A Study of Blockchain Technology in Farmer's Portal

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ABSTRACT:

Blockchain is a method in which a confirmation of a transaction is kept by means of a crypto-currency. The record is maintained transversely, linking several computers in a peer to peer network. Contracts, transactions, and the records of them define the economic system of a country. They set boundaries and provide security to the assets. Considering the features of blockchain such as immutability and maintaining the footage of transaction details, this paper highlights the usage of blockchain technology with farmer's portal that keep the footage of selling and buying information of crops. The proposed solution uses the python as a programming language in integration with the blockchain system that will benefit the farmers or vendors and individuals by preserving the contract of trade. An interface for the farmers is designed using a python programming language in addition with blockchain technology, which is used to store the information related to seller, buyer, selling and buying an item and total value transacted.

Index Terms: Blockchain, peer-to-peer network, economic system, immutability, transaction recording, farmer's portal, Python, trade contracts.

1.INTRODUCTION

Blockchain [1] an open, disseminated and decentralized ledger that evidences transactions involving two parties capably in a confirmable and stable way (Iansiti, Lakhani 2017). In the above given definition, open means the blockchain is accessible to one and all, disseminated means that there is no single party control and decentralized means there is no central third party available, capable means it is fast and more scalable than the conventional technologies, confirmable means that everyone can check the validity of the informat ion and stable means that the data is nearly immutable that is it is nearly impossible to change or tamper the data or information. They verify and validate the identities and chronological events. They guide every action, transactions that have taken place among individuals, communit ies, organizations and nations as well. In this era of digitizat ion, the way maintained and regulated these type of data must be changed, it must be highly secure and the blockchain is the solution to this.

In the era of information and communication technology, a farmer's portal has always been helpful for farmers in many ways, providing ease of use and convenience of information to the farmers [1]. The Government of India has also taken many initiat ives for the same. Few examples of

such portals are Krishijagran.com, farmer.gov.in, agricoop.nic.in and agriwatch.com etc. Apart from these some E-commerce websites are also available; fert.nic.in and enam.gov.in etc. The sectors currently using blockchain are shown in Fig.1.Using blockchain technology in the field can make available decentralized computation and informat ion sharing platform that enables multiple authoritative domains, which do not trust each other, to cooperate, coordinate and collaborate in a rational decisionmaking process, a reliable informat ion recording system can be made that can contribute for the development in theagriculture sector.
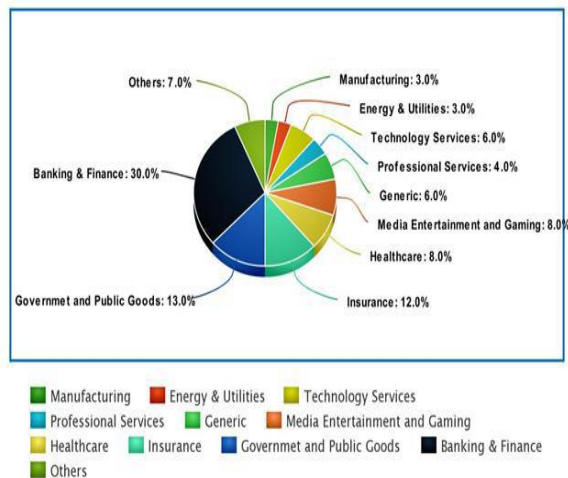

Figure.1 Block Chain

Since blockchain works like a publicledger, so it can be utilized to ensure many different aspects such as

Protocols for Commitment: Ensure that every valid transaction from the clients are committed and included in the blockchain within a finite time.

● Consensus: Ensure that the local copies are consistent and updated.

● Security: The data needs to be tamper - proof. Note that the client may act maliciously or can be compromised.

● Privacy and Authenticity: The data or transactions belong to various clients; privacy and authenticity need to be ensured.

Cryptography is a foremost part of the functioning of blockchain technology [4]. Public key encryption is the root of blockchain wallets and transaction, cryptography hash functions endow with the trait of immutability and merle trees systematize transactions while enabling blockchain to be more competent.

2.EXISTING SYSTEM

Farmers, as well as agriculture, are the foundation of life. Numerous work has been done towards the enhancement of agriculture by developing technologies that support directly and indirectly to agriculture. A range of research shows that with the various enhancements in the field of ICT, the farmers are unable to take its advantage and fail to get the proper sale value for their crops

Gosh et al. [5] has designed an interface that benefited the farmers by providing the informat ion related to the advancement of agriculture techniques; farmers can interact with the system by means of text and speech as an input. The approach was the first rate in terms of providing the interface to the farmers.

