

KLE Society's
KLE Technological University



Distributed and Cloud Computing
Course Project Report On
Cloud Based Supply Chain Management System Using Blockchain in
Agriculture

Bachelor of Engineering In
Computer Science and Engineering

SUBMITTED BY

TEAM-07

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1. INTRODUCTION

1.1. Introduction

The definition of supply chain is given as “the network of organizations that are involved, through upstream and downstream linkages, in the different processes and activities that produce value in the form of products and services in the hands of the ultimate customer”

Today’s food supply chain faces problems such as disconnection between its various stakeholders, lack of transparency in food production and distribution. Complete traceability of the product to its original source is also not available, loosing of data and less computing speed. Keeping track of such information can eradicate the limitations of the current supply chain. A blockchain and Cloud based transparent network will ensure digital ledger of transactions and movement for all stakeholders in their supply chain network

1.2. Motivation

- There are some problems in Traditional Supply Chain Management.
- They are:
- Illegal production of food.
- Lack of trust and credibility.
- Unable to handle large amount of data.
- Loosing of data.
- Computing speed Problems.
- Lack of assurance in the quality of food products.
- Maintaining manual records are vulnerable to inaccurate updating.
- SCM is a centralized system.

1.3. Objectives

1. To create a blockchain and Cloud based platform where the farmers and consumers could implement a co-operative farming method.
2. To list the potential crops and the expected yield on the distributed public ledger by farmer and Store it in cloud.
3. To view the details and check for the farmer credibility based on the previous cultivation and supply.
4. To create a transparent and tamper-proof digital market platform for farm products using Blockchain and Cloud Computing.

1.4. Problem Statement

“To develop a system which tracks a farm product from former to consumer and to store immutable transactions using Blockchain”

2. PROPOSED SYSTEM

2.1. System model

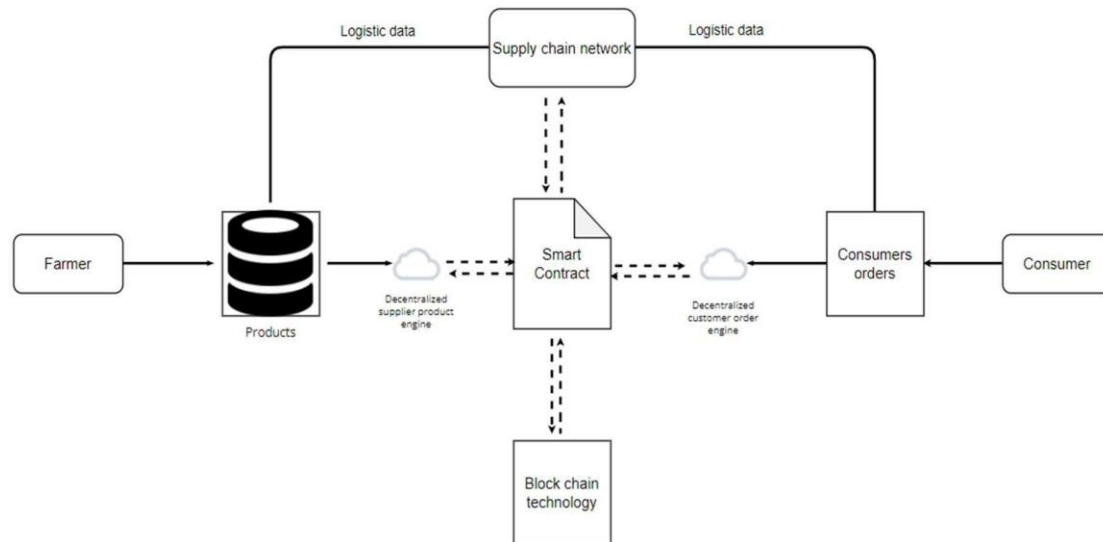


Fig.1. Shows Architecture of the system.

The Server connects Nodes that are run on Ethereum to the software. The API of the Ethereum virtual machine, which is present in the form of android library provides all the necessary functionalities of blockchain to the Software. The Provider-consumer Software allows the user to sign transactions, interact with smart contract in any blockchain network.

2.2. Advantage of the system

1. Blockchain is a major change from traditional approaches to data management.
2. Management of agricultural supply and data access.
3. Reduces manual work of admin.
4. Farmer can view their agricultural history.
5. Clients can track their product.
6. Established a security management system for the supply chain based on blockchain
7. Decentralized and permissionless blockchain system can deliver real time information to all parties.

3. TECHNOLOGIES

Solidity Smart Contract: Solidity is an object-oriented programming language for writing smart contracts. It is used for implementing smart contracts on various blockchain platforms, most notably. The programs compiled by Solidity are intended to be run on Ethereum Virtual Machine.

Ethereum: Ethereum is a blockchain platform with its own cryptocurrency, called Ether (ETH) or Ethereum, and its own programming language, called Solidity. As a blockchain network, Ethereum is a decentralized public ledger for verifying and recording transactions. The network's users can create, publish, monetize, and use applications on the platform, and use its Ether cryptocurrency as payment. Insiders call the decentralized applications on the network "dApps".

Ganache: Ganache is used for setting up a personal Ethereum Blockchain for testing your Solidity contracts. It provides more features when compared to Remix. You will learn about the features when you work out with Ganache. Before you begin using Ganache, you must first download and install the Blockchain on your local machine.

JavaScript: JavaScript used for frontend. It's a programming language that is one of the core technologies of the World Wide Web, alongside HTML and CSS. Over 97% of websites use JavaScript on the client side for web page behavior, often incorporating third-party libraries.

EC2: Amazon Elastic Compute Cloud (Amazon EC2) provides scalable computing capacity in the Amazon Web Services (AWS) Cloud. Using Amazon EC2 eliminates your need to invest in hardware up front, so you can develop and deploy applications faster. You can use Amazon EC2 to launch as many or as few virtual servers as you need, configure security and networking, and manage storage. Amazon EC2 enables you to scale up or down to handle changes in requirements or spikes in popularity, reducing your need to forecast traffic.

4. WORK CARRIED OUT

- Installed some tools such as node, npm, truffle.
- Deploy the contract.
- Connecting the Ethereum to frontend so that it comes out to be application.
- User sign-in into aws management console
- Start EC2 instance
- Check for '2/2 status pass' and instance state 'running'
- Connect instance with RDP client
- Using key pair decrypt password for connection
- Open remote desktop connection and verify username and password for logging in into the console.
- Install anaconda and sql lite through command prompt
- Open anaconda command prompt and run the application.
- Open dbsqlite for storing database.

5. IMPLEMENTATION

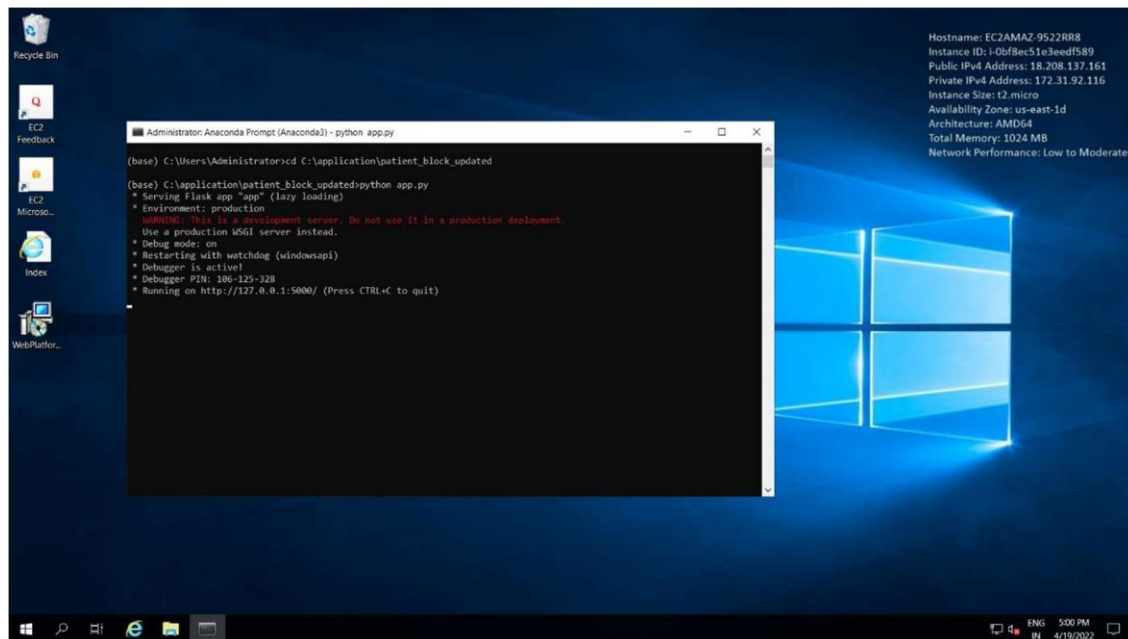


Fig 2 — Running "app" python file in anaconda prompt to get HTTP server

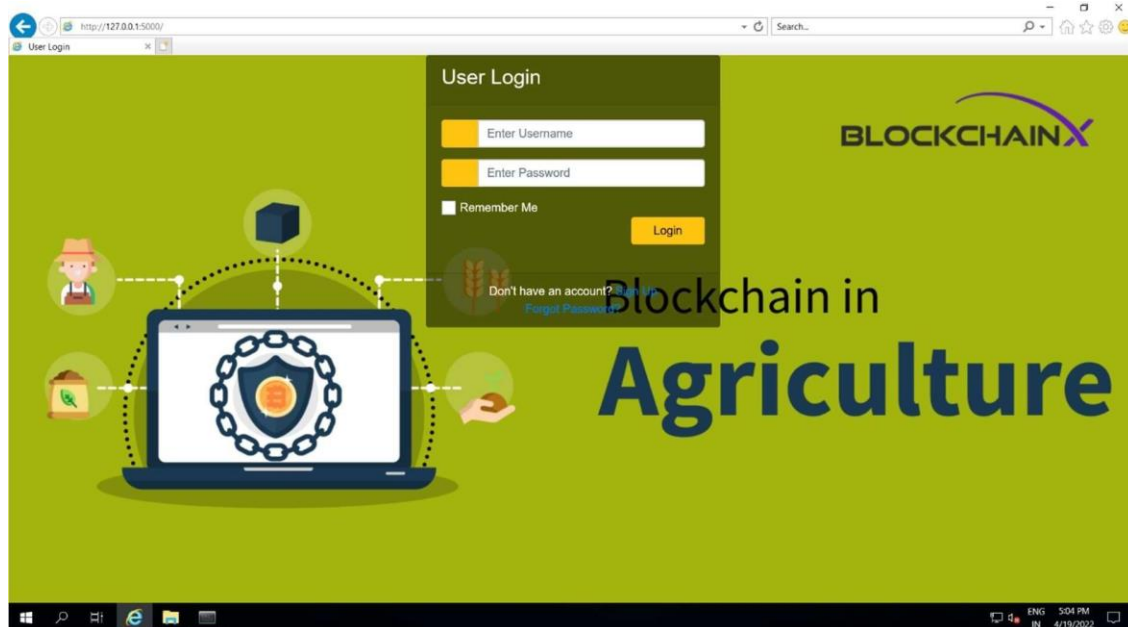


Fig 3— Login page

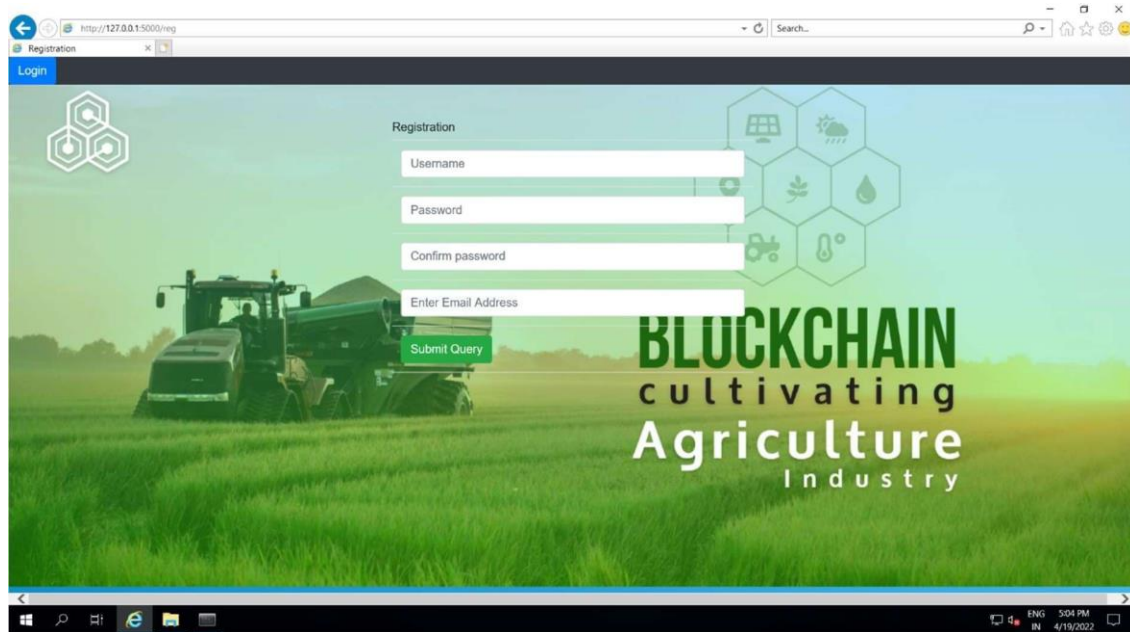


Fig 4— sign up page

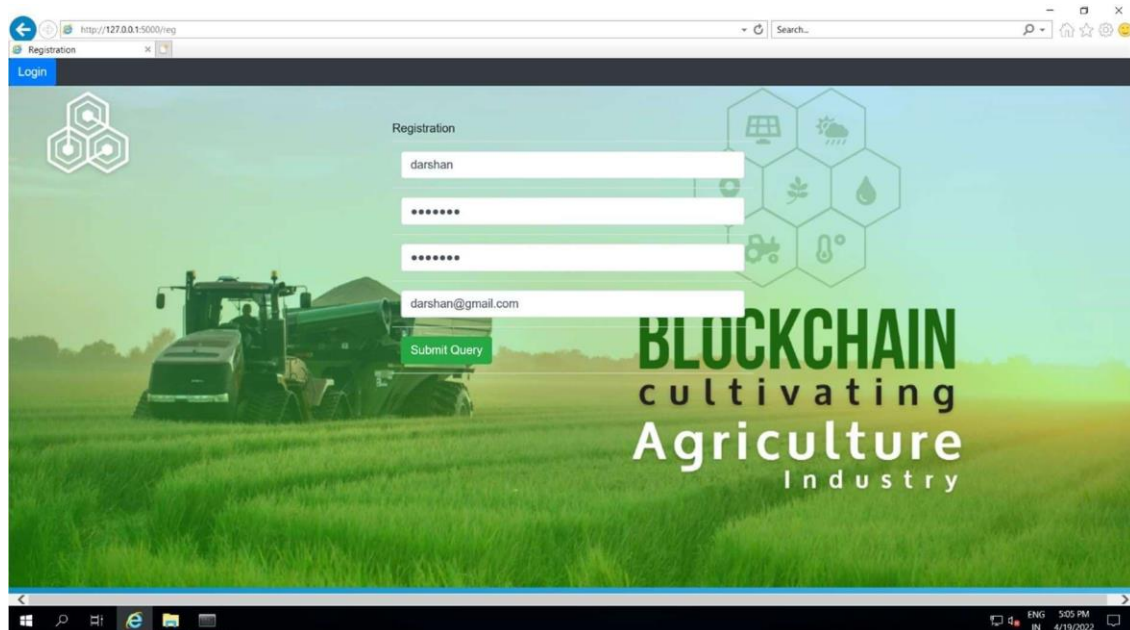


Fig 5 — Registered User filling details for login

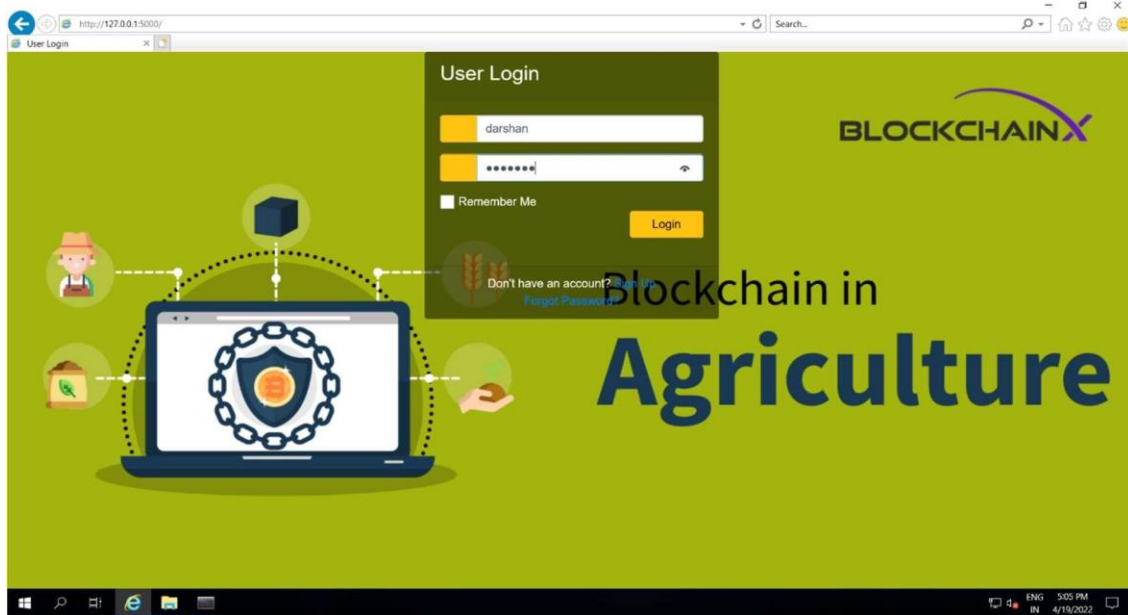


Fig 6— user logged into web application

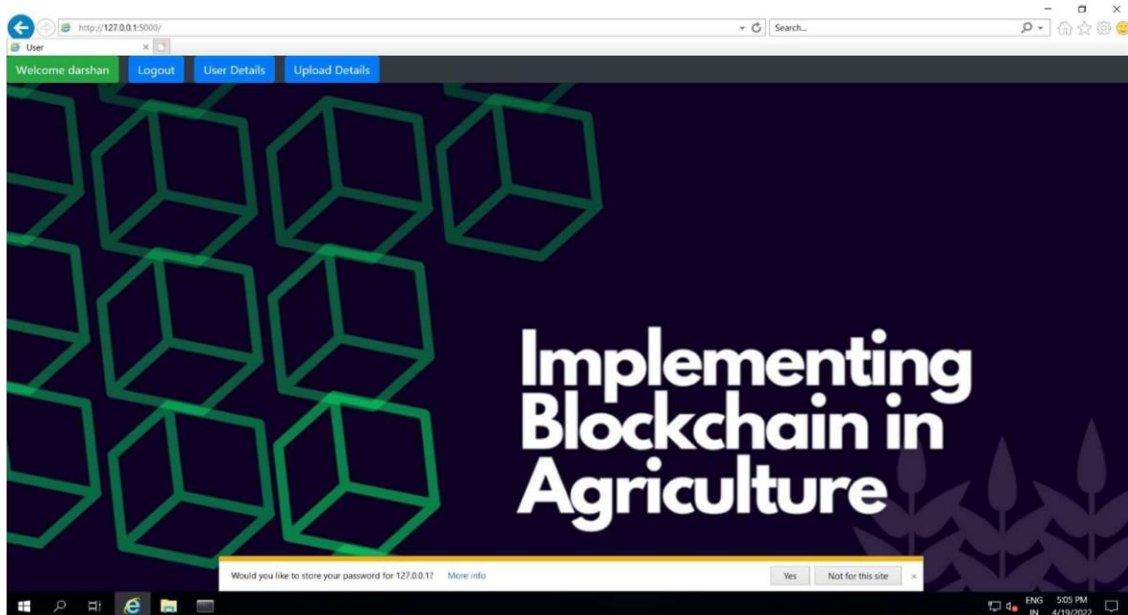


Fig 7 — Home page

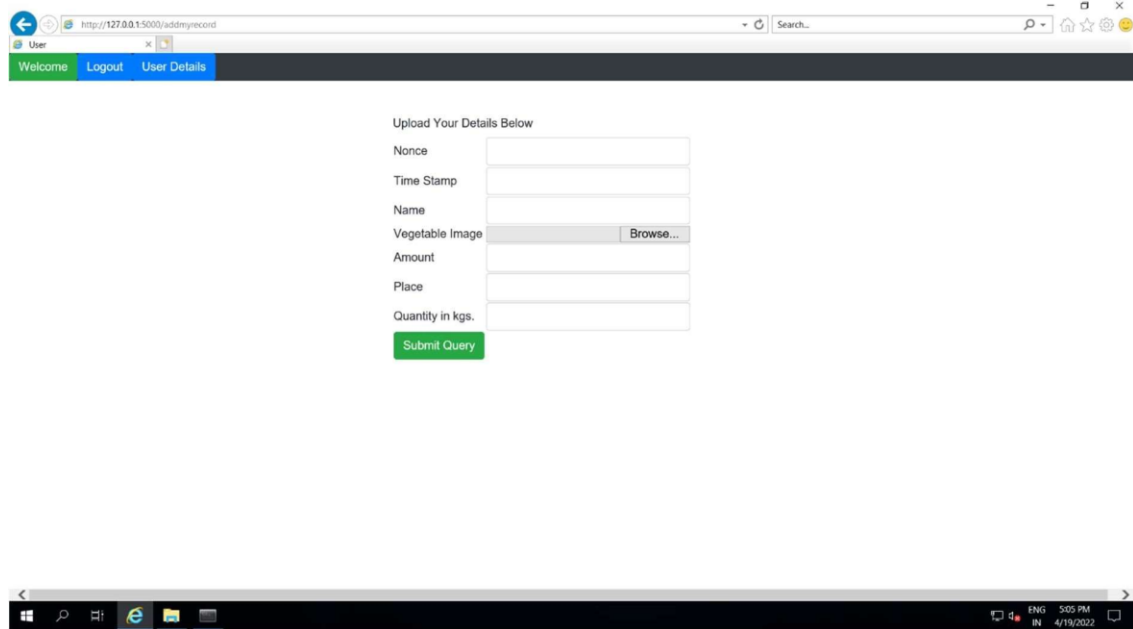


Fig 8 — User uploads details

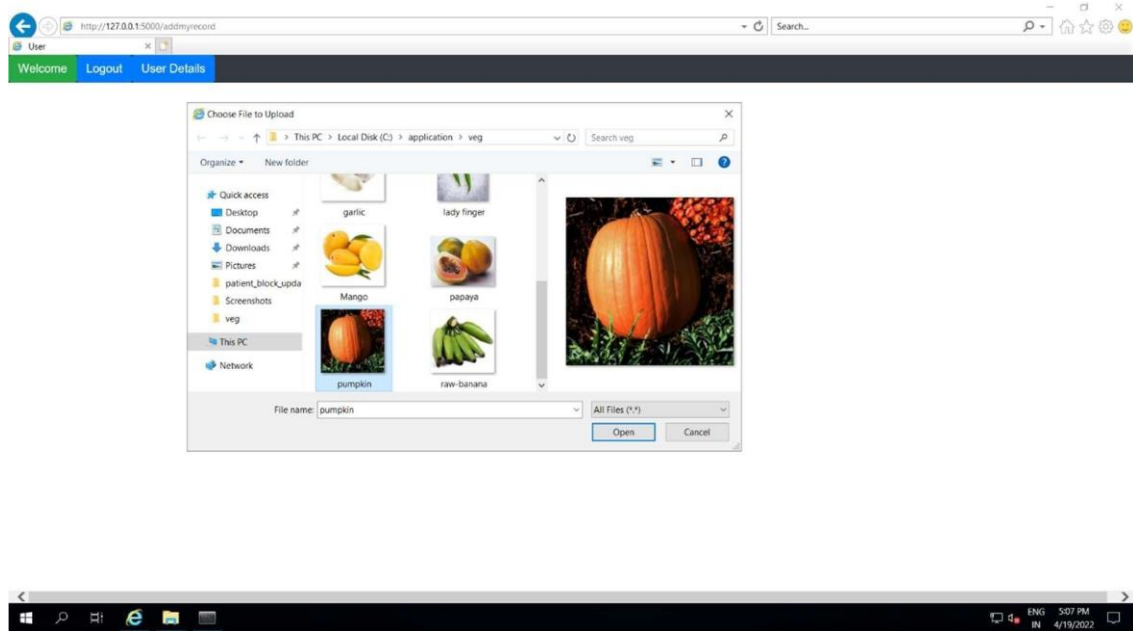


Fig 9--user choose vegetables/fruits that are available

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The screenshot shows a web browser window with the URL `http://127.0.0.1:5000/addmyrecord`. The page has a navigation bar with 'Welcome', 'Logout', and 'User Details' links. The main content area is titled 'Upload Your Details Below' and contains a form with the following fields:

- Nonce: 100
- Time Stamp: 100
- Name: darshan
- Vegetable Image: C:\application\veg\pumpk\ Browse...
- Amount: 100
- Place: Hubli
- Quantity in kgs: 2

A green 'Submit Query' button is located at the bottom of the form.

Fig 10 — final submission

The screenshot shows the DB Browser for SQLite application. The table 'block_chain' is displayed with the following data:

nonce	timestamp	name	place	amount	location	sqft	phash	hash
0	01/01/2019	gensis name	gensis reason	Gensis Block	10000	Tambaram	05292a27e77e263a7a2ba6591513bc8...	05292a27e77e263a7a2ba6591513bc8...
0	01/01/2019	gensis name	gensis reason	Gensis Block	10000	Tambaram	05292a27e77e263a7a2ba6591513bc8...	05292a27e77e263a7a2ba6591513bc8...
0	01/01/2019	gensis name	gensis reason	Gensis Block	10000	Tambaram	05292a27e77e263a7a2ba6591513bc8...	05292a27e77e263a7a2ba6591513bc8...
20	2020-02-12	praveen	256451	Screenshot (15).png	hubli	123	175232f20bf10e075153546e3bca04c6...	88cee79344c996b2db6fe79700ae44...
1	2022-04-21	praveen	Screenshot (13).png	1200	hubli	21	88cee79344c996b2db6fe79700ae44...	d28da7ea4b79ebdf6852d5a3c7b4a...
1	2022-03-30	praveen	1500	Screenshot (13).png	hubli	123	d28da7ea4b79ebdf6852d5a3c7b4a...	bd93bcc8445d3aef47e3b025df85a0...
1	2022-04-15	swagat	cauliflower.jpg	5626	dharawad	566	bd93bcc8445d3aef47e3b025df85a0...	40e02eddb0c0953e6049980b81040deb...
1	11	appu	12000	beans.jpg	ilkal	5	40e02eddb0c0953e6049980b81040deb...	23330a77cbb8c32b5e9cb7a3fb64c22...
4	4	naveen	broccoli.jpg	5	ilkal	10	23330a77cbb8c32b5e9cb7a3fb64c22...	be76aa9ebbe4b62036fb35c2a4c77f6e...
55	55	naveen	70	cabbage.jpg	dharwad	2	be76aa9ebbe4b62036fb35c2a4c77f6e...	7b97e1c84bde0747a0687cc3414ba1...
100	100	darshan	pumpkin.jpg	100	Hubli	2	7b97e1c84bde0747a0687cc3414ba1...	a49b2483d03f3d099a14176e1207441...

Fig 11 — data stored in blockchain database

6. RESULT AND DISCUSSION

This project helps the supply chain management system to not just store the record but also reduces the manual paper work of the admin and also helps the farmer and clients to view their farm and agricultural history. It also helps farmer to know the client details and farm history. So overall it helps the supply chain management system by minimizing the work and making the work easy.

7. CONCLUSION

- In this paper we got an end-to-end solution for cloud based agri-food supply chain using Blockchain.
- Analyzed the performance of smart contract in order to ensure the security of food products.
- Established a security management system for the supply chain based on blockchain
- Provided storage for data/transactions in Cloud for data backup.
- Decentralized and permissionless blockchain system can deliver real time information to all parties.
- Enhance the efficiency, transparency.
- By implementing blockchain and Cloud technology in food supply chain we can avoid food related problems.

8. REFERENCE

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