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Research Article

Property Registration and Ownership Transfer using Blockchain

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Abstract

It's important to have accurate records for any kind of property such as Land or Home. Such a record can find the present owner of the property and provide proof that he is truly the owner to prevent the unauthorized, fraudulent changes. The current property verification and transfer procedures are slow, susceptible to errors, unclear and intermittently corrupt. The proposed system allows us to provide a more transparent system for document registration and transfer of ownership using blockchain technology. Here we make use of the digital signature concept to maintain the trustworthiness of the property registration process. The attempt to use IPFS decentralized file-sharing platform who gives even more secure data transfer by the fact that there is no dependence on a central point of storage, reducing the risk of it being lost or destroyed. The main objective of this systems to avoid fraud while property transaction. To make Digital contract as legal document, so it replaced paper documentation format also, to make secure deal records, where no one can interfere in blocks of records.

Keywords: *Property Registration Process, Ownership Transfer, Blockchain Technology, Digital Signature, Decentralized Platform,Transparent System,Trustworthiness.*

Introduction

The property registration process is very important aspect where it should be highly secured, transparent. As real estate is high value property so, Maintaining the correctness and completeness of such property is important. Moreover it is essential to have the correct records that recognize thecurrent owner and be responsible for the Proof that he is the real owner.Substantial efforts have been made by the scholars across the world to compute the economic benefits of secure ownership, but there is no end-to-end effective property records management system. [2]The concern of proprietorship is so critical that nearly all financial institutions deeply rely on the ownership of the properties for guaranteed security. At present, people have to trust on third-party users. E.g. a government agency might be responsible for keeping record of ownership information. Sometimes, these records are not preserved systematically. Because of the uncertainties on the ownership rights, it turns out to be more robust for the financial institutions to work properly with comfort and thus blocking the growth of the nation. Today's property registration system works with paper base documentation and after deal it will be register on local server by taking 2-3 months of period which is enough period to make fraud by doing double spending also, The capacity of loading Bulk of registrations on local server is very poor that's why many time the failure occurs during transaction. Because of uncertainties creates in system the vulnerabilities generates for attacks on confidential information.[12]

Issues facingin today's Property deal:

- Lack oftransparency
- Risk of datamanipulation
- Deal based on paper documentation so chances to destroy in disaster.
- 2-3 months required for register and transfer ownership so during this time period fraud happens.
- Lack of correctness and completeness.
- Poor user experience andeducation

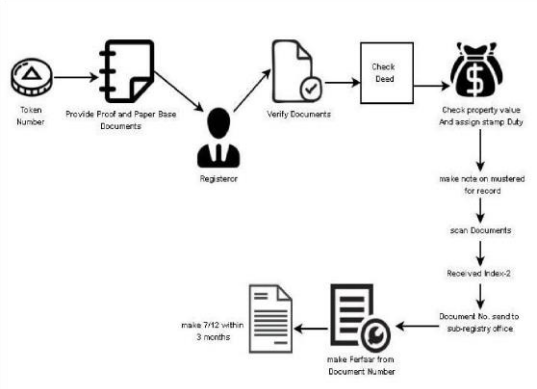


Fig 1: Existing/ Today's Registration system

Review of literature

Miroslav Stefanovic et al.[1] discussed possibilities of implementation of blockchain and smart contracts in registering real estate transactions in land administration systems(LASs).

Wei-Tek Tsai et al.[2] presents an IP-protection model for microfilms using blockchain technology. Information registered at a BC cannot be changed without being notified, and this provides an ideal setting for IP protection. This paper proposesaBC-basedframeworkformicrofilmsinChina.

Zhixong Chen et al.[3] terms a new method of constructing a decentralized transparent[8] absolute secure personal archive management and service scheme. The paper defines the various applications of the blockchain technology to the idea of ―proof of X‖ for example proof of uniqueness, proof of property ownership, proof of specific transaction, proof of college degree, proof of medical records, proof of academic achievements,etc.