Manav et al. [6] proposed an android based mobile application that would take care of updating the farmers regarding agricultural products, weather forecasts, and agricultural news. However, the system was good in providing the instant update to the farmer but the version was only in the English language, which was the limitation of the system.

Jason [7] has discussed various technical approaches made in agriculture, mostly in the field of food and supply chain management. The incorporation of blockchain technology in agriculture has improved the efficiency of the agriculture supply chain by reducing the need for verification of data. However, the technology proposed benefited only the producers in terms of maintaining the accuracy of data for supply.

Jing Hua et al. [8] has used blockchain technology and proposed an agricultural tracing system that is decentralized, maintained collectively and provides trust and reliability in case of supply chain management. The system proposed is beneficial for producers in terms of safeguarding the data of production and supply that is immutable.

3.PROPOSED SYSTEM:

The Proposed Farmer's portal is a single gateway through which the e-commerce activity of crops can be performed. The users' experience of the portal can be tailored according to the individual need. It is a single access point i.e., everything is in a single place, the only thing needed is single login to approved users

The security of the blockchain is maintained in the way that the transactions are bundled together to form a block that has a unique ID [10]. The data in it is made tamperproof by using a cryptographic hash function and adding a digital fingerprint to the block. Each block has its hash value and the hash value of the previous block which makes it the chain of blocks, then proof of work is also added as a constraint in the hash value to make it a cumbersome process for the user to mine a block in the chain. The blockchain implements hash functions. If someone tries to alter the data in the b lockchain, he has to do the following things, first has to calculate all the hash values once again, second, he has to do the corresponding proof of work and third he has to take the influence on at least 51 percent of the nodes in the network. And these three things are nearly impossible to be done simultaneously. The larger the network, the more temper resistance it will be.

The retrieval of a particular t ransaction of interest in future from the storage is one of the most important characteristics as this functionality will help the user to have the chronological ledger of everything done in the past. In our system, a simple generic blockchain is implemented which keeps the record of a transaction for an act ive session only because it is stored in a local system but when a deployable blockchain will be used and the storage may be on a cloud it can retrieve any data from the generic block to the last block which has been added to the blockchain. This ultimate ledger of the transaction will be transparent to every node in the network and it can also help us in

tracking and tracing any information or data related to the items in the portal.

Advantages of Proposed System

It is enhancing the degree of participation, reducing the intermediation cost; many farmers experience difficulty when they try to sell their product at a fair price, the portal helps the farmers to reach the market without taking any extra help from the middlemen.

☐ The portal stores all the informat ion at a single place so it can be easily accessed by those who need it and hence simplifying the entire process and solving the time and energy.

☐ The use of blockchain ensures greater efficiency, trust, accessibility and transparency from farm to groceries. It will benefit users with more options and get competitive returns.

☐ Improved level of customer interaction, customer and business loyalty will ensure increased workflow, smarter decision making and increased productivity.

4.SYSTEM ARCHITECTURE
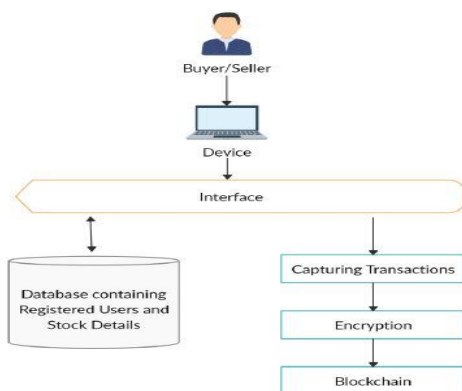
Figure.2 System Architecture

5.IMPLEMENTATION

An uncomplicated shopping gateway is developed using Python language for the backend and HTML, CSS, JS for frontend fraction. The component used for backend development is Flask which is a micro web framework for web applications written in python.

The build system has two types of relation i.e. Buyer relation and Seller relat ion; Buyer can search and buy the accessible commodities. The seller can post or add commod it ies. The blockchain is introduced at two points, one at the time of updating the item in the system and another at the time of complet ion of the transaction. When a farmer adds his crop details on the portal to sell, a transaction is added on the blockchain containing in format ion about the items and seller details. On the other hand when a buyer purchases an available item the transaction is added on blockchain including item and buyer details.

As the merchandise like crop has a low shelf life, so it's troublesome to return and resell the item. So, in the sequence to evade the loss that can be caused to the farmer and individual a contract is ensured between them using blockchain at the entry and end of the transaction. The added blockchain will save the digital footage of the details of item added, item sold, item purchased and seller as well as buyer that is immutable and tamper-proof; ensures that no one can disagree with the contract to sell and buy the commodity which they have confirmed.

For this application to be built modules of python have been used in it.

● flask – It is a micro-web framework for the backend of web applications written in python. In this work, it is used to develop the backend of a portal using its functionalities namely Routing, Rendering of Templates, Framing Redirects, and Building Sessions etc. Flask is based on Jinja2 for template and Werkzeug for WSGI toolkit. It is easy to use and an efficient framework to use in applications like e-commerce or trade portal.

● SQLAlchemy – It is a Python SQL Tool Pack which provides ease and flexibility of using SQL round the application. In this portal, it is used to integrate SQL to Web applications directly and perform required operations.

● hashlib – It is a module responsible for giving an interface to programs for many of the hashing and message digest algorithms such as SHA1, SHA224, SHA256, SHA384, SHA512 and RSA MD5. Suma V. [11] has made a comparison for Average time (ms) and average cost (%) for blockchain with RSA-DS and blockchain without RSA-DS. The author has found thata blockchain with RSA-DS is efficient. However, the RSA-DS does not contain any hashing, so to make it more secure SHA2 is recommended since it provides better security [12]. The proposed system uses SHA256. It is used to generate a hash of the block containing index, transaction, timestamp, previous_hash and nounce.

● json – It is a light-weighted data interchange format which is used to request data in JSON format.

● Time – This module is equipped with functions associated with time. In our work, it has been used to capture the juncture on which the transaction is being succeeded.

● os – This module equips functionality which is dependent on the operating system. In our work, it is used for defining system paths, Directories etc

The application is present in the master directory which has sub-directories and some important files to drive the application. The master directory contains a sub-directory name ly "app" and files to drive the web applicat ion and deploy the blockchain. Coming to the sub-directory "app", have eight sub-directories namely cart, items, notificat ions, reviews, static, tags, templates, users which are the main necessary classes

All the eight sub-directories consist of files which are used to declare and control the methods and variables needed to drive the web app. These files control all the activities and interferences of that particular entity and contain the declaration of the particular attributes of that entity.

In a sequence to this, a file to implement and deploy a blockchain in the master directory is made which is responsible for Storing

transactions into blocks that attach digital footprints to the blockchain that provides proof of work algorithm. This local blockchain has been integrated to run on port localhost: 8000 with the main app running on port localhost: 5000.

Before running the flask application, blockchain is deployed and runs on localhost: 8000 for capturing transactions of Buying and selling to ensure it's ready for operation. Finally, the main flask app is run on localhost: 5000 and loaded in the browser.

5.1 IMPLEMENTATION:

MODULES:

1.Add Product Details

To build project I used some sample products image to train product identification models

2.Train Model

In this Module screen train model generated with 100% accuracy and now show product to web cam.

3. Add/Remove Product from basket

To allow application to identify product image and then show in text area and if we again show same product then application will remove from text area

6.RESULTS

on 'run.bat' file to start DJANGO server and to get below screen
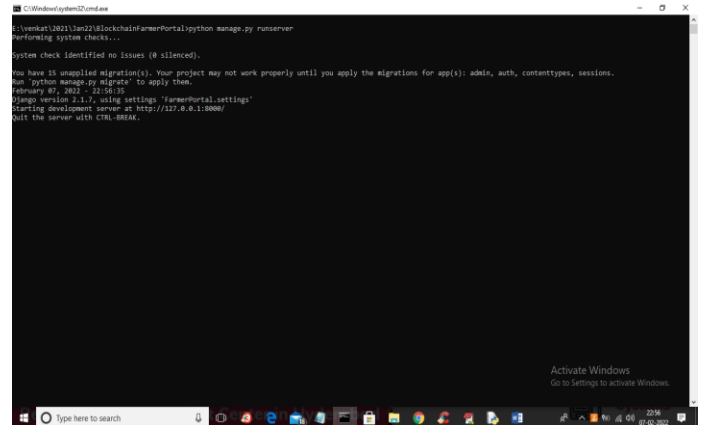
Figure.3 Console Screen

In above screen we can see DJANGO server started and now open browser and enter URL as http://127.0.0.1:8000/index.html and press enter key to get below home page
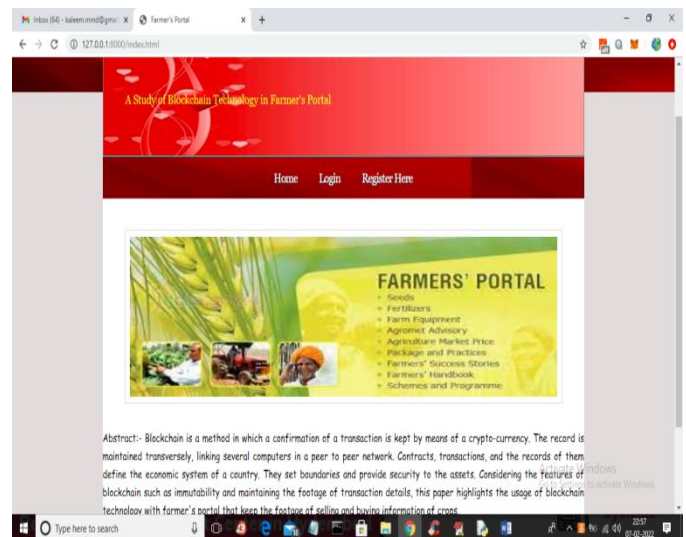
Figure.4 Index Screen

In above screen click on 'Register Here' link to get below signup screen
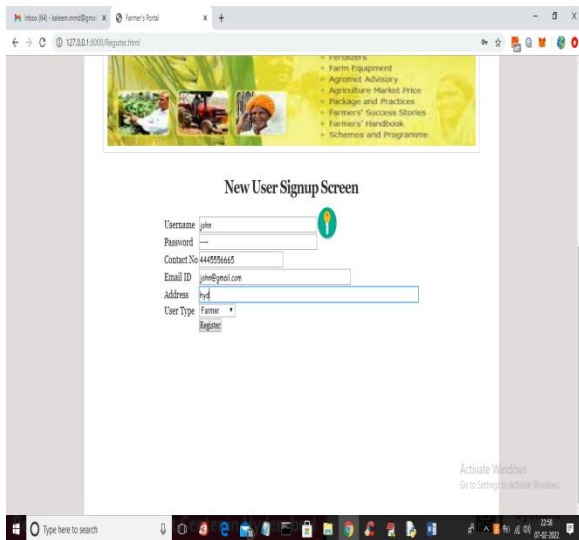
Figure.3 Signup screen

In above screen I am entering signup details and then click on 'Register' button to store data in Blockchain and to get below output
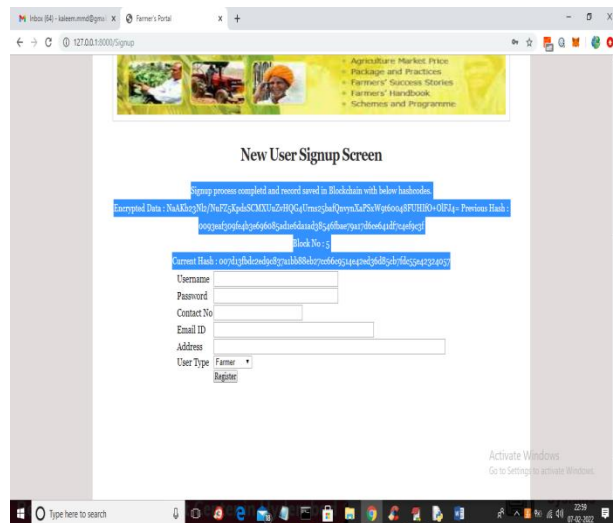

Figure.4 Signup Screen

In above screen in blue colour text we can see data is encrypted and then printing block number and previous and current hashcode to which this block data associate and similarly add new consumer also like below screen
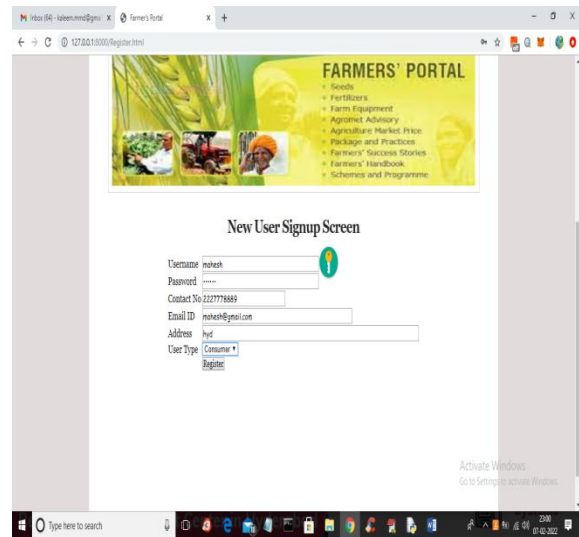

Figure.5 Signup Screen

In above screen I selected user type as consumer and then press button to add consumer details and get below output
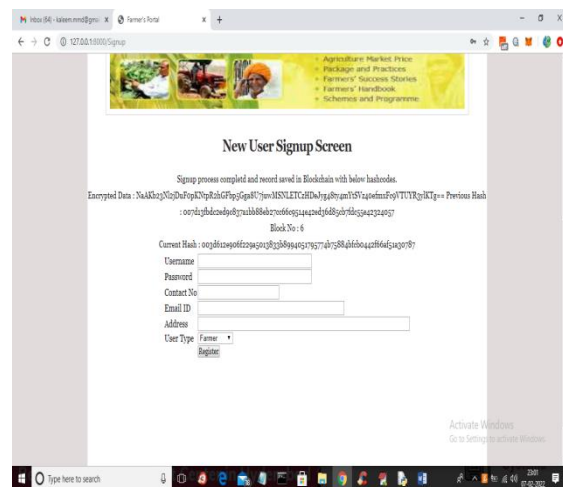
Figure.6 Signup Screen

In above screen we can see all Blockchain details and now click on 'Login' link to get below screen
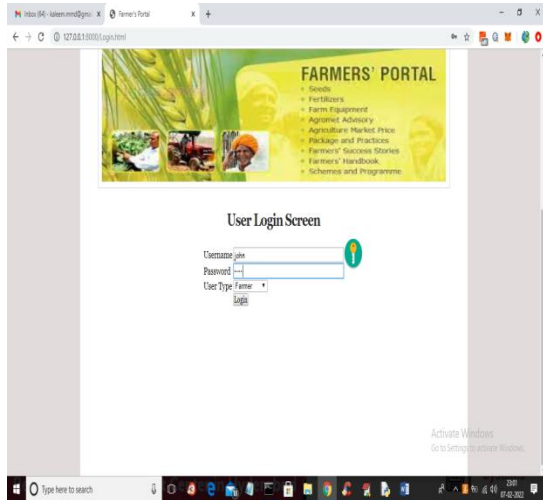
Figure.7 Login Screen

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

Figure.8 User Screen

In above screen farmer can click on 'Add New Products' link to add new crop details like below screen
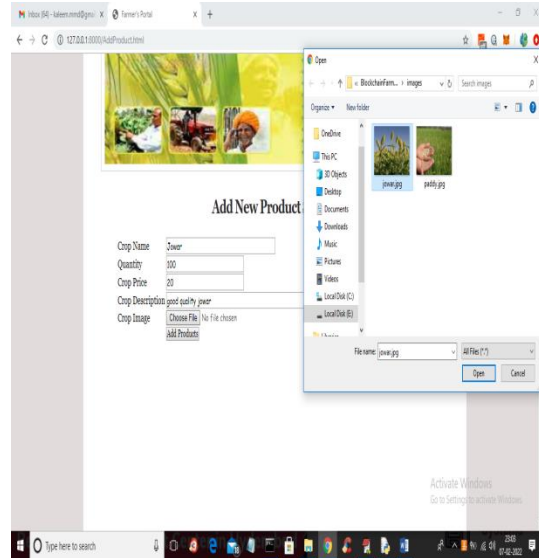

Figure.9 Add New Product Screen

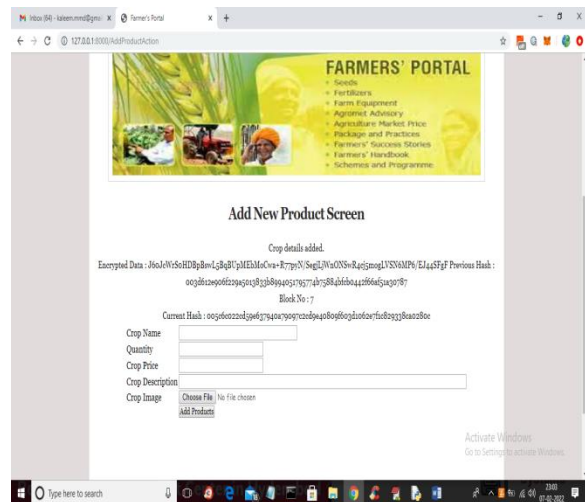In above screen farmer can add crop details and upload crop image and then click on 'Add Products' link to get below output

Figure.10 Add New Product Screen

In above screen we can see crop details added and displaying

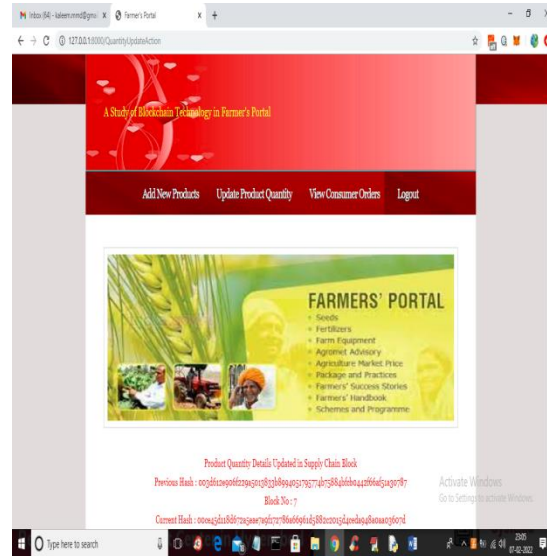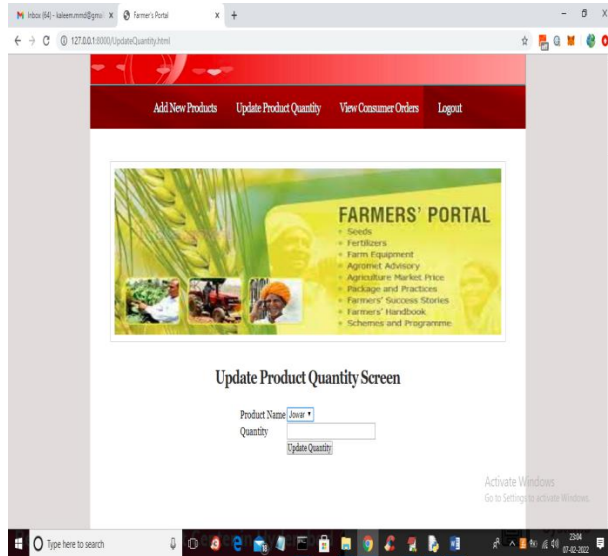Blockchain storage details and now click on 'Update Product Quantity' link to get below screen

Figure.11 Update Product Quantity Screen

In above screen farmer can select product name and enter quantity value to update quantity like below screen

Figure.12 Update Product Quantity Screen

In above screen entering quantity values and then press button to get below output

Figure.13 Quantity Details Screen

In above screen in red colour text we can see crop quantity details updated and now logout and login as consumer to book order
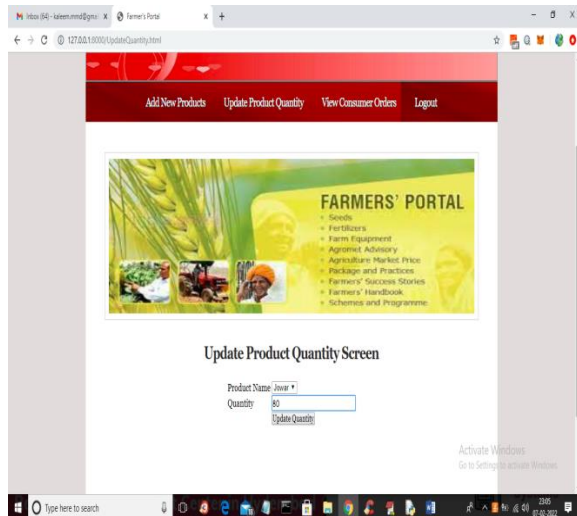

Figure.14 Consumer Login Screen

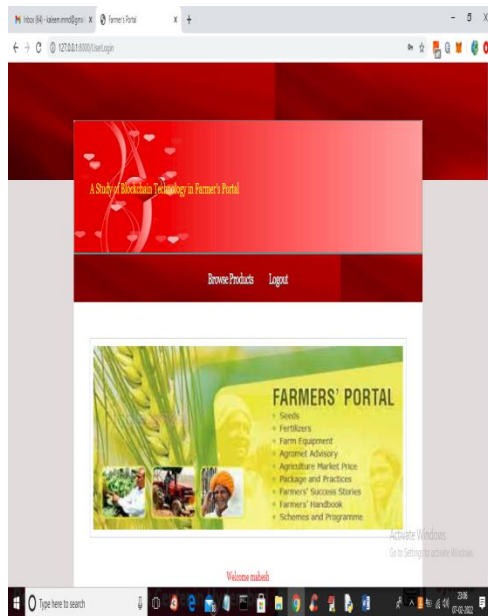In above screen consumer is login and after login will get below screen

Figure.15 Consumer Screen

In above screen consumer can click on 'Browse Products' link to view list of products like below screen
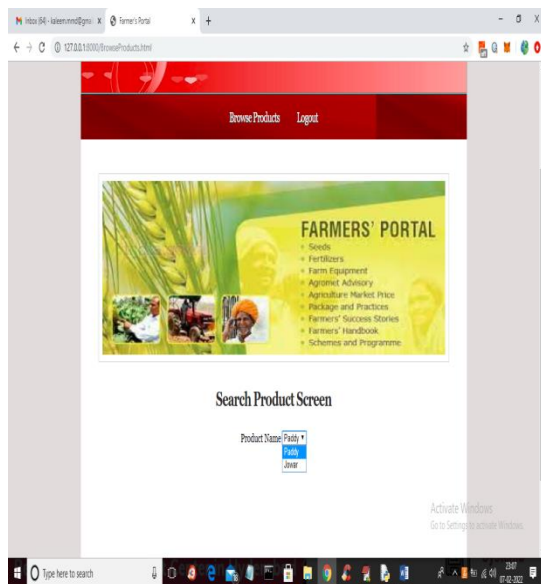

Figure.16 Browse Products Screen

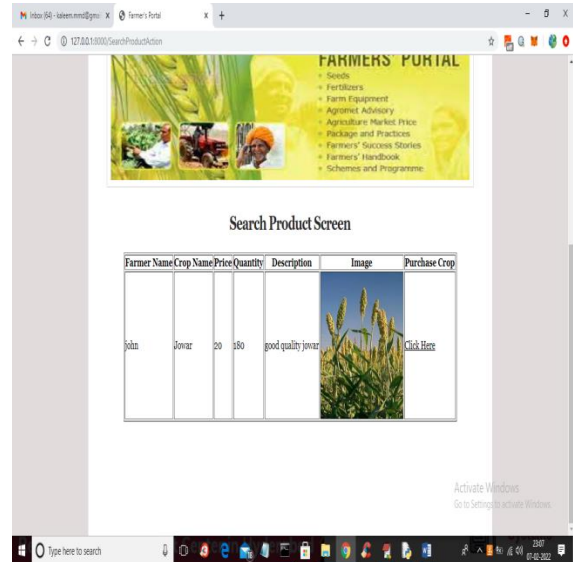In above screen user can select desired crop and press button to get below screen

Figure.17 Search Screen

In above screen consumer can view crop details and then click on 'Click Here' link to book order and get below screen
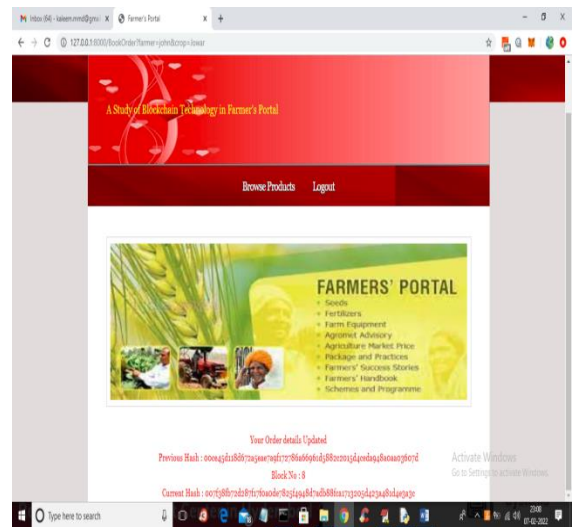

Figure.18 view crop details Screen

In above screen in red colour text we can see order details updated and now farmer can login and view and complete that order like below screen

Figure.19 User Login Screen

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

Figure.20 User Screen

In above screen farmer can click on 'View Consumer Order' link to get below list of orders
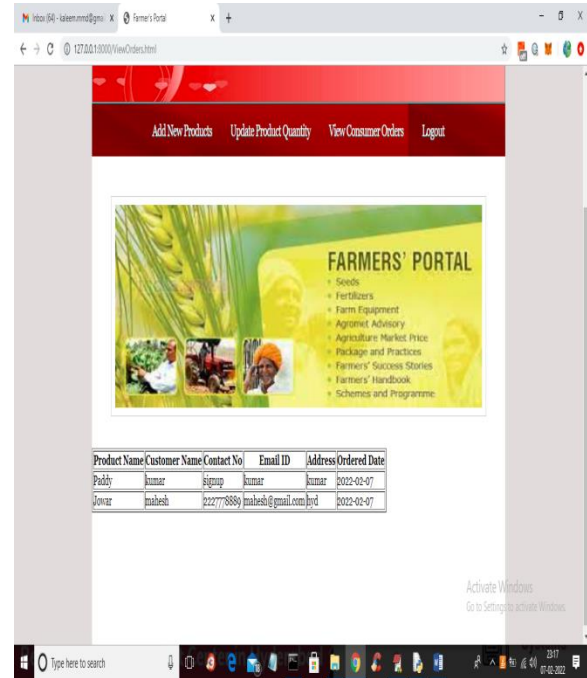
Figure.21 View Consumer Order Screen

In above screen all farmers can view order details and then contact consumer to complete order.

Similarly you can add any number of farmers, consumers and add new crop details

7.CONCLUSION

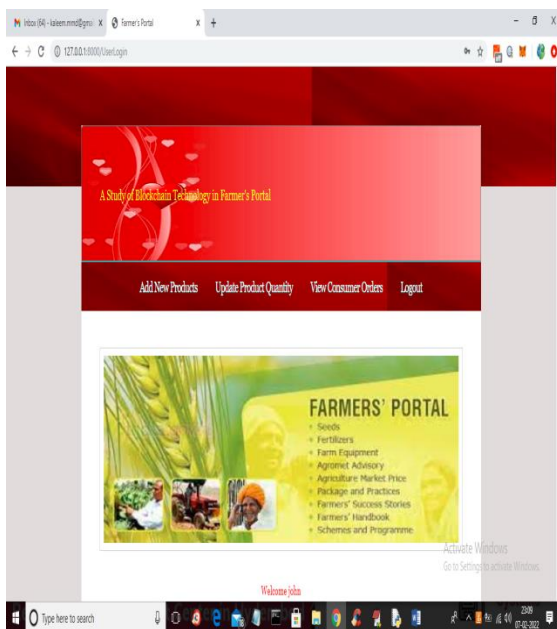Blockchain Technology in the field of agriculture can bring a revolutionary enhancement in the area of maintaining farmers data securely, ensuring the quality of seed, monitoring of moisture content in the soil, data of crop yield and lastly demand

and s ale price of crops. In this work, a blockchain-based portal is proposed to deal with the issue of demand and sale price of crops which in result ensure crop security to farmers as well as to get fair price of the crop. For this, a portal is proposed on which a farmer can register and sell his crops, recording a transaction on a blockchain at a point when buyers commit to buy a farmer's crop. This transaction is capable of recording crop details, the price at which it is committed to buying and quantity of crop purchased.

This immutable nature of blockchain technology will fortify farmers to get a legit imate price of crop and reduce the cost of operation for selling and buying crops when compared to traditional methods.

Akin kind of portal can be implemented by the government and its confederate bureaus to ensureamelioration in the field of farming and commerce of crops which will improve the prominence of the nation's farmers

This application can be more refined with increasing integration of blockchain in a spectrum of areas and constellating it into a single paramount portal for farmers. This can be done by putting farme r's crop details to the blockchain, buyer's data to the blockchain and adding more features and services to the single portal and bringing all possible facilities for farmers of the nation under sui generis awning.

Information integrity and precision issues can be solved using open, protected and trusted systems presumptuous; the infrastructure dispensation and footage connections are protected and suitably provided. The blockchain technology did not promise the information reliability in the footage. Thus realizat ion in blockchain faces several boundaries that might require a vital authority or protected footage of confirmation.

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