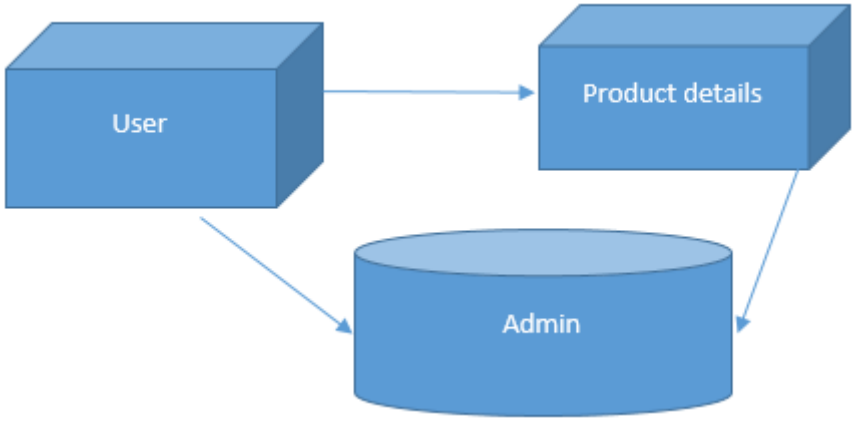


Fig. 6.3 deployment diagram

6.4 DATA FLOW DIAGRAM:

The bubble chart is every other call for the DFD. It's far a sincere graphical formalism that can be used to depict a gadget in phrases of the information it is moreover fed into it, the diverse techniques which is probably completed on it, and the facts this is produced because of those operations.

One of the most essential modeling equipment is the facts drift diagram (DFD). The device's issue fashions are created the use of it. Those factors encompass the machine's operation, the statistics it uses, a 3rd celebration that engages with it and the way information actions through it.

DFD demonstrates the records' float thru the system and the diverse modifications that have an effect on it. It is a visual tool that indicates how facts flows and how statistics is converted because it actions from enter to output.

Any other call for DFD is bubble chart. A device at any level of abstraction can be represented the usage of a DFD. DFD may be divided into levels that correspond to escalating operational complexity and statistics flows.

Level 0:

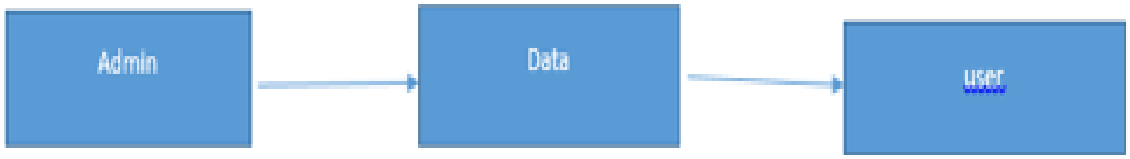


Fig 6.4.1 Level 0

Level 1:

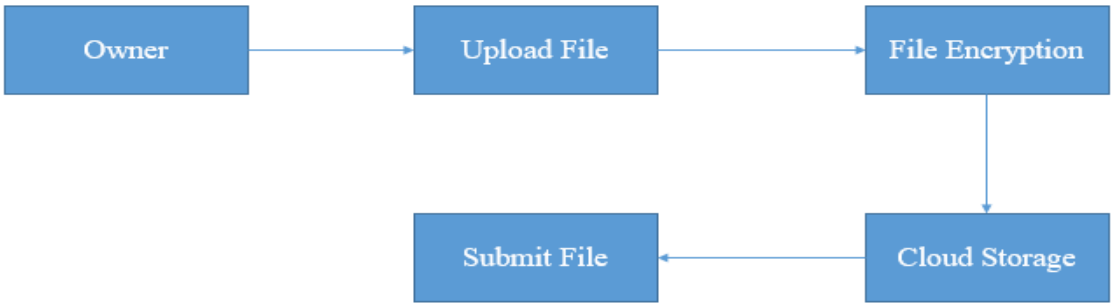


Fig. 6.4.2 Level 1

Level 2:

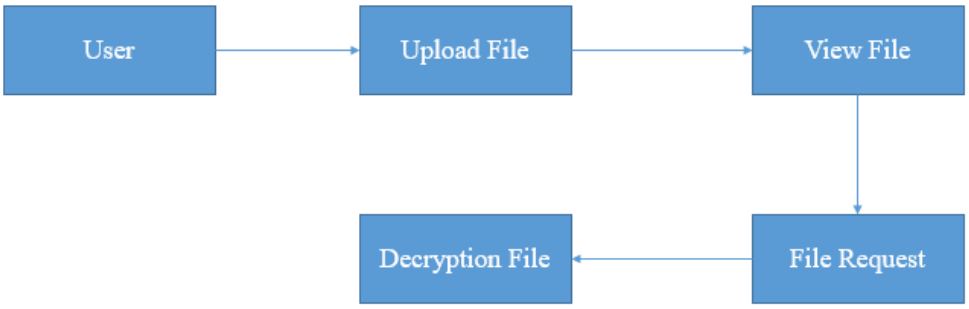
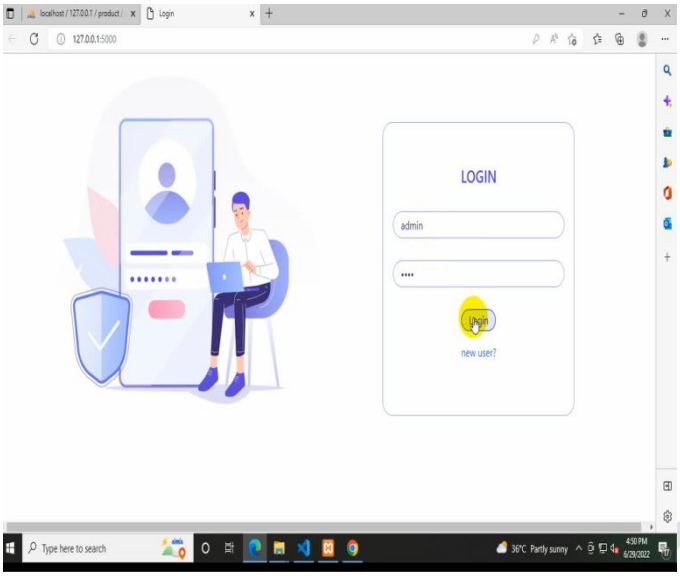