Tesnim Abdellatif et al.[4] present a new technique to build a smart contract and blockchain execution protocol with users'behaviors based onaformal modelcheckinglanguage.Depend ing on this implementation, and their expected behavior, design susceptibilities of the smart contracts can be evaluated using a statistical model checking tool. An example of a concrete smart contract is used to explain the same.

Jacques Vos et al.[7] the functioning of blockchain technology and the possible use or the impact it may have on current Land Registry systems.

Pauliina KRIGSHOLM et al.[8] study the potential benefits and barriers related to implementation of the technology using a qualitative approach. It shows that at least technical, social and juridical barriers exist for u implementing a blockchain technology.

Alex Norta et al.[9] presents the blockchain-based Ever- ex capital transfer system that aims to enable and ease the financial inclusion of two billion unbanked, or under banked adults around the world. For that the novel concept of eFiat, a cryptocurrency, where each unit has its value pegged to, and a name based on, the fiat currency it presented. Users convert local fiat currencies to eFiat using a currencyexchange and transfer the coins to their Everex wallet. The Everex system provides its users access to financial services using eFiat, without the volatility issues of existing, non-stable coin cryptocurrencies.

A. Related work

United States,In 2019 south Burlington clerk office announced its collaboration with the Blockchain startup for the transfer real estate records on the Blockchain. Presently, the government of US spend thousands of real estate records on blockchain.

A Digital solution built on the blockchain cloud reduce the cost and avoid Human errors/intervention. [13]

Netherland, The Architect of Netherland's landregistry Koen Huisstede would integrate the Blockchain solution into the country's land registry ecosystem with one to three years. TheNetherlands was the member of Europe who signed a declaration to develop a European Blockchain
Partnership.[13]

UK, UK makes partnership with the Blockchain based Firm in 2018 who collaborate with land registry government for the simplifying growing land registry issues. The project titled is ―Digital steet‖ could resolve many challenges faced by UK land registry professionals presently. [13]

Sweden country is the first country who shows an interest to transfer or develop a Ehereum Blockchain Based land registry. He started his work in 2016 and now this system they are using for their registry.[13]

Proposed methodology

A. Blockchain Technology:
ABlockchain is a Decentralized, Distributed technology. The blockchain is the transparent, Immutable, Irreverse, resilience and the main feature is that it provides tight security. Basically the blockchain is the linear ledger of blocks who added with regular intervals. Every block has its own Hash and every Hash is different from each other that Hash called as Cryptographic Hash. Each block contain a Hash of previous block that's why blocks are interlink connected to each other. [5]Because of Cryptographic Hash of previous block connection the block deletion, alter and temper of block is not possible who actually maintain the tight security about transactions. The Blockchain work in peer to peer manner where each node has the replica of transactions of whole system. So, if one node getting fail toProvide service, then there are multiple nodes who are ready to provide same service facility. The Cryptographic Key generates by using RSA algorithm who makes communication via providing private and public key.[10] The Transaction when ready to add into ledger,the replica of transaction broadcast to nodes in network where the decision of add and reject transaction is taken by miners. Now, the miners are the nodes who has the high power for the processing. Using consensus algorithm the miners take decision on transaction called ―Proof of Work‖. If the transaction approved by miners by majority voting in the number of 51% or more than that then only the transaction add into ledger of blockchain. Otherwise it will be rejected.

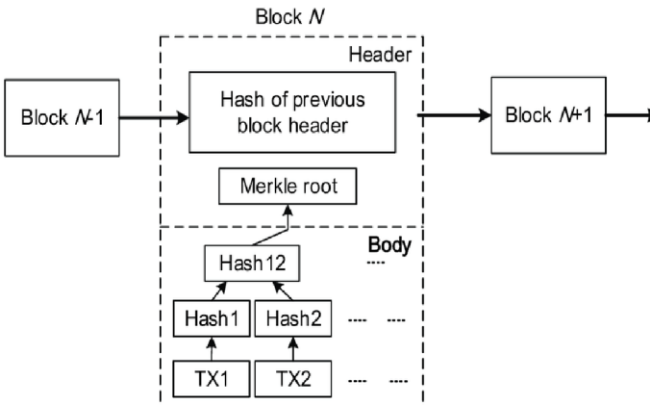


Fