BLOCKCHAIN BASED SOLUTION FOR LAND REGISTRATION

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***Abstract*—Manipulation or Tampering with The Land Data from the Land Registry Agencies is a major concern for the government in the land registration process, and agencies are frequently questioned about this unlawful manipulation of Land Registration Data. Always bringing actual papers is a headache, and if they are misplaced, they can lead to identity theft. Many studies show that economic progress and corruption are negatively correlated. Thus, many parties want different levels of property control. The Indian government has launched several initiatives, including Digital India. The Digital India Land Records Modernization Program (DILRMP) modernizes land records and reduces corruption at all phases of land dealings. Despite DILRMP efforts, India's land title management system remains flawed. Land ownership and records are corrupt. Federal officials verify and process deeds for DILRMP. This lets dishonest people record fake deeds, transfer property ownership, and more. Blockchain and Aadhaar for land record management and property registration are efficient. Thus, this study discusses important case studies, identifies requirements, and presents the solution idea and system design. Based on our findings, we believe that blockchain technology combined with Aadhaar card verification would be a good instrument for promoting transparency in government processes, reducing fraud and corruption, and improving socioeconomic benefits.**

Keywords*—DILRMP, Land registration data, Blockchain, Aadhaar Introduction (Heading 1)

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I. INTRODUCTION

Land is an extremely precious asset for any government. It is the government's responsibility to ensure that land registration and transfer are completed without fraud, in a timely and transparent manner. In India, property registration normally entails the following steps:

- Verifying the title deed to the property: It informs you of the property's ownership status and any outstanding dues, such as property taxes, water/electricity bills, and so on.
- Preparing the Sale Deed: Get a lawyer to draft a sale deed for registration.
- Stamp duty: A registration cost for a property document is typically 1% of the property value, up to a maximum of INR 30,000. The stamp duty, which ranges from 3 to 10% of the property value, varies by instance.
- Approach the sub-registrar for registration: The seller and buyer, or those holding power of attorney, must appear in front of two witnesses. the office of the Sub-Registrar of Assurances, under whose jurisdiction such property belongs.

Space constraints, fraudulent activity in land registration, the absence of an integrated ownership verification and investigation system, a lack of uniformity and inadequate maintenance of land records, and the threat of records being destroyed by force majeure events are some of the difficulties that land registrations confront today. To address these concerns, blockchain-based distributed ledger technology is projected to revolutionize land registration by providing a safe architecture for storing land transactions via cryptographic protocol.

II. BACKGROUND

A. What is Blockchain?

A blockchain is a distributed record of transactions which holds a continually expanding collection of records (blocks) that are privately linked collectively using hashes of cryptography. It is a digitally protected electronic information document. All data stored in the blockchain is immutable; once a piece of data enters the blockchain, it is practically impossible to alter its value. Because of its peer-to-peer nature, Blockchain makes dealing with businesses easier, faster, and more trustworthy. It has become the most used business model in different industries, such as construction industries, as it is the safest, fastest, transparent, and it also is more comfortable to implement. The critical feature of Blockchain that makes it today's most potential technology are:

- Persistent: Data recorded cannot be deleted or altered and are saved permanently; hence it cannot be corrupted. Time-stamped records: Entire data entry in the Blockchain is recorded digitally at the time of occurrence.
- Approachable: Participants have easy access to data records; they can examine or add data based on the consent granted.
- Decentralized: Because the network is managed by a collection of blocks, there is no single governing authority. Any data, important documents, contracts, and so on, can be securely stored and directly controlled with the aid of the private key.

B. Benefits of Blockchain in Land Registration

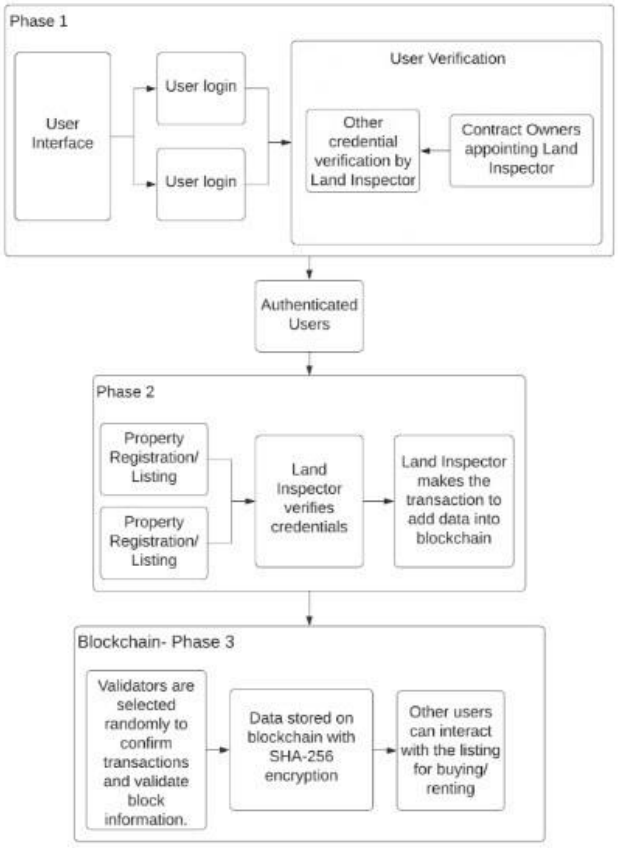
The blockchain land registration platform will make it possible for you to upload ownership documents to the blockchain network, where signers may sign it while other users may validate it as required. Blockchain can demonstrate that you are the legitimate owner of the land ownership thus preventing fake documentation by maintaining a permanent record of activities. As an outcome, a blockchain-based property registration platform might be used as proof of ownership and existence, transaction, and purchase.

The smart contract concept is utilized for verification or confirmation of this blockchain technology in a property record. The person who purchases the property is confident that the land acquired is authentic and genuine as well as that the individual selling it is the legitimate proprietor of the property, which somewhat diminishes the likelihood of any fraud in future.

III. OBJECTIVES

- If data were centrally held, all departments could handle requests for subsidies, mutations, and other services more quickly.
- Land Owners will be assured that dishonest parties will not be able to alter land ownership or any other details.
- The public will be able to verify property registration blockchain data using the Registration software workflow system. This will display the property chain from initial buyer to final buyer.
- The buyer need not rely on a third party to verify the seller's documents.
- Citizens and the department of registration would have access to clear, dependable, and tamper-proof Property Registration documents.
- Before purchasing, citizens can research property ownership and history.
- Document chain prevents fraudulent registration.
- To reduce the cost of processes by automating processes in land registration.
    - To establish a single source of truth for land ownership records, reducing the risk of data inconsistencies.
    - To reduce the environmental impact of traditional land registration processes by eliminating paper-based land transfers.
    - To promote the use of sustainable land use practices, such as conservation easements, for buying & selling.
    - To enable the integration of smart contracts into land transactions for buying & selling, automating contract execution, and improving the efficiency of the process.

IV. PROPOSED ARCHITECTURE



1. User registration
   - On the landing page of website user will be provided with two options to either login or signup
   - The user who are new and unverified will have to sign up.
   - The existing users are automatically directed to the user dashboard.

2. User verification
   - User is required to provide some details to get platform access.
   - The details will be verified by the land Inspector.
   - If all the details are verified the user will get access to the platform else user will be denied access to the platform

3. Document verification
   - The user uploads the land or property documents on the platform and these documents are only accessible by land inspector.
   - Land inspector focuses on evaluating the authenticity of land documents and verify them.
   - Once the land documents are verified by the inspector the property gets registered on blockchain

4. Blockchain
   - Once the property is registered on blockchain the Land Owner can put the land for selling.
   - Once the Land Owner puts the land on listing for selling other users can request for buying those properties.
   - If the buying request is rejected by owner, the listing in put back up.
   - If owner accepts the request the transfer process is initiated between the owner and buyer

V. ENTITIES INVOLVED

A. User

The users of our web app are the people who are looking for some property or land to buy or sell. Prior to this they need to get their credentials verified such as Name, Aadhar Number, Pan Number, Email etc by Land Inspectors.

B. Land Inspector

Land Inspectors are the ones who will verify the user credentials and authenticate them. They are also responsible for verifying the Land details uploaded by the user before it is available to other users for sale. At last, the transfer of ownership of land from one user to another is also done by Land Inspectors.

C. Contract Owner

Before Land Inspectors get the authority to monitor and approve the entire user and land authentication and transfer process, they themselves need to be approved. Contract owners are responsible for approving and adding the Land Inspectors.

VI. TECHNOLOGY USED

A. Flutter

Flutter is a mobile app development framework created by Google that allows developers to build high-performance, high-fidelity, apps for iOS, Android, and the web. It is built using the Dart programming language and provides a rich set of pre-built widgets and tools for creating beautiful, responsive, and animated user interfaces.

B. Ethereum Blockchain

A blockchain is a distributed record of transactions which holds a continually expanding collection of records (blocks) that are privately linked collectively using hashes of cryptography.

C. Metamask Wallet

Metamask is a popular cryptocurrency wallet and browser extension that allows users to interact with decentralized apps on the Ethereum blockchain. It provides a secure way to store, manage, and transfer Ethereum.

D. Solidity

Solidity is a programming language used for developing smart contracts on the Ethereum blockchain. It is a high-level language that is similar in syntax to JavaScript and is designed to be easy to learn and use for developers who are familiar with object-oriented programming.

VII. RESULT

Initially the user has to login/register using the private key of the MetaMask wallet. New users are automatically directed to the registration page and existing users are directed to the Dashboard. Land Inspector verifies the users and once all documents are in proper order the user is marked as verified and is given access to all the user accessible modules. Once the user is logged in, he/she can proceed with the Buying/Selling process.

The figure below shows the Verify Land page. Here the land inspector can verify and accept or reject land registration based on the authenticity of documents. This page can be accessed only by land inspectors.

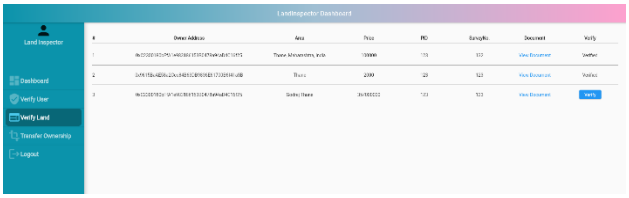


Fig 2: Land Inspector verify land Dashboard

The figure below shows the dashboard page after the verified user is logged in; unverified users do not have access to any modules. Once users are verified by the land inspector, they can register their own property and put it up for sale or they can view the Land Gallery if they wish to purchase some land.

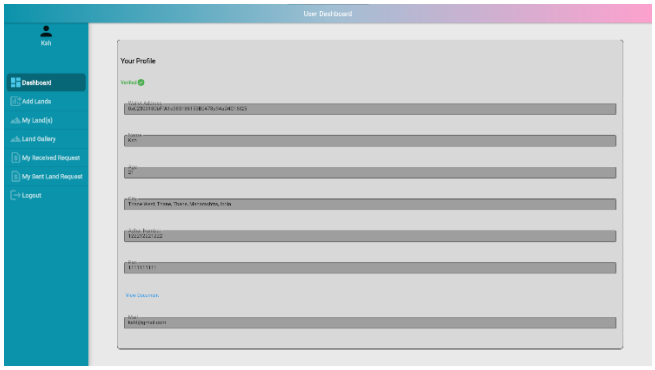


Fig 2: Dashboard page for Verified User

The figure below shows the Add Land(s) page (only verified users can add land for registration and sale). Land Owners should fill-up the mentioned details with utmost caution as the data cannot be changed later on and upload a pdf of all the land records (combined) as mentioned below in the Note. Failure to do so can result in rejection of registration of the land and no refund will be provided for the same.

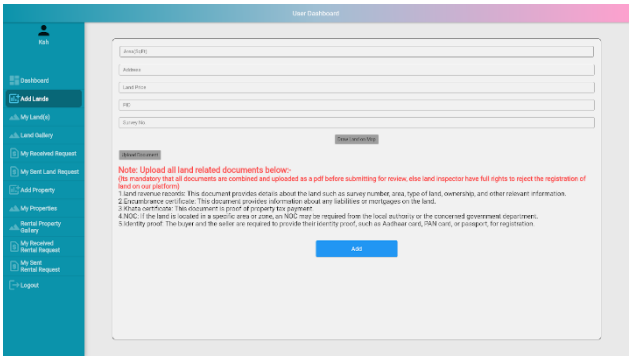


Fig 3: Add Land details page

After users have added their properties and verified by the land inspector, users can start buying/selling their properties. When user A sends a request to buy some property from user B the owner (user A) gets the option to accept the request or reject it. If accepted the buyer can make the payment and then the land inspector, then must make the final transfer of the land ownership from user A to user B.

The fig below demonstrates the Land Gallery where users create a list of lands they wish to sell. Other users that are interested in buying the land can view this page and send requests accordingly.

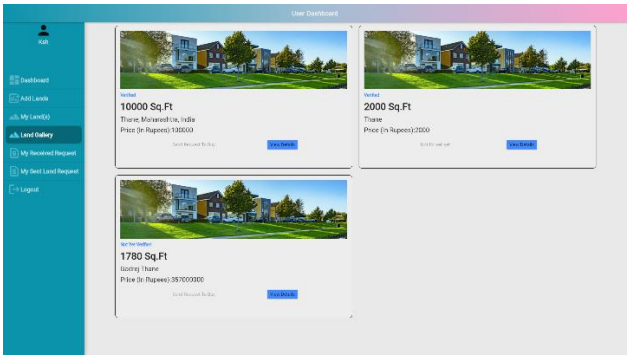


Fig 4: Land Gallery

Figure Below Shows the My Received Requests page. Here the Land Owner can accept or reject the request to sell the land, here there can be multiple buyer's requests for one land.