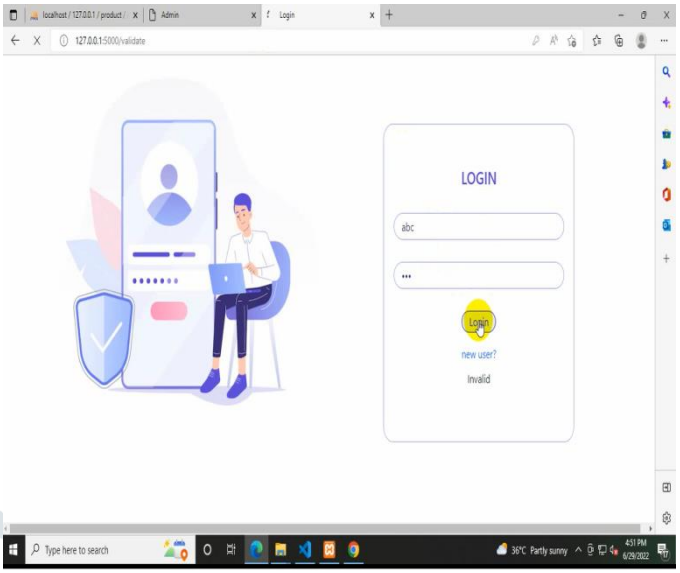
Fig. 6.4.3 Level 2

VII. RESULTS AND DISCUSSION

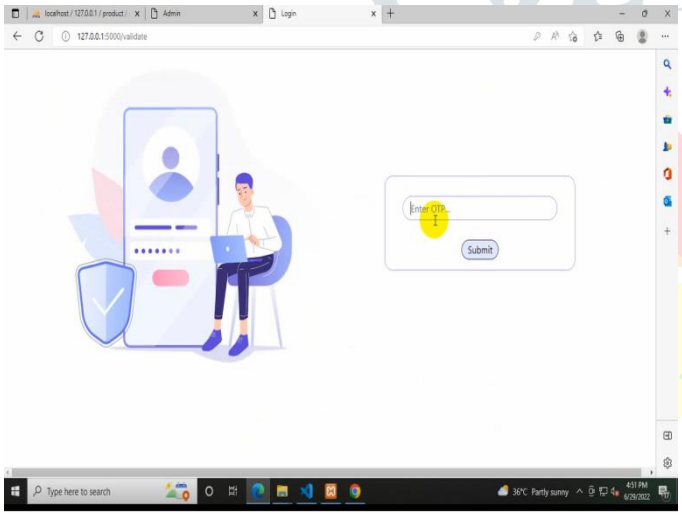
Admin Login



User Login



User OTP Verification



QR Code Generation

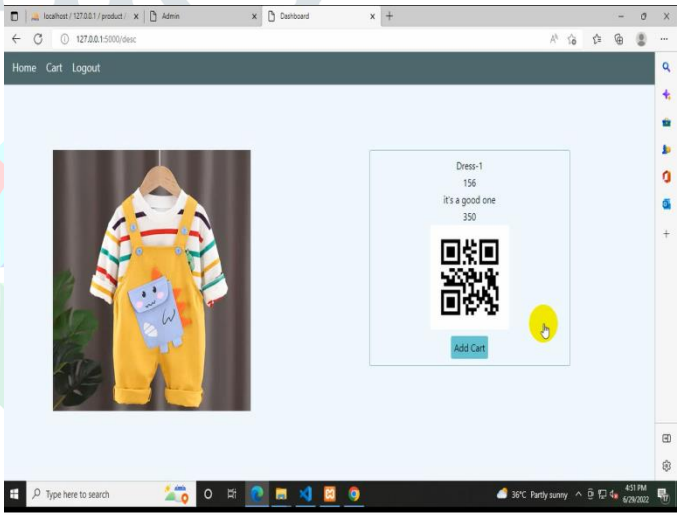


Fig 7.1 Detail outputs of Admin and User

Admin Login: The admin login module lets in the admin to login to the blockchain community through coming into a username and password. Via default admin credentials are furnished and admin act as a producer itself. Admin can upload newly synthetic product or available of their keep. Admin can view the brought product list as well as registered users listing.

User Login: The user Login module lets in a person to login to the blockchain community by getting into a username and password. User can see their profile and might replace simple information which is already stuffed. Consumer can view the goods updated or delivered by the admin or manufacturer. User can pick out the product to feature into the cart so that consumer can get an alert message to consumer e-mail approximately the product whether or not the product is unique or reproduction.

User OTP Verification: By way of imparting an OTP security code on login, Pass code confirmation confirms email accounts and speaks to variety for users. Moreover, the OTP verification plug-in verifies whether or not the person's emails cope with or cell variety is already in use.

QR Code: A paper titled ‘faux Anti-Fraud technology primarily based on QR Code image Watermarking set of rules explains how to embed an photograph of a community corporation in a QR code so that we are able to tag an photo with a QR code. It’s far a watermarking algorithm based on DWT and SVD firm. n. Experiments have validated that this technique can withstand the onslaught of pressure, round assaults, noise attacks and extra.

VIII. CONCLUSION

This study introduces Account Trade, which enables accountability in the big data trade among dishonest consumers and ensures accurate bookkeeping. If customers conduct dishonestly during data transactions, Account Trade holds them accountable. Manufacturers can utilize the system to maintain pertinent sales data for their products in a publicly accessible blockchain. Both the seller's maximum possible sales and the number of products she has remaining on the market are transparent.

FUTURE ENHANCEMENT: The distributed system's code unpredictability directly affects the overall cost of running it on the Ethereum block blockchain. Future usage of this system may demonstrate how simple the code is. Due to the distributed application's simple design and lack of redundant code, the customer may be confident that it won't increase consumption.

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