A

Major Project

On

PROPERTY REGISTRY AND TRANSACTION USING BLOCKCHAIN

Submitted to

Jawaharlal Nehru Technological University, Hyderabad

In Partial fulfillment of the requirements for the award of Degree

of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

by

D. ROHITH REDDY (187R1A05K0)

Y. SADHVIKA (187R1A05N2)

M. PRAKASH (197R5A0517)

Under the esteemed guidance of

J. NARASIMHARAO

(Associate Professor)

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

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2018-22

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CERTIFICATE

This is to certify that the project entitled **“PROPERTY REGISTRY AND TRANSACTION USING BLOCKCHAIN”** being submitted by **D. ROHITH REDDY (187R1A05K0), Y. SADHVIKA (187R1A05N2) & M. PRAKASH (197R5A0517)** in partial fulfillment of the requirements for the award of the degree of B.Tech in Computer Science and Engineering to the Jawaharlal Nehru Technological University Hyderabad, is a record of bonafide work carried out by him/her under our guidance and supervision during the year 2021-22.

The results embodied in this thesis have not been submitted to any other University or Institute for the award of any degree or diploma.

Mr. J. Narasimharao
Associate Professor
INTERNAL GUIDE

Dr. A. Raji Reddy
DIRECTOR

Dr. K. Srujan Raju

EXTERNAL EXAMINERHOD

Submitted for viva voice Examination held on________________________________

ACKNOWLEDGEMENT

Apart from the efforts of us, the success of any project depends largely on the encouragement and guidelines of many others. We take this opportunity to express our gratitude to the people who have been instrumental in the successful completion of this project.

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D. ROHITH REDDY (187R1A05K0)
Y. SADHVIKA (187R1A05N2)
M. PRAKASH (197R5A0517)

ABSTRACT

A Property is an asset can be a land, gold or any other entity that holds a value. TheConventional database systems are responsible for the storage of prosperity data and their transactions, which are maintained by either Government or third parties. This makes the system vulnerable since the data can be modified by a single person or an entity. Blockchain technology can be used to overcome this vulnerability since the network is decentralized and doesn't have any operations that include modifying or deleting the data. The current land registration process involves a lot of vulnerabilities and people uses it to cheat the common people and the government. This paper discusses about a secure land registry implemented using blockchain which works on the basis of majority consensus. By implementing the land registry in blockchain, the security issue is resolved to a great extent. The hash value calculated for each block will be unique as it is linkedto the hash of the previous block. Message digest that is generated for each block is of fixed sizeand each hash represents a complete set of transaction within a given block. The proposed land registry blockchain network consists of 12 nodes which calculates the proof of work. Nodes are responsible for verifying a transaction, mining a new block and adding the new block to the blockchain. A total of 200 land transactions are recorded using the blockchain methodology which offers a tamper proof and updated version of land registry. Elliptic curve cryptographic algorithm is used for signature generation which is used for verifying whether the transaction is signed by the owner or not. Merkle tree is used for linking the transactions using hash and in turn reduces the disk usage. The proposed implementation of land registry using blockchain thus offers a 99% reductionin manual effort spent in record keeping. This makes the system vulnerable since the data can be modified by a single person or an entity.

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+

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1.INTRODUCTION

1. INTRODUCTION

1.1 PROJECT SCOPE

An incredible scope of Blockchain technology has been observed in the financial field. Incorporating Blockchain with financial transactions gives out amazing benefits, such as a significant amount of time and money could be saved, including a drastic reduction in time needed for processing and validating transactions.

1.2 PROJECT PURPOSE

The purpose of this project is to provide a platform for the public where they can sell or buy properties in a blockchain network. This provides the users using the platform to make transactions secure and guarantees the records aren't forged. Since the network is a peer-to-peer network, the illegal transactions are verified since every node in the blockchain network holds a copy of all transactions. The project targets to remove the vulnerable database transaction and replace it with blockchain

1.3 PROJECT FEATURES

The features of this project are that it uses the Ethereum blockchain as a blockchain network and meta mask wallet that the users use to manage their accounts and transactions. Users can add their property details and can sell or buy properties. It makes users have legitimate account and property details since it lies in the decentralized network.

2. SYSTEM ANALYSIS

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SYSTEM ANALYSIS

System analysis is the important phase in the system development process. The system is studied to the minute details and analyzed. In analysis, a detailed study of these operations performed by the system and their relationships within and outside of the system is done. A key question considered here is," what must be done to solve the problem?". The system is viewed as a whole and the inputs to the system are identified. Once analysis is completed the analyst has a firm understanding of what is to be done.

2.1 PROBLEM DEFINITION

The current system of property registration and transactions happens in Convention database systems, which is reliable to some extent. But the database systems are centralized, which leads to many vulnerabilities. The data can be changed illegally and forged.

2.2 EXISTING SYSTEM

In existing system, the transaction records are saved in a regular database applications and queried accordingly. Since a single entity maintains the database and few people have access to it contains a greater possibility of fraudulent activities such as documents forgery, illegal transactions, changing records, etc.

2.1.1 LIMITATIONS OF THE EXISTING SYSTEM

The Limitations of current system are:

- The transactional data is vulnerable for modification.
- The current system is centralized where only a single entity have access to the database.
- If any data gets deleted, it is gone forever.

2.2 PROPOSED SYSTEM

In the Proposed System, to solve the existing problems and issues with the current system, we implemented a software platform where anyone can register themselves and can sell or buy their lands which are connected through a blockchain network. The proposed system includes user registration, which can be done by providing the public key of their wallet for blockchain transactions. User must provide their details along with their Aadhaar card or social security card or any kind of identity proof. Users can upload their lands and their related documents and proceed with selling. They can buy land by exploring different lands in the land gallery. The transactions happen through blockchain.

2.2.1 ADVANTAGES OF PROPOSED SYSTEM

- The Blockchain network is decentralized system thus it is a peer to peer connected network
- The functions that blockchain supports are read and write thus making it difficult to modify the data
- Even the property owners have the access to transactional data and history.

2.3 FEASIBILITY STUDY

The feasibility of the project is analyzed in this phase and a business proposal is put forth with a very general plan for the project and some cost estimates. During system analysis the feasibility study of the proposed system is to be carried out. This is to ensure that the proposed system is not a burden to the company. Three key considerations involved in the feasibility analysis are

- Economic Feasibility
- Technical Feasibility
- Social Feasibility

2.3.1 ECONOMIC FEASIBILITY

The developing system must be justified by cost and benefit. Criteria to ensure that effort is concentrated on a project, which will give best, return at the earliest. One of the factors, which affect the development of a new system, is the cost it would require.

The following are some of the important financial questions asked during preliminary investigation:

- The costs conduct a full system investigation.
- The cost of the hardware and software.
- The benefits in the form of reduced costs or fewer costly errors.

Since the system is developed as part of project work, there is no manual cost to spend for the proposed system. Also all the resources are already available, it gives an indication that the system is economically possible for development.

2.3.2 TECHNICAL FEASIBILITY

This study is carried out to check the technical feasibility, that is, the technical requirements of the system. Any system developed must not have a high demand on the available technical resources. The developed system must have a modest requirement, as only minimal or null changes are required for implementing this system.

2.3.3 BEHAVIORAL FEASIBILITY

This includes the following questions:

- Is there sufficient support for the users?
- Will the proposed system cause harm?

The project would be beneficial because it satisfies the objectives when developed and installed. All behavioral aspects are considered carefully and conclude that the project is behaviorally feasible.

2.4 HARDWAREAND SOFTWARE REQUIREMENTS

2.4.1 HARDWARE REQUIREMENTS

Hardware interfaces specify the logical characteristics of each interface between the software product and the hardware components of the system. The following are some hardware requirements.

• Hard Disk	:	50 GB and above
• Processor	:	Pentium IV or higher
• RAM	:	4 GB and above

2.4.2 SOFTWARE REQUIREMENTS

Software Requirements specifies the logical characteristics of each interface and software components of the system. The following are some software requirements.

• Operating system	:	Windows 7 or later / Mac Os X 10.11 or later / Linux Ubuntu 18.01 or later.
• BROWESER	:	Chrome 96.0 or later / Firefox 91.9.1 or later
• Technology used for development	:	HTML5 , CSS3, JavaScript ES6, Flutter 3.0.1, Node.js 12, Ethreum 1.0, solidity 0.6.0 or above.
• Tools used for development	:	Truffle 5.5, Ganache 7.2, Meta mask 10.12

2. ARCHITECTURE

3. ARCHITECTURE

3.1 PROJECT ARCHITECTURE

The project architecture of the system depicts the interaction of the subsystems in the system as shown inbelow Figure 3.1

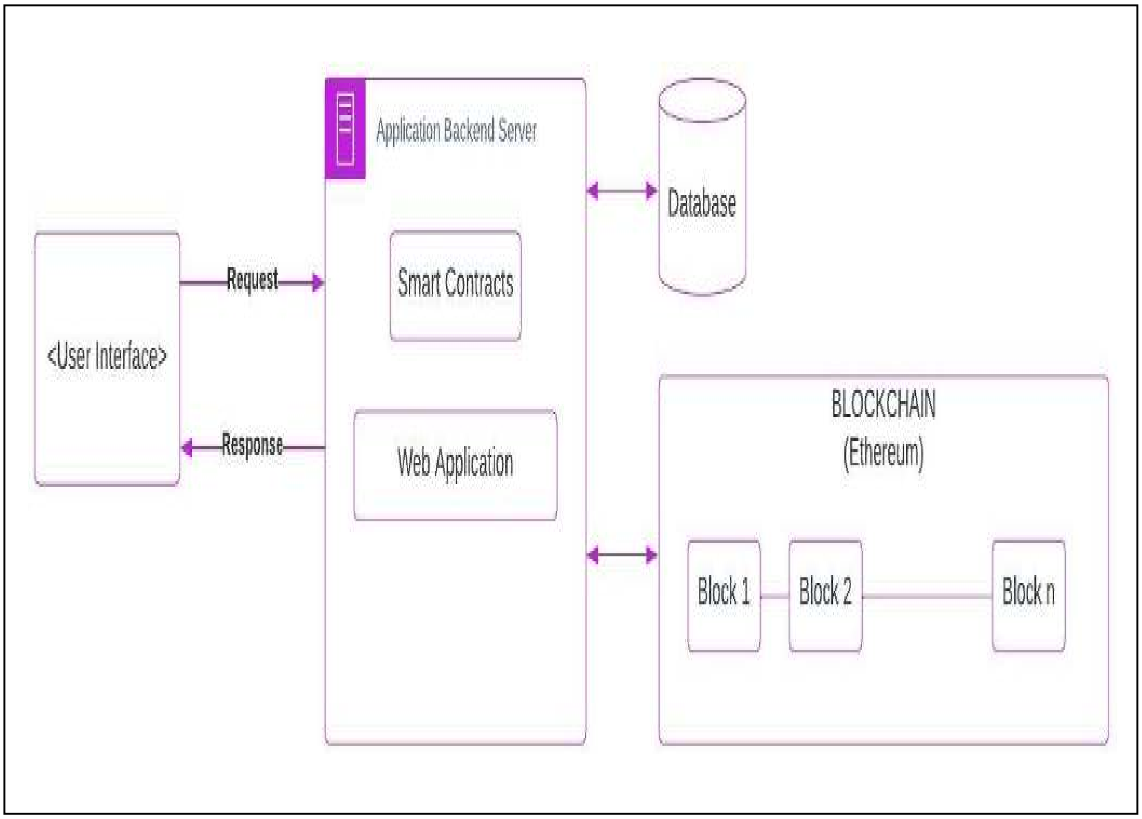


Figure 3.1: Project Architecture for property registry and transaction using blockchain

3.2 MODULE DESCRIPTION

Modules:

The system is divided into three modules:

- **USER INTERFACE**

A user should able to interact with the platform which should be user friendly. So, the User interface is a web application where user should use a browser to interact with the platform. The platform is built using Flutter. Flutter is UI technology that helpful in building hybrid applications.

- **APPLICATION LOGIC**

This module handles the user request from User interface and processes and returns appropriate response. For every request the user sends to server from browser the input is processed and the output is sent back to the server in a JSON format where the frontend application parses it accordingly.

- **BLOCKCHAIN TRANSACTION LOGIC**

This module is responsible for interacting with block chain, the API calls are done using Web3 apis. Initially the smart contracts that we wrote using solidity are deployed in ethereum blockchain network. In order to interact with the blockchain through our contracts we use web3 apis.

3.3 USE CASE DIAGRAM

Use-case diagrams describe the high-level functions and scope of a system. These diagrams also identify the interactions between the system and its actors. The use cases and actors in use- case diagrams describe what the system does and how the actors use it, but not how the system operates internally.

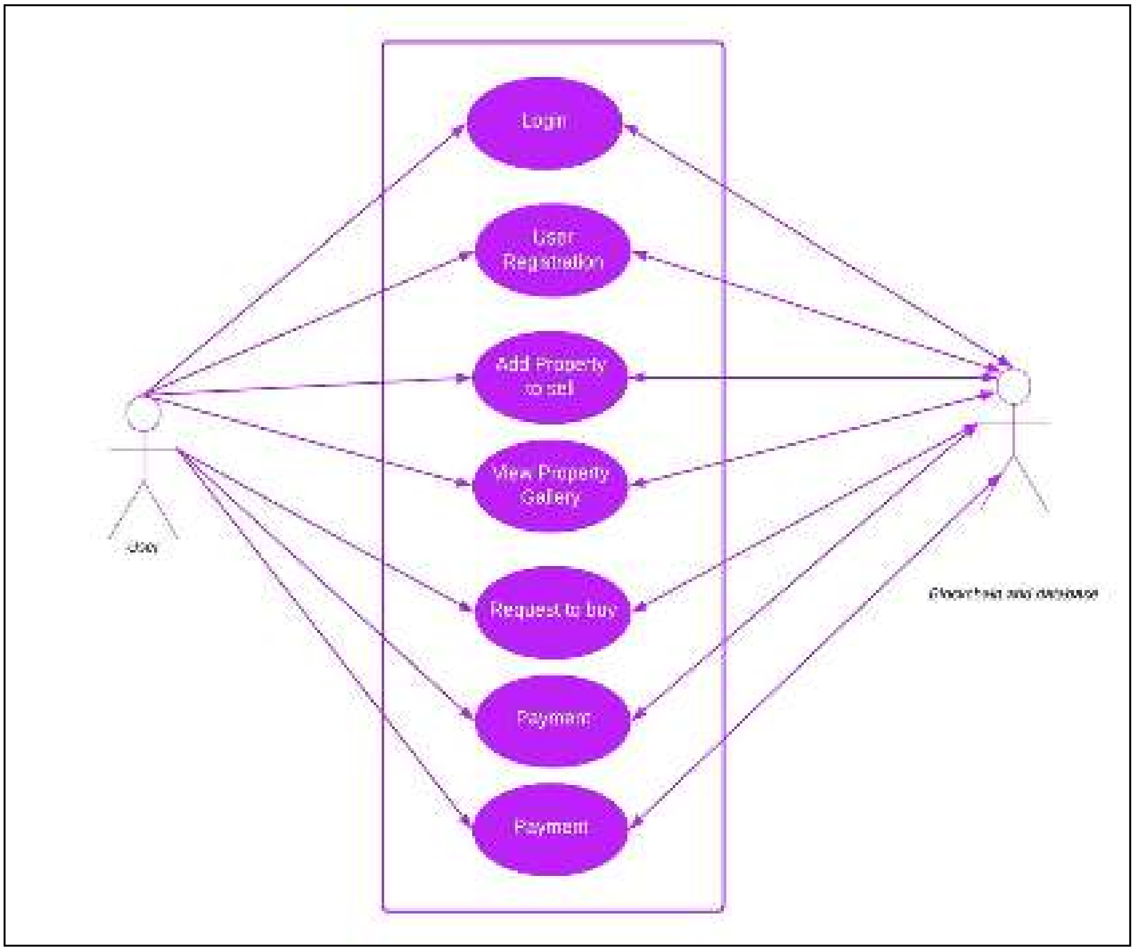


Figure 3.2 : Use case diagram for Property registry and transaction Using blockchain

3.4 CLASS DIAGRAM

Class diagrams are one of the most useful types of diagrams in UML as they clearly map out the structure of a particular system by modeling its classes, attributes, operations, and relationships between objects.

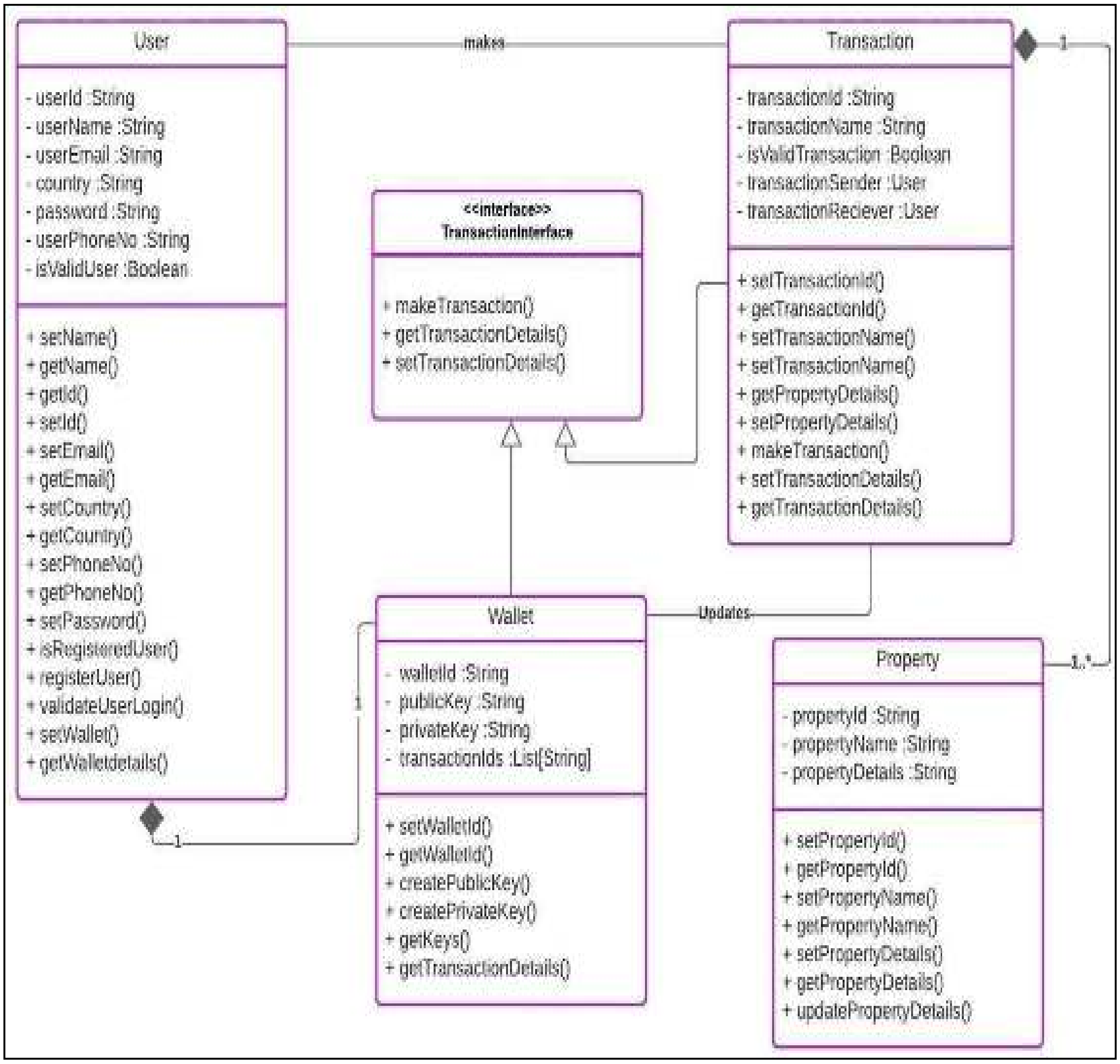


Figure 3.3 : Class diagram for Property registry and transaction Using blockchain

3.5 SEQUENCE DIAGRAM

A sequence diagram is a type of interaction diagram because it describes how—and in what order—a group of objects works together. These diagrams are used by software developers

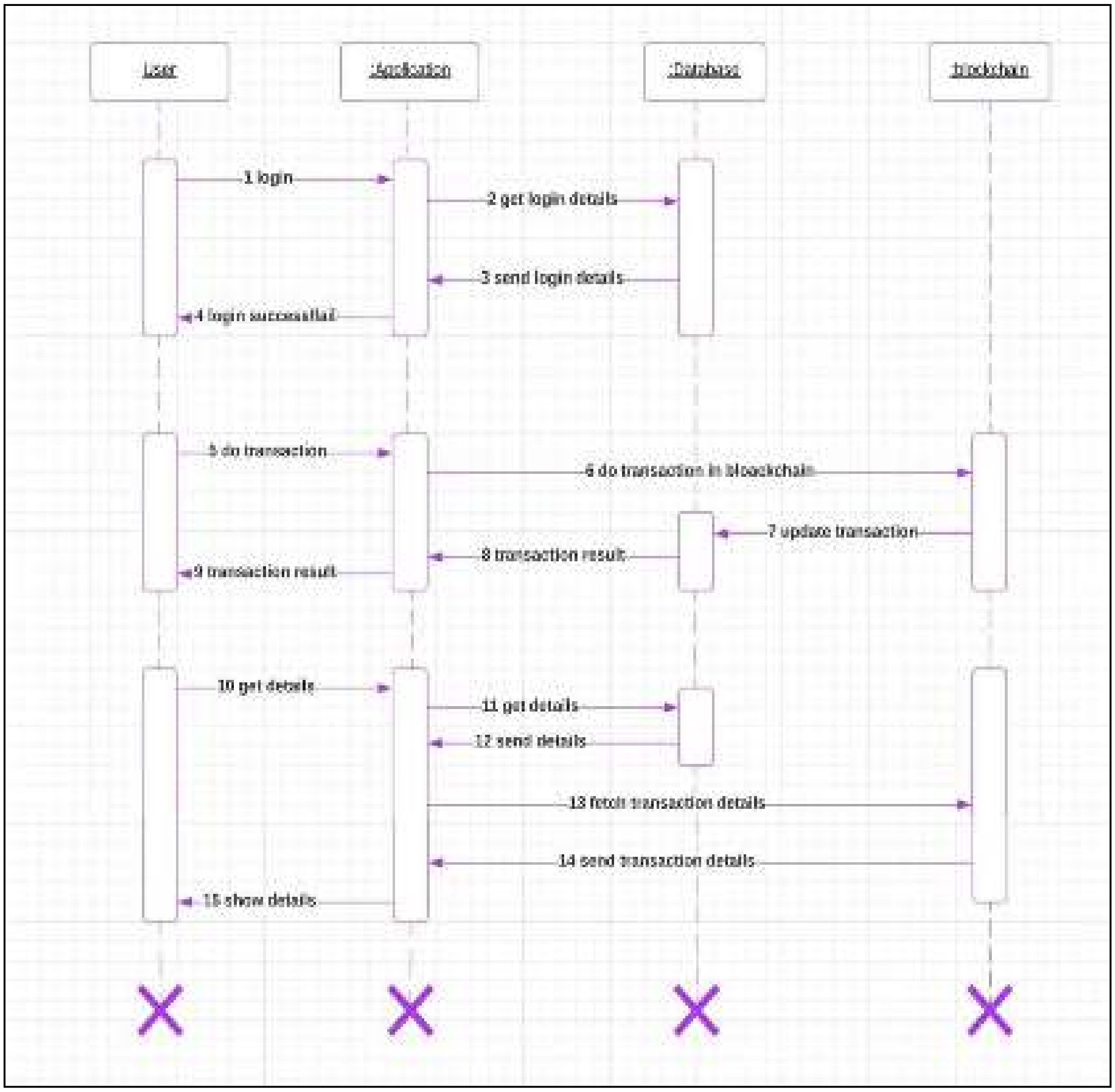


Figure 3.4: Sequence diagram for Property registry and transaction Using blockchain

3.6 ACTIVITY DIAGRAM

Activity diagram is basically a flowchart to represent the flow from one activity to another activity. Theactivity can be described as an operation of the system.

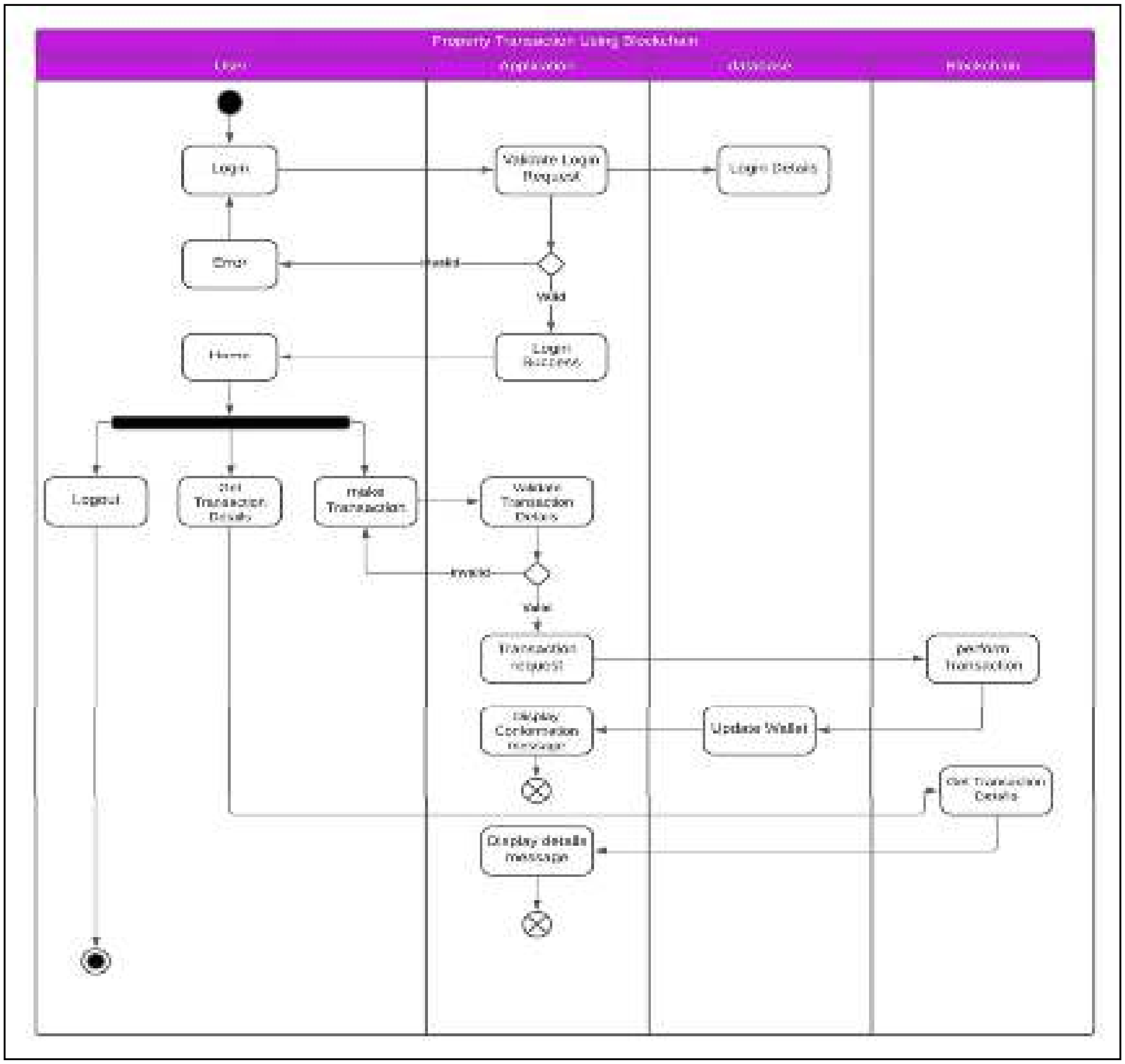


Figure 3.5: Activity Diagram for Property registry and transaction Using blockchain

3.7 DATAFLOW DIAGRAM

A data flow diagram (DFD) **maps out the flow of information for any process or system**. It uses defined symbols like rectangles, circles and arrows, plus short text labels, to show data inputs, outputs, storage points and the routes between each destination.

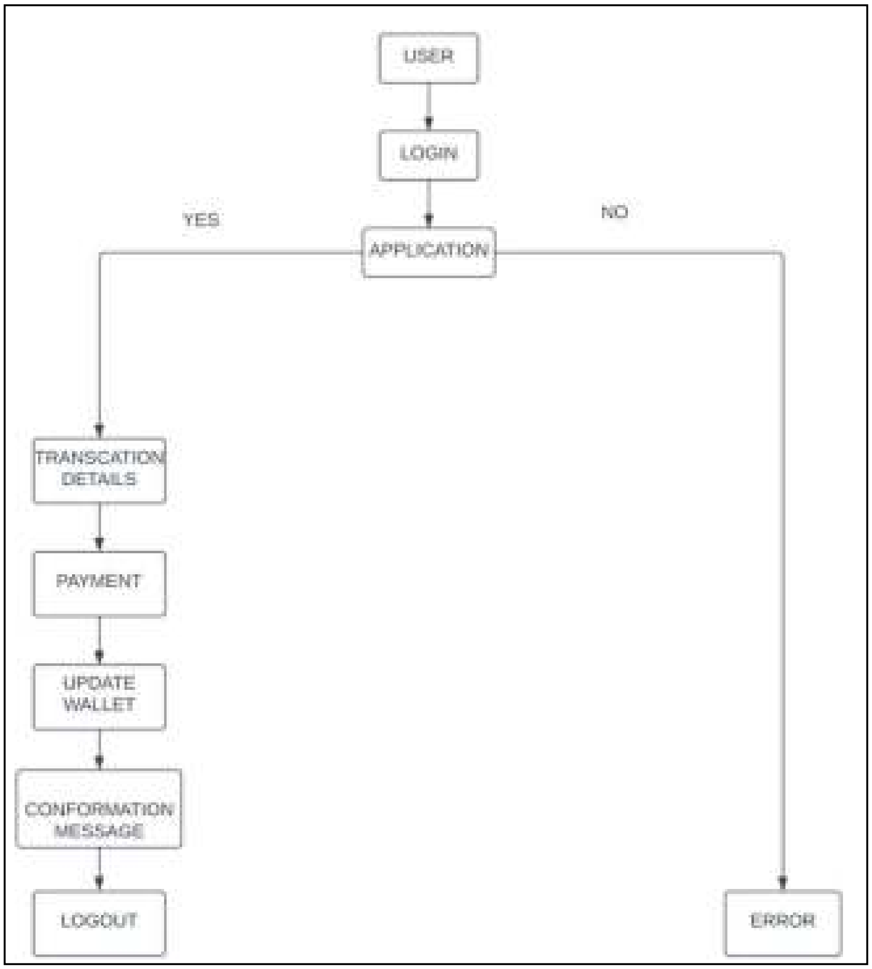


Figure 3.6: Data Flow Diagram for Property registry and transaction Using blockchain

4. IMPLEMENTATION

4. IMPLEMENTATION

4.1 SAMPLE CODE

```
  function isUserRegistered(address _addr) public view returns(bool)
  {
  if(RegisteredUserMappin
g[_addr]){ return true;
  }else{
  return false;
  }
  }
  function registerUser(string memory _name, uint _age, string memory _city,string memory
_aadharNumber, string memory _panNumber, string memory _document, string memory
_email
  ) public {
  require(!RegisteredUserMapping[msg.sender]);
  RegisteredUserMapping[msg.sen
der] = true; userCount++;
allUsersList[1].push(msg.sender;
AllUsers[userCount]=msg.sende;
  UserMapping[msg.sender] = User(msg.sender, _name, _age,
_city,_aadharNumber,_panNumber,
  _document,_email,false);
  //emit Registration(msg.sender);
  }
  function verifyUser(address
_userId) public{
require(isLandInspector(msg.sende
r));
UserMapping[_userId].isUserVerif
ied=true;
  }
  function isUserVerified(address id) public view
returns(bool){ return  UserMapping[id].isUserVerified;
  }
  function ReturnAllUserList() public view returns(address[] memory)
  {
  return allUsersList[1];
  }
  function addLand(uint _area, string memory _address, uint landPrice,string memory
_allLatiLongi, uint
  _propertyPID,string memory _surveyNum, string memory _document) public {
require(isUserVerified(msg.sender));
  landsCount++;
  lands[landsCount] = Landreg(landsCount, _area, _address,
landPrice,_allLatiLongi,_propertyPID,
  _surveyNum , _document,false,msg.sender,false);
MyLands[msg.sender].push(landsCount);

  allLandList[1].push(landsCount);
  // emit AddingLand(landsCount);
  }
  function ReturnAllLandList() public view returns(uint[] memory)
  {
  return allLandList[1];
  }
  function verifyLand(uint _id)
public{
require(isLandInspector(msg.sende
r)); lands[_id].isLandVerified=true;
  }
  function isLandVerified(uint id) public view
returns(bool){ return  lands[id].isLandVerified;
  }
  function myAllLands(address id) public view returns(
uint[] memory){ return MyLands[id];
  }
  function makeItforSell(uint id) public{
require(lands[id].ownerAddress==msg.sender);
lands[id].isforSell=true;
  }
  function requestforBuy(uint _landId) public
  {
  require(isUserVerified(msg.sender) &&
isLandVerified(_landId));  requestCount++;
  LandRequestMapping[requestCount]=LandRequest(requestCount,lands[_landId].ownerAdd
ress,msg.sender,_la ndId,reqStatus.requested,false);
  MyReceivedLandRequest[lands[_landId].ownerAddress].push(requestCount);
MySentLandRequest[msg.sender].push(requestCount);
  }
  function myReceivedLandRequests() public view returns(uint[] memory)
  {
  return  MyReceivedLandRequest[msg.sender];
  }
  function mySentLandRequests() public view returns(uint[] memory)
  {
  return  MySentLandRequest[msg.sender];
  }
  function acceptRequest(uint _requestId) public
  {
  require(LandRequestMapping[_requestId].sellerId==msg.sender);
LandRequestMapping[_requestId].requestStatus=reqStatus.accepted;
      }
  function rejectRequest(uint _requestId) public
  {
  require(LandRequestMapping[_requestId].sellerId==msg.sender);
LandRequestMapping[_requestId].requestStatus=reqStatus.rejected;
  }
  function requesteStatus(uint id) public view returns(bool)
  {
  return LandRequestMapping[id].isPaymentDone;
  }
  function landPrice(uint id) public view returns(uint)
  {
  return lands[id].landPrice;
  }
  function makePayment(uint _requestId) public payable
  {
  require(LandRequestMapping[_requestId].buyerId==msg.sender &&
LandRequestMapping[_requestId].requestStatus==reqStatus.accepted);
  LandRequestMapping[_requestId].requestStatus=reqStatus.paymentdone;
  //LandRequestMapping[_requestId].sellerId.transfer(lands[LandRequestMapping[_requestI
d].landId].landPrice);

  //lands[LandRequestMapping[_requestId].landId].ownerAddress.transfer(lands[LandReques
tMapping[_requestI d].landId].landPrice);
  lands[LandRequestMapping[_requestId].landId].ownerAddress.transfer(msg.val
ue); LandRequestMapping[_requestId].isPaymentDone=true;
paymentDoneList[1].push(_requestId);
  }
```

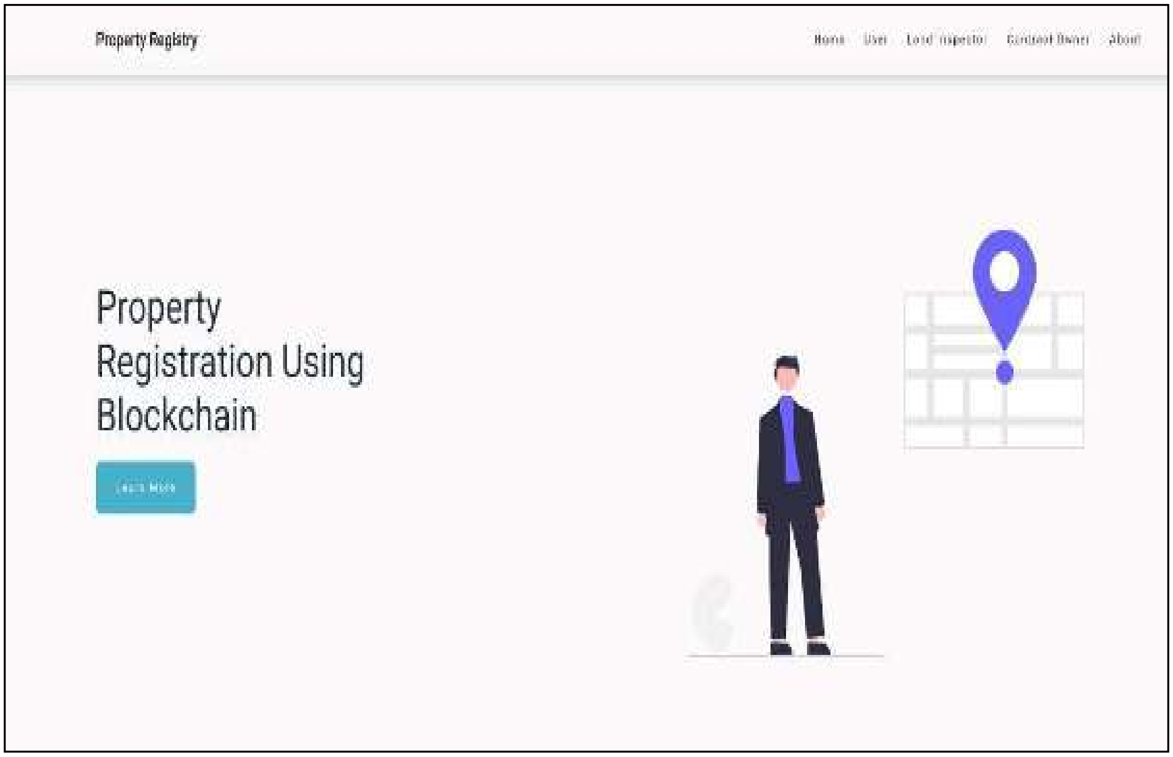
5. RESULTS

5. RESULTS

5.1 SCREENSHOTS

5.1.1 HOME PAGE:

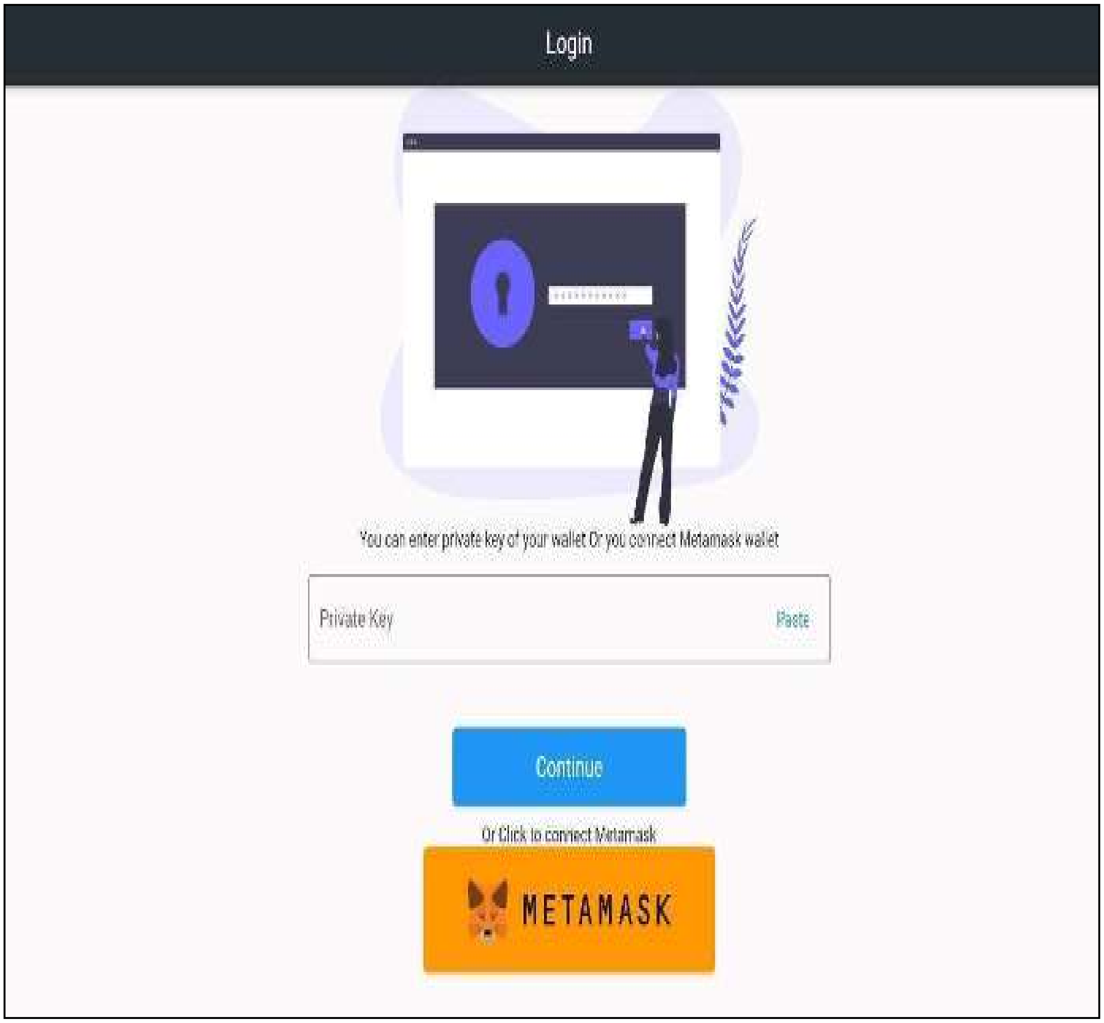
A home page is a webpage that serves as the starting point of website. It is the default webpage that loads when you visit a web address that only contains a domain name. The home page is located in the root directory of a website.



Screenshot 5.1.1 : Home page for Property registry and transaction using blockchain

5.1.2 USER LOGIN:

A login page is a web page or an entry page to a website that requires user identification and authentication, regularly performed by entering a username and password combination.



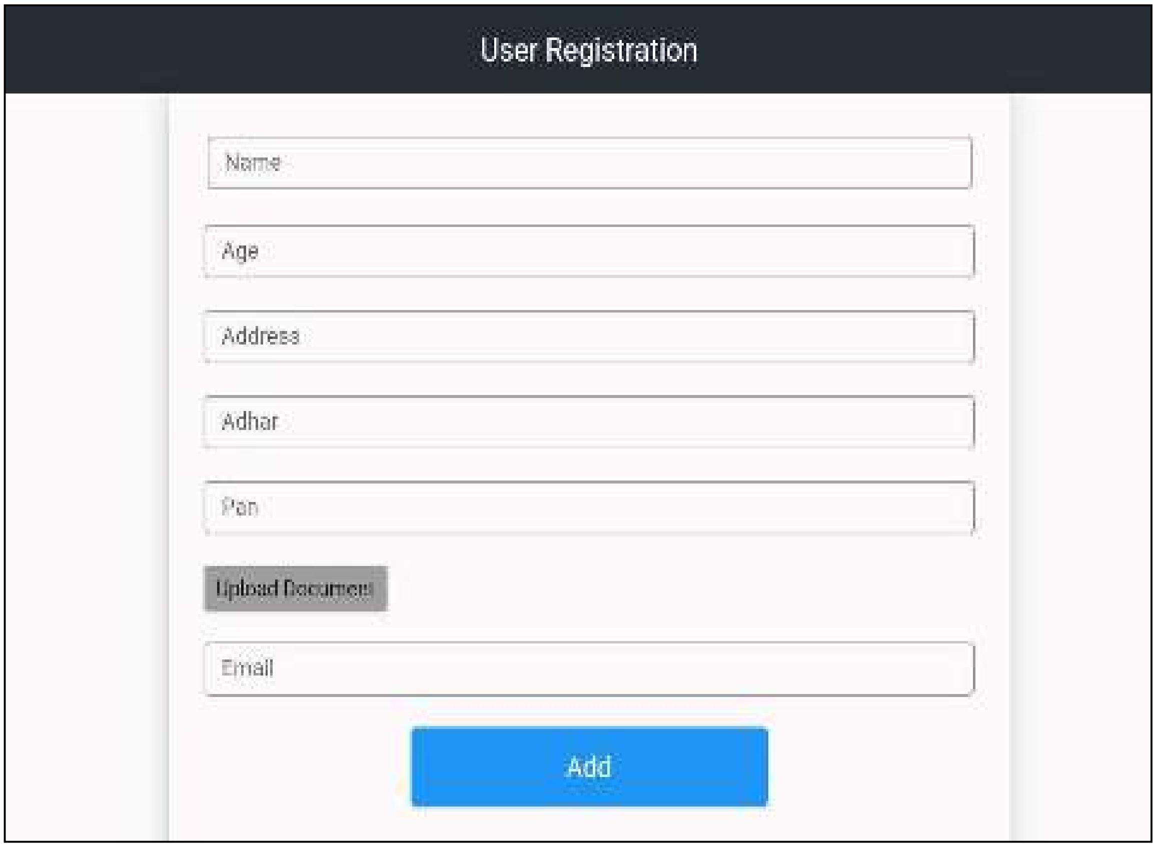
You can enter private key of your wallet Or you connect Metamask wallet

Or Click to connect Metamask

Screenshot 5.1.2 : User login for Property registry and transaction using blockchain

5.1.3 USER REGISTRATION:

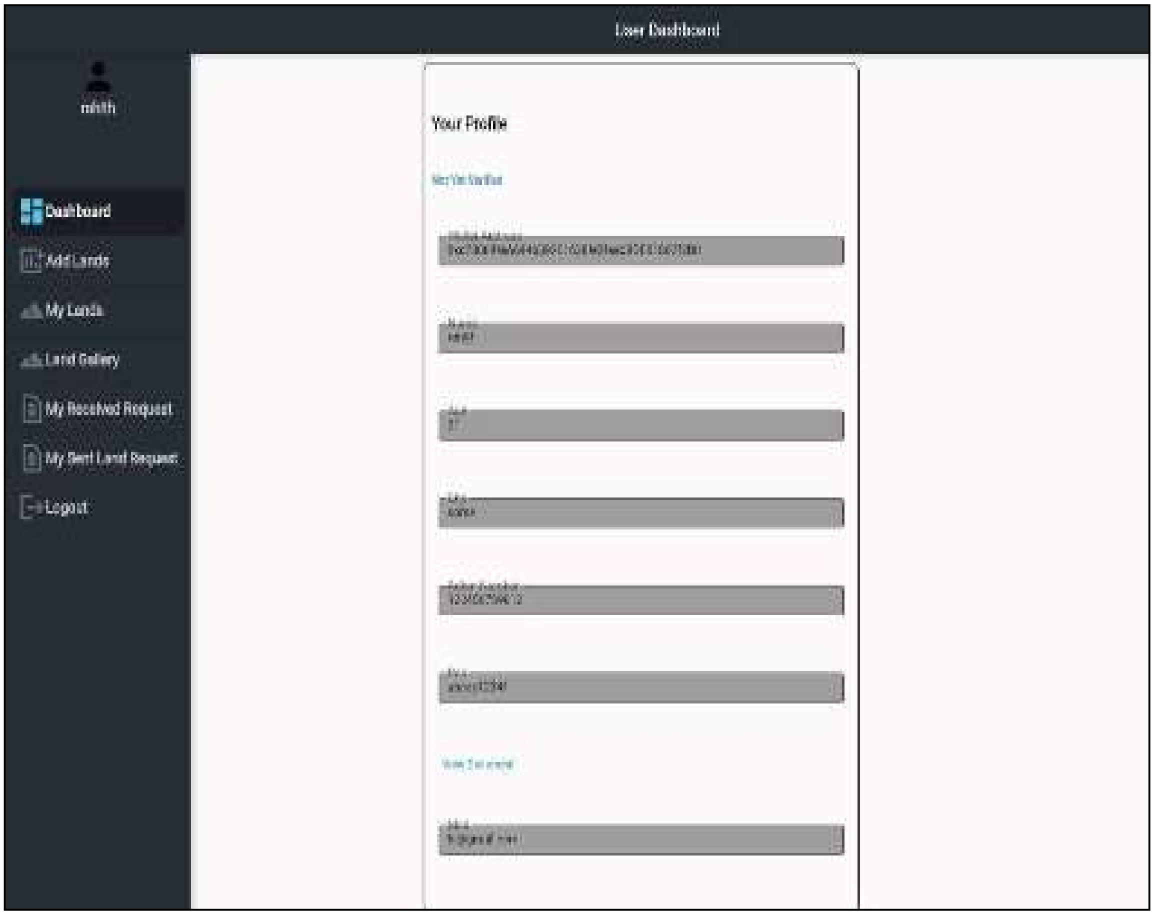
A signup page (also known as a registration page) enables users and organizations to independently register and gain access to your system. It is common to have multiple signup pages depending on the types of people and organizations you want to register.



Screenshot 5.1.3 : User Registration for Property registry and transaction using blockchain

5.1.4 USER PROFILE:

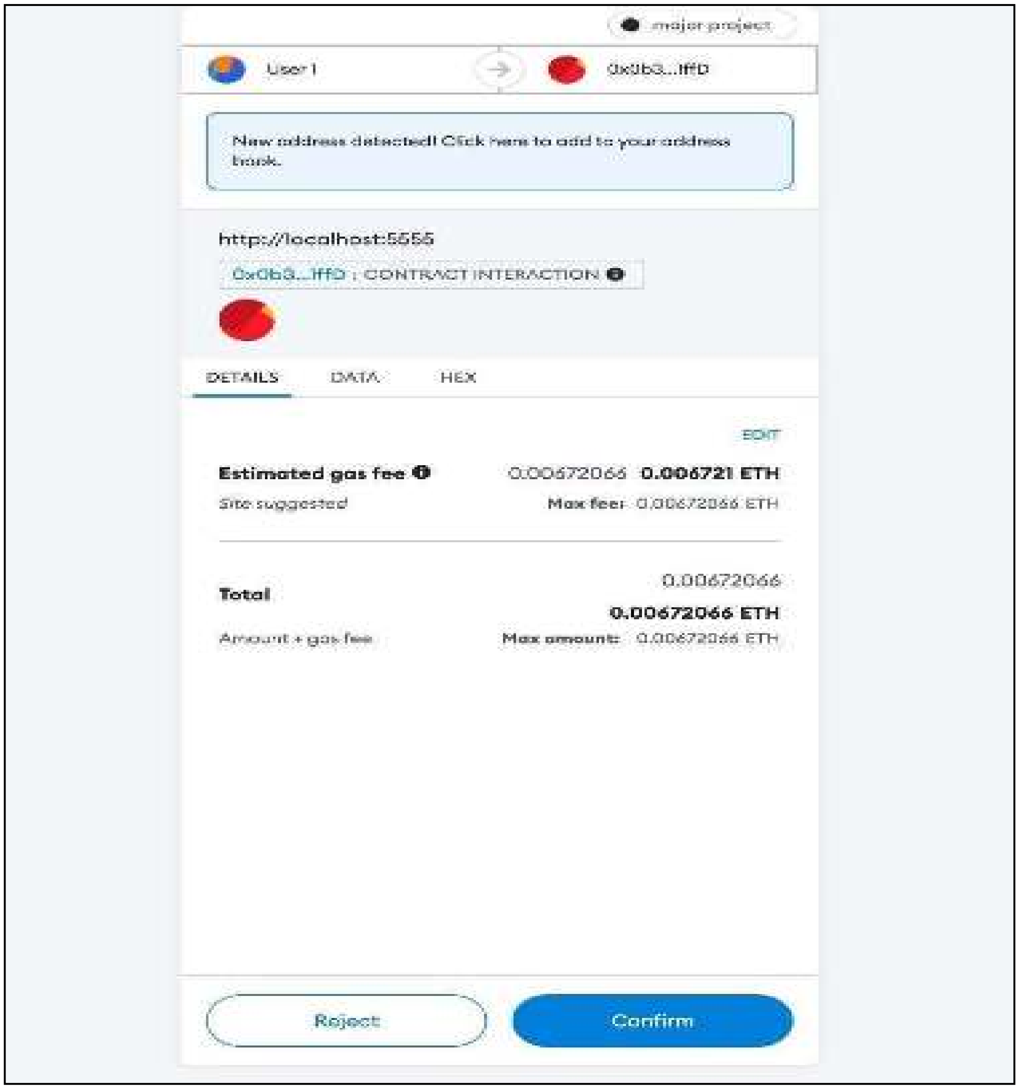
A user profile is a collection of information associated with a particular user. A user profile can be defined as the explicit digital representation of the identity of the user, with respect to their operating system, software applications or websites visited.



Your Profile

Screenshot 5.1.4 : User profile for Property registry and transaction using blockchain

5.1.4 METAMASK TRANSACTION FOR EVERY CONTRACT MADE:



New address detected! Click here to add to your address book.

http://localhost:5555

0x0b3...IffD : CONTRACT INTERACTION

Estimated gas fee 0.00672066 **0.006721 ETH**

Site suggested Max fee: 0.00672066 ETH

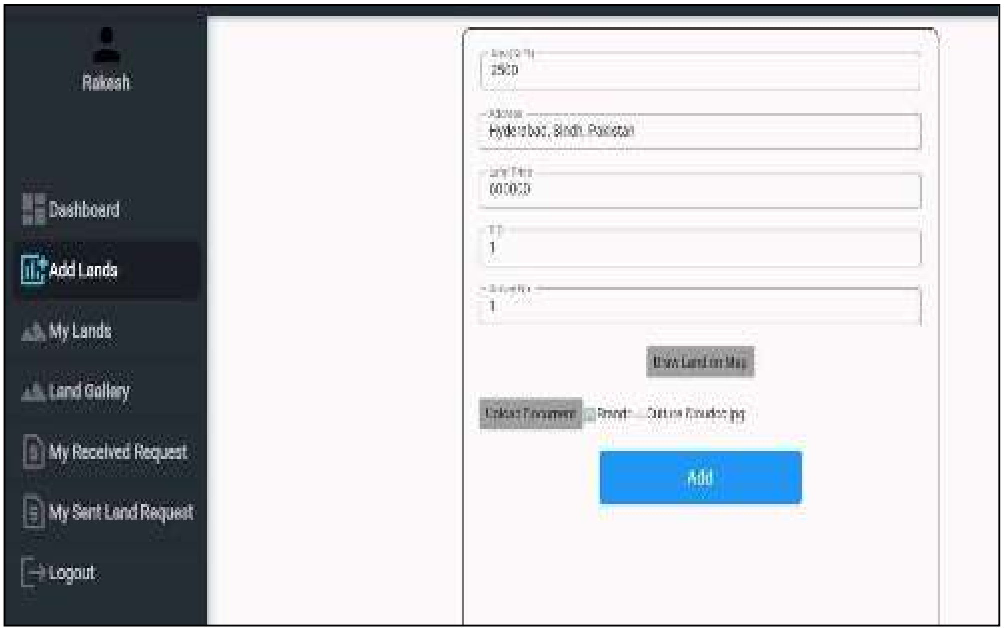
Total 0.00672066

0.00672066 ETH

Amount + gas fee Max amount: 0.00672066 ETH

Screenshot 5.1.5 : Metamask transaction for every contract made for Property registry and transaction using blockchain

5.1.5 ADDING LANDS:



2500

Hyderabad, Sindh, Pakistan

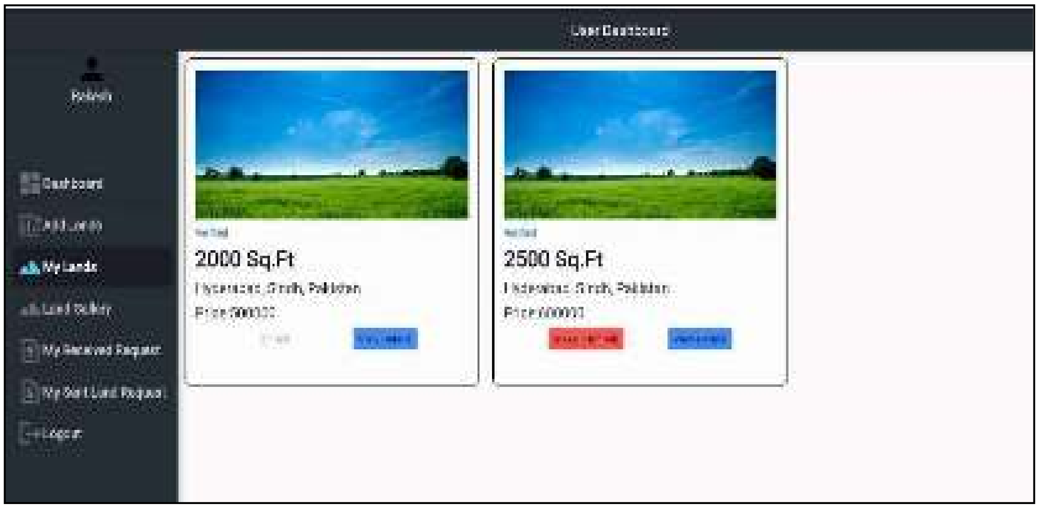
600000

1

1

Screenshot 5.1.6 : Adding lands for Property registry and transaction using blockchain

5.1.6 ADDED LANDS:



2000 Sq.Ft

Hyderabad, Sindh, Pakistan

Price 500000

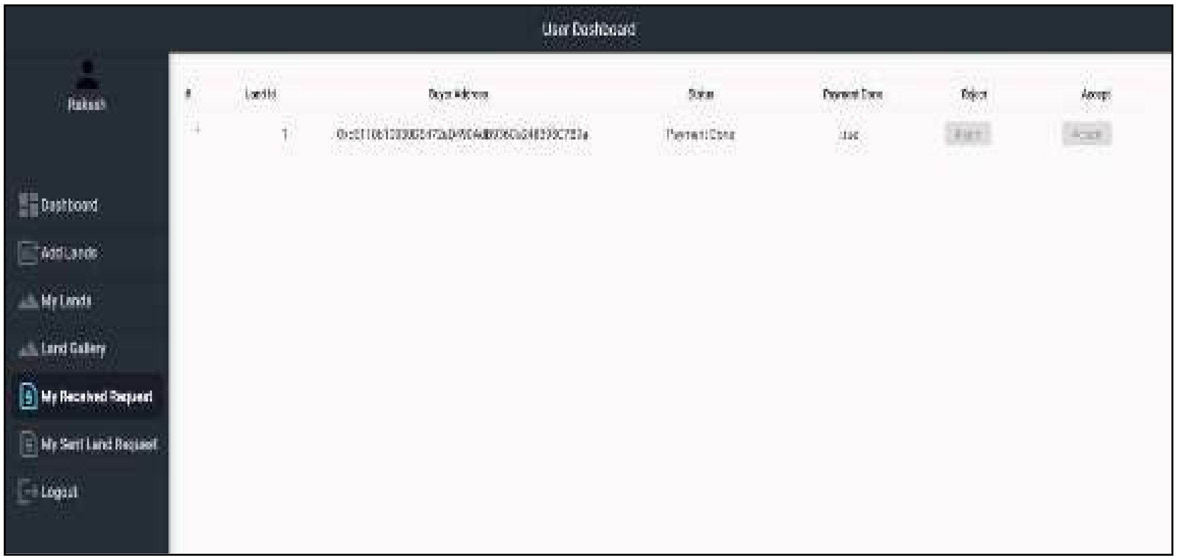
2500 Sq.Ft

Hyderabad, Sindh, Pakistan

Price 600000

Screenshot5.1.7 : Added lands for Property registry and transaction using blockchain

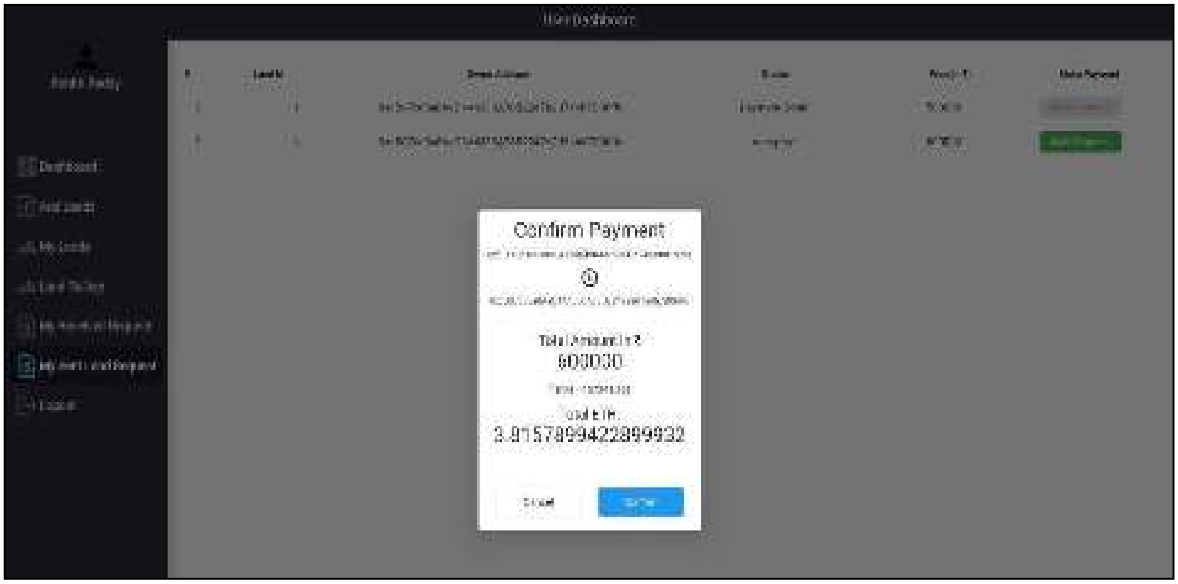
5.1.7 LAND REQUESTS:



#	Land Id	Buyer Address	Status	Payment Done	Reject	Accept
1	1	[illegible]	Payment Done	true	Reject	Accept

Screenshot 5.1.8 : Land requests for Property registry and transaction using blockchain

5.1.9 MAKING PAYMENT FOR PROPERTY:



Confirm Payment

Total Amount in ₹
600030

Total ETH
3.9157899422899932

Screenshot 5.1.9 : Making payment for Property registry and transaction using blockchain

6. TESTING

6. TESTING

6.1 INTRODUCTION TOTESTING

The purpose of testing is to discover errors. Testing is the process of trying to discover every conceivable fault or weakness in a work product. It provides a way to check the functionality of components, subassemblies, assemblies and/or a finished product[6]. It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectations and does not fail in an unacceptable manner. There are various types of tests. Each test type addresses a specific testing requirement[9].

6.2 TYPES OF TESTING

6.2.1 UNIT TESTING

Unit testing involves the design of test cases that validate that the internal program logic is functioning properly, and that program inputs produce valid outputs. All decision branches and internal code flow should be validated. It is the testing of individual software units of the application .It is done after the completion of an individual unit before integration[8]. This is a structural testing that relies on knowledge of its construction and is invasive. Unit tests perform basic tests at component level and test a specific business process, application, and/or system configuration. Unit tests ensure that each unique path of a business process performs accurately to the documented specifications and contains clearly defined inputs and expected results[1].

6.2.2 INTEGRATION TESTING

Integration tests are designed to test integrated software components to determine if they actually run as one program. Testing is event driven and is more concerned with the basic outcome of screens or fields[11]. Integration tests demonstrate that although the components were individually satisfaction, as shown by successfully unit testing, the combination of components is correct and consistent. Integration testing is specifically aimed at exposing .

6.2.3 FUNCTIONAL TESTING

Functional tests provide systematic demonstrations that functions tested are available as specified by the business and technical requirements, system documentation, and user manuals.

Functional testing is centered on the following items:

Valid Input : identified classes of valid input must be accepted.

Invalid Input : identified classes of invalid input must be rejected.

Functions : identified functions must be exercised.

Output : identified classes of application outputs must be execised.

Systems/Procedures : interacting system or procedure must be invoked.

Organization and preparation of functional tests is focused on requirements, key functions, or special test cases. In addition, systematic coverage pertaining to identifying Business process flows; data fields, predefined.

6.3 TEST CASES

Test case ID	Test case name	Purpose	Test Case	Output
1	Network_ connect fail	To get wrong network message when connected to other network	The user gives private key or connect with meta mask	An output with wrong network is shown
2	Nerwork_ connect_ pass	To get wrong network message when connected to other network	The user gives private key or connect with meta mask	The user is able to login and do further activities.
3	Document _upload _fail	To get error when the user registers without uploading document	The user clicks registerwith out uploading document	Error message is shown.
4.	Document _upload_ fail	To register and continue	The user will able to register	User able to register and do further activities.

7. CONCLUSION

7.CONCLUSION & FUTURE SCOPE

7.1 PROJECT CONCLUSION

After the development of proposed project, users can able to use the platform to upload land details for selling and also users can buy the land that has been added by other users. The entire buying, selling, uploading lands and all other transactions happen in Ethereum Blockchain whichwas user for this project purpose.

7.2 FUTURE SCOPE

The platform is developed as a proof of concept to demonstrate the usage of Land as property and their transaction in a blockchain network. This can be further enhanced and upgraded for any other property related transactions. The major flaw of using a blockchain is the transaction speed is very low compared to databases. The concept of blockchain is in its seed state. There will be rapid growth in the future and this potential can be used for this project.

8.BIBLIOGRAPHY

8. BIBLIOGRAPHY

8.1 REFERENCES

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8.2 GITHUB Link

https://github.com/rohithreddy333/majorProject

9.PAPER PUBLICATION

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PROPERTY REGISTRY AND TRANSACTIONS USING BLOCKCHAIN

[1]Jonnadula Narasimharao, [2]Yarra Sadhvika, [3]Manchala Prakash, [4]Dhoodhipala Rohith Reddy

[1]Associate Professor of Dept of CSE, CMR Technical Campus, Hyderabad

[2,3,4]UG student CMR Technical Campus, Dept of CSE, Hyderabad

[1]jonnadula.narasimharao@gmail.com, [2]sadvikayerra2017@gmail.com,

[3]manchalaprakash960@gmail.com,[4]rohithreddyd333@gmail.com

ABSTRACT

Currently, numerous transactions occur daily including properties like Land. The majority of these transactions use traditional database systems as their core. Due to the database being the centralized system itis vulnerable. The records can be altered since the data in the database systems is mutable. A property registry implemented using a blockchain system can be a better alternative. The data in the blockchain is immutable. Once a transaction happens in a blockchain it cannot be altered. A blockchain network makes thetransactions more secure due to its immutabililty. A blockchain guarantees fidelity and security of a record ofdata without the need of trusted third party.

Key Words: Blockchain, Property, Immutable, Secure, Transaction.

1. INTRODUCTION

This paper is titled “Property registry and transaction using Blockchain”. Property registration involves various data like ownership, property details, size of the property, etc. In current times, property transactions are done using the traditional database methods. Conventional database systems are also vulnerable since the data is mutable. It results in illegal transactions, forgery, etc[4]. Blockchain is a perfect replacement for this problem, since the records in blockchain networks are immutable. We can only read and write the data,unlike databases where the date can be modified or deleted. Since the blockchain is a decentralized,peer-to-peer network, there can be no involvement of trusted third parties. The target of this project is to provide a platform for any user to perform property related transactions using blockchain.

This paper is intended to explore the potential that the blockchain system has in the area of property transactions. It is intended to explore the immutability, security of the records and how a blockchain system performs in this field. There are many approaches have been made to automate the property registry data maintenance in order to eliminate the process of keeping bookish records or on paper. Initially databases are used to store this huge data. But it is not efficient in terms of data security as the data contents can be breached easily and poorly maintained data bases can lead to data tampering.

2. LITERATURE SURVEY

2.1 EXISTING PROPERTY TRANSACTIONS SYSTEMS.

In current times the properties like land and other entities are being sold and the transactions are being made using conventional database systems where the records present in one central server and maintained by a single administrative entity[1]. The payments involving in transaction may be traditional paper based currencyor can be digital payments involving internet banking. The payment transaction can also involve third party commercial organizations like Paypal, Amazon , Google, etc but the commission these organizations charge for every bulk transaction is high[2].

2.2 BLOCKCHAIN AND CRYPTOCURRENCIES

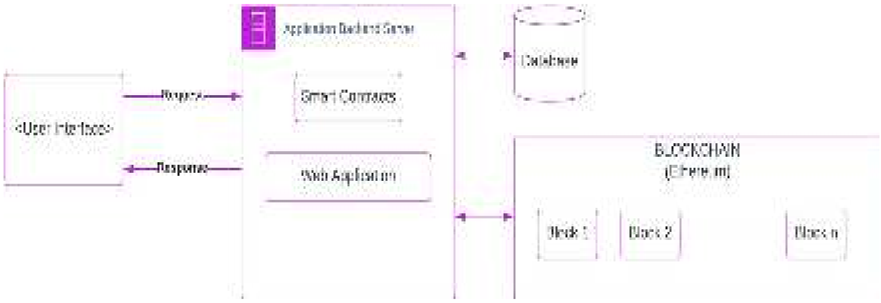
Over the years the Blockchain evolved as center for digital payments since the evolution of cryptocurrencies[3]. This has created a system where the transactions are made without involvement of any third party entity or governing body. As a relatively new technology, blockchain is designed to achieve realtime peer-to-peer operation,decentralization, transparency, anonymity, integrity and irreversibility in a widely applicable manner. However, there are still challenges vulnerabilities and vulnerabilities related to this technology that should not be neglected. Performance can be on of its limitation. The verification of every transaction requires the acknowledgement of every node in the network, which substantially will take more time than the centralized system.

3. PROPOSED METHODOLOGY

3.1 PROPOSED SYSTEM

In the Proposed System, to solve the existing problems and issues with the current system, we implemented a software platform where anyone can register themselves and can sell or buy their lands which are connected through a blockchain network. The proposed system includes user registration, which can be done by providing the public key of their wallet for blockchain transactions. User must provide their details alongwith their Aadhaar card or social security card or any kind of identity proof. Users can upload their lands andtheir related documents and proceed with selling. They can buy land by exploring different lands in the land gallery. The transactions happen through blockchain.

3.1.1 ARCHITECTURE



The proposed system architecture has the following components.

User interface: This is where the user interacts with the platform. This is where users add, sell and buy properties on the platform. They will use their metamask wallet or their wallets private key to login to platform.

Smart Contracts: These are conditions for a transaction to occur in a blockchain. These are written in solidity and deployed in Ethereum network.

Web Application: This component handles the server side logic that acts as an mediator between user interface, blockchain and database.

Database: Database is used to store metadata and other required data.

Blockchain: The blockchain here is ethereum and we will make API calls to blockchain to make a transaction happen or to get transaction details.

3.2 TECHNOLOGY AND TOOLS USED TO BUILD PROPOSED SYSTEM

Technologies used for Development : HTML5, CSS3, Java Script ES6, Flutter 3.0.1, Node.js 12, Solidity 0.6.0 or above.

HTML: It is standard mark up language used to design document and display in web. HTML stands for Hyper Text Markup Language

CSS: Its a styling language used to describe the style of the documents that were written in mark up languages like HTML.

Java Script: Java Script is a programming language used to develop webpages, servers. Majority of the client side websites are written in javascript.

Flutter: It is an opensource UI software. Flutter uses to hybrid model to design UI for android, IOS, websites, etc using a single codebase.

Node js: Node.js is an open-source, cross-platform, back-end JavaScript runtime environment that runs on the V8 engine and executes JavaScript code outside a web browser.

Solidity: Solidity is an object-oriented programming language for implementing smart contracts on various blockchain platforms, most notably, Ethereum.Programs in Solidity run on Ethereum Virtual Machine.

Tools used for Development : Truffle 5.5, Ganache 7.2, Metamask 10.12 .

Truffle: Truffle is a development environment, testing framework and asset pipeline for Ethereum. With Truffle, you get: Built-in smart contract compilation, linking, deployment and binary management.

Ganache: Ganache is a personal blockchain for rapid Ethereum and Corda distributed application development. You can use Ganache across the entire development cycle; enabling you to develop, deploy, and test your dApps in a safe and deterministic environment.

Metamask: MetaMask is a software cryptocurrency wallet used to interact with the Ethereum blockchain.It allows users to access their Ethereum wallet through a browser extension or mobile app, which can then be used to interact with decentralized applications.

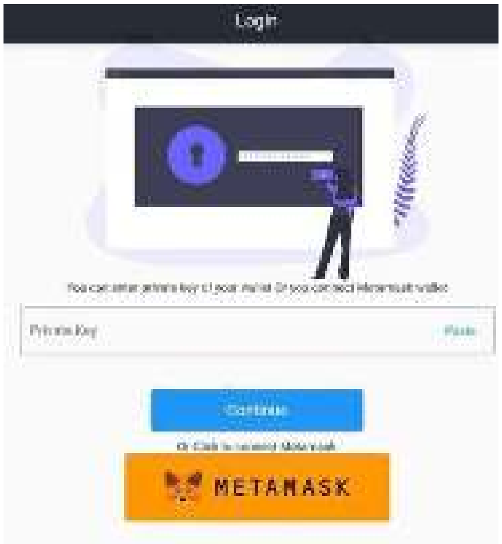
3.2.1 ETHEREUM BLOCKCHAIN AND WEB3

The proposed system is built using the ethereum blockchain which is an opensource blockchain used to build enterprise level applications. To connect to ethereum blockchain web3 framework provides the required API's to interact with ethereum blockchain. We deploy smart contracts into ethereum blockchain network which are written in solidity.

4. RESULT

The following screenshots are the results of the platform tthat is built to serve the purpose of making land transaction using ethereum blockchain as a proof of concept to the proposed system.

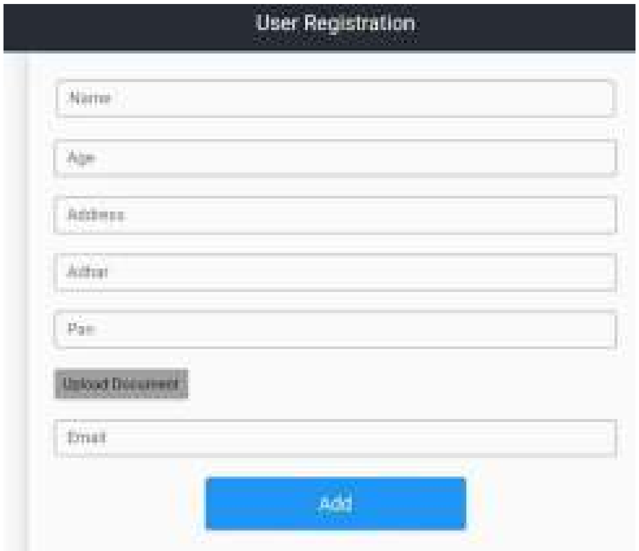
4.1 Login



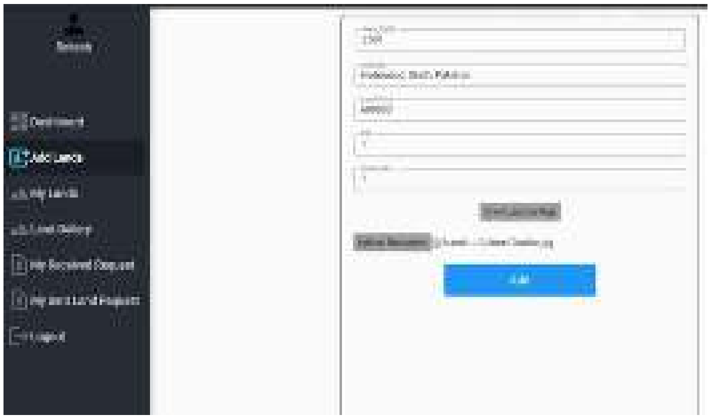
You can enter private key of your wallet Or you connect Metamask wallet

Or Click to connect Metamask

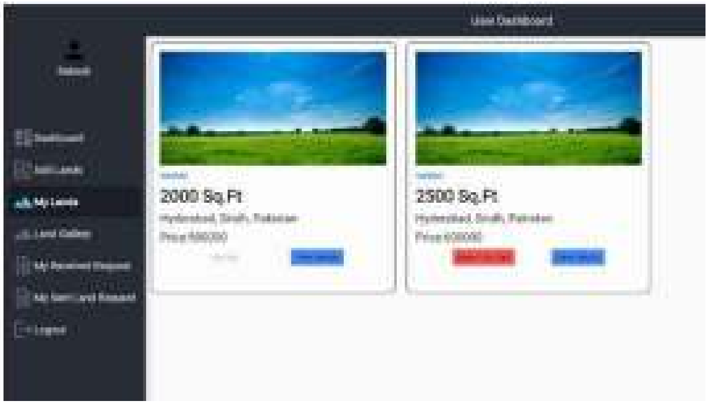
4.2 User Registration



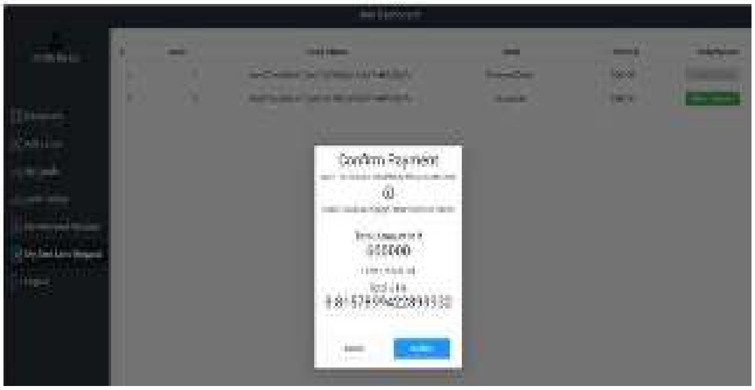
4.3 Adding Lands



4.4 Land Gallery



4.5 Payment



CONCLUSION

After the development of proposed project, users can able to use the platform to upload land details for selling and also users can buy the land that has been added by other users. The entire buying , selling , uploading lands and all other transactions happen in Ethereum Blockchain which was user for this project purpose. The ownership of the properties are maintained.

FUTURE ENHANCEMENTS

The platform is developed as a proof of concept to demonstrate the usage of Land as property and their transaction in a blockchain network. This can be further enhanced and upgraded for any other property related transactions. The major flaw of using a blockchain is the transaction speed is very low compared to databases. The concept of blockchain is in its seed state. There will be rapid growth in the future and this potential can be used for this project.

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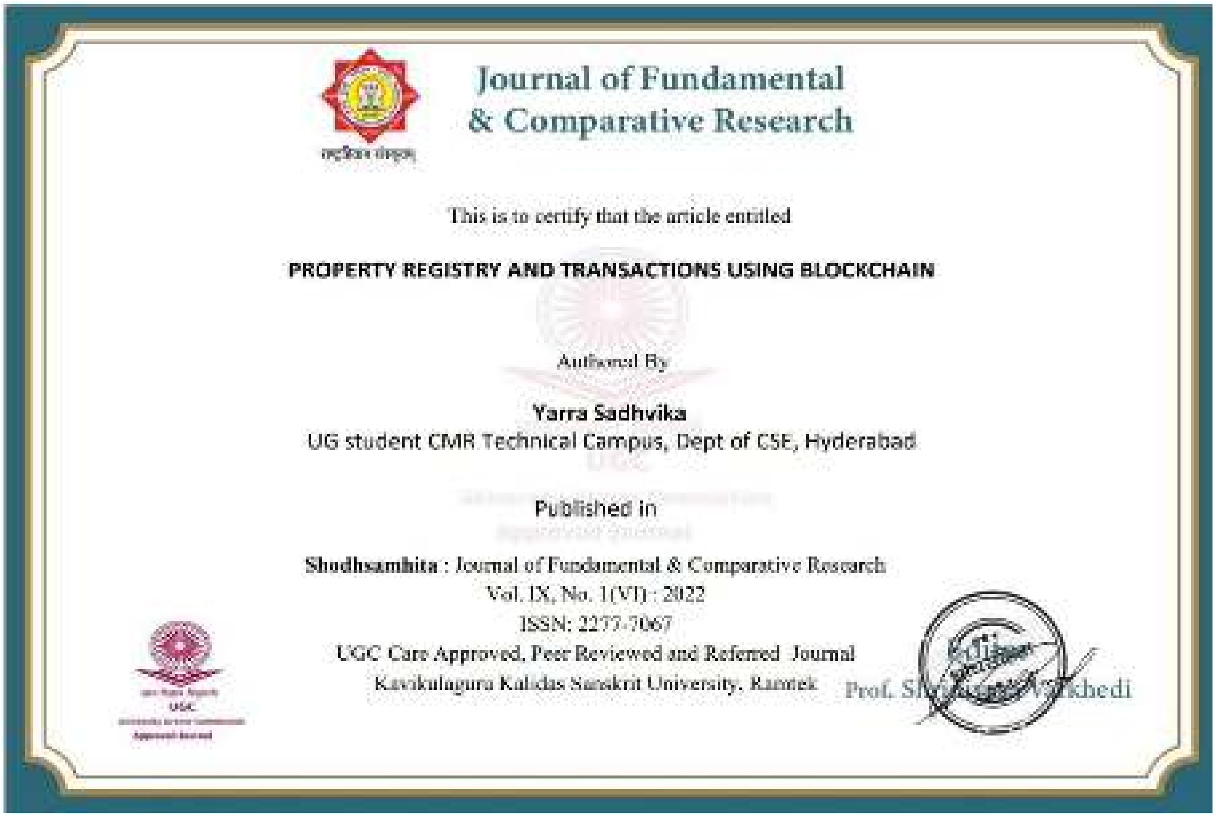

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Yarra Sadhvika
UG student CMR Technical Campus, Dept of CSE, Hyderabad

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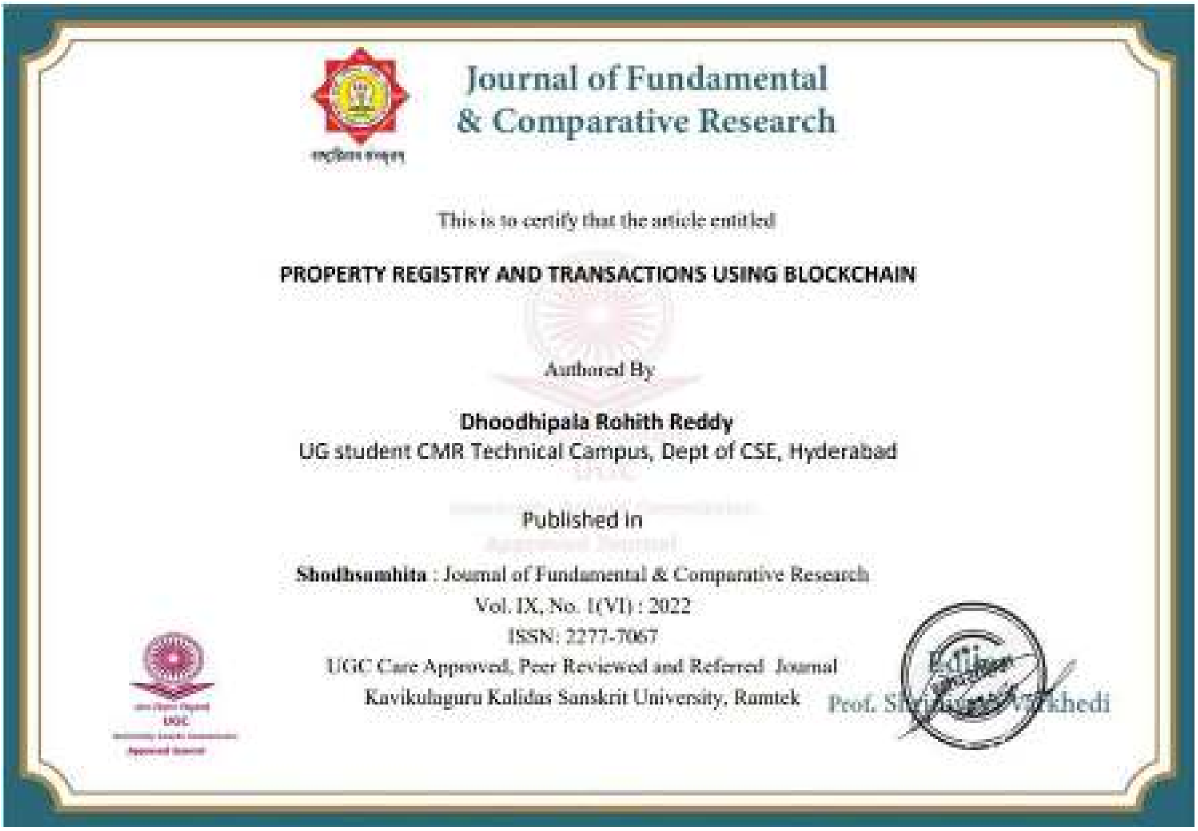

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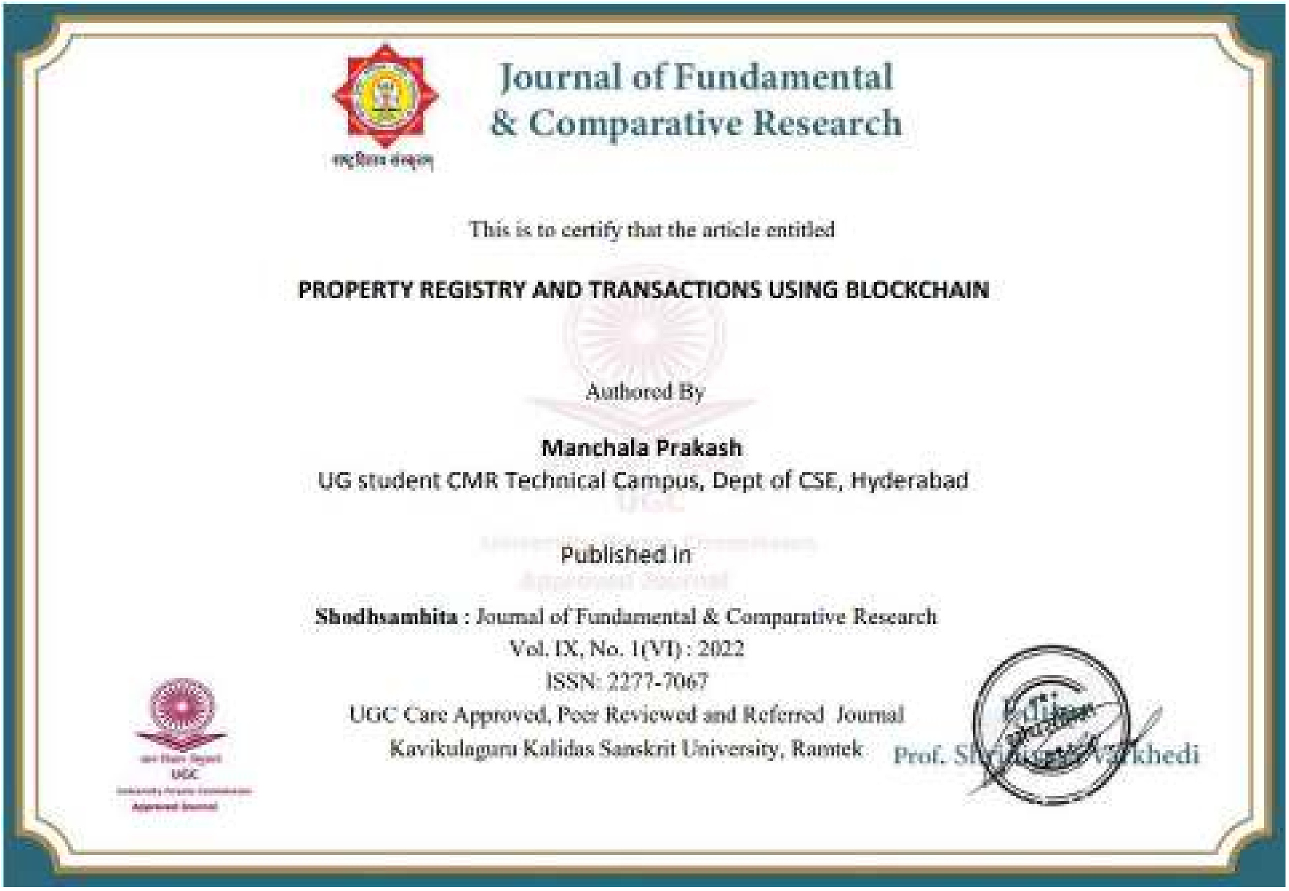

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Manchala Prakash
UG student CMR Technical Campus, Dept of CSE, Hyderabad

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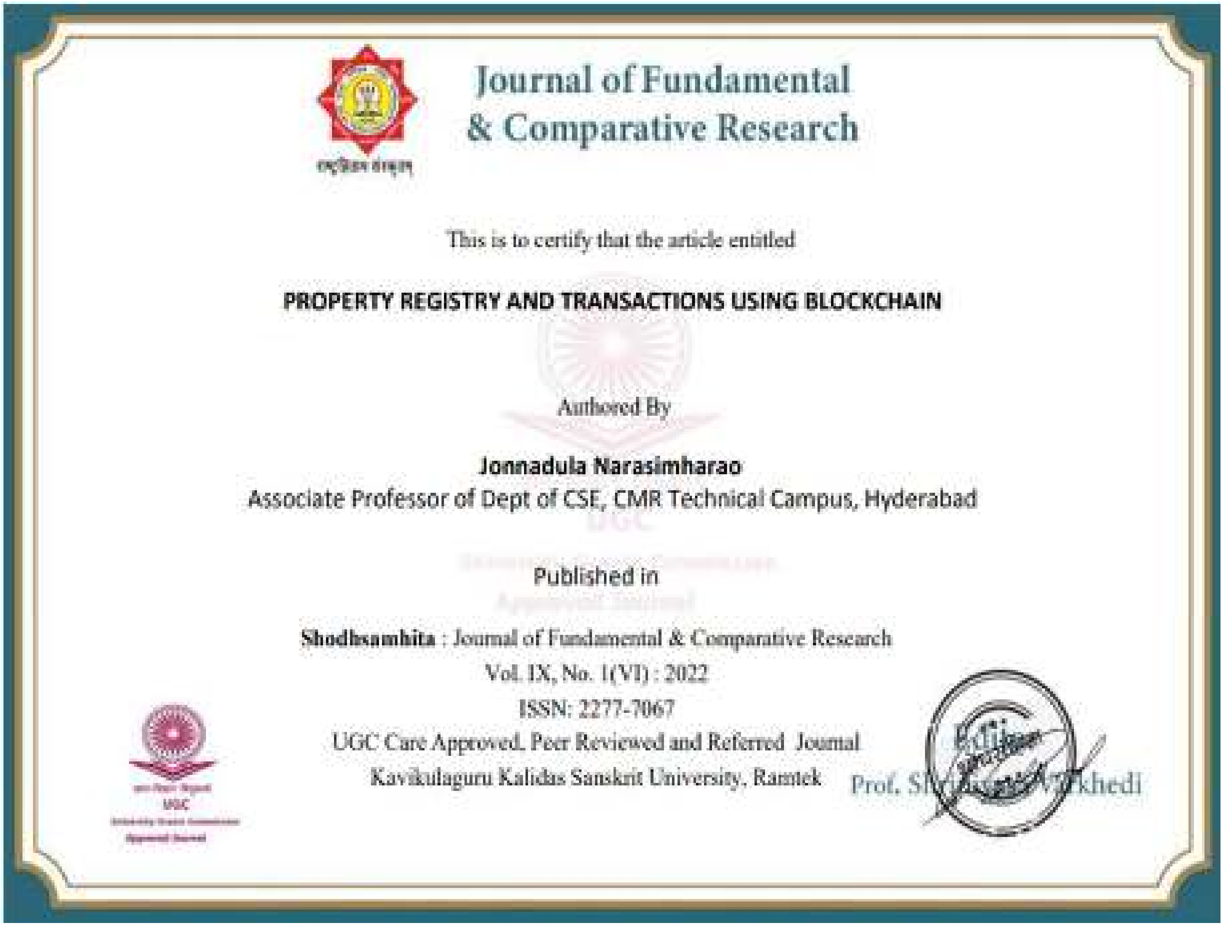

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