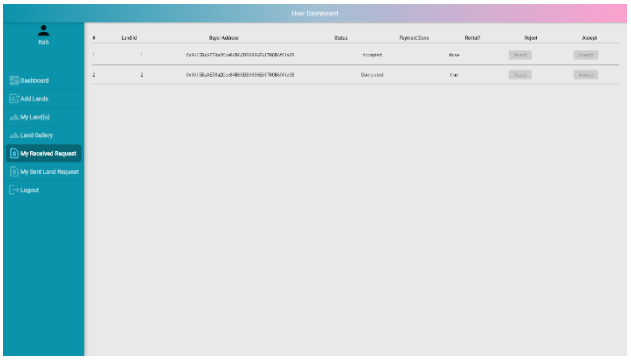


Fig 5: My (user) Received Requests page

Figure Below Shows the Transfer Ownership page. Here once both the parties come to an agreement, they proceed towards payment and the land inspector transfers the ownership to the respective party.

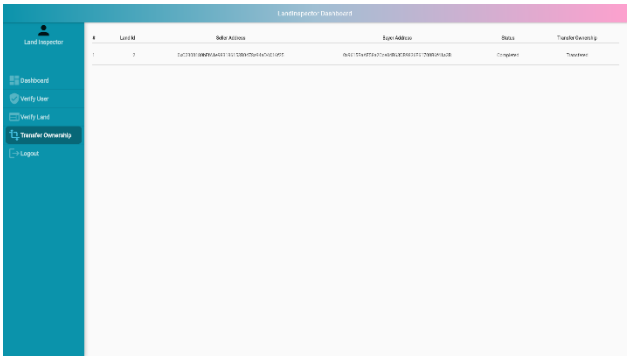


Fig 6: Transfer Ownership page (land inspector)

As shown in the image below (Fig 4), the transfer page includes all details of both parties as well as taking their live pictures, so both buyer and seller must be present with the land inspector while the ownership is being transferred.

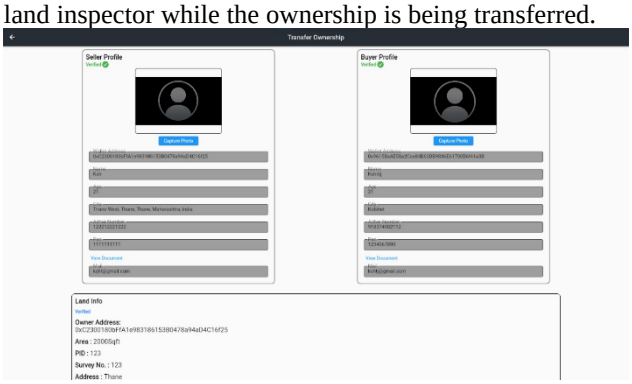


Fig 7: Seller and Buyer Information and Live photo capture

There is also a witness present during the ownership transfer process. Details and a live image of the witness is also taken and stored in the database i.e., blockchain.

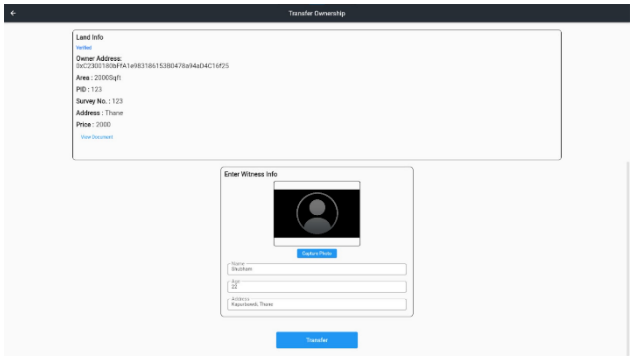


Fig 8: Witness and Final Transfer of Land

VIII. CONCLUSION

Blockchain is one of the most secure ways of storing data without it being changed. It is a distributed ledger that is open to anyone, and once data is put into it, it is exceedingly difficult to change or meddle with it. Using this property of blockchain we want to put it to use into one of the most fraudulent systems in India, the Land Registration System. Our system uses blockchain with the employment of Hyperledger. This gives rise to a system that is more evolved and features all the activities like buying and selling in an efficient and reliable way. Blockchain technology made this system secure and faster. If this kind of system is upgraded further and integrated with useful API then this will lead to faster transactions and will eventually lead to easement of the entire process, thus making the entire system hassle free and convenient in the long run which would be beneficial to mankind.

IX. FUTURE SCOPE

Blockchain is a very secure way of storing data and being able to store data of valuable assets such as land without any alteration is very crucial. Currently all the documents and data being uploaded are monitored and verified by a human (land inspector), this process can be automated using AI to make it more efficient and secure. Human involvement can be minimized for increased security throughout the process of land registrations and transfer.

This can streamline the process of buying and selling property and make the entire process more efficient. In the future, not only in Ethereum (crypto currency), but we will be able to pay in Indian or any other currency as per the user's current location. Rental can also be added into the web-app which can allow users to directly rent a property through our web-app with all the features and security of blockchain, so users are rest-assured that the property they are renting is in proper order and not face any shady deal due to middleman.

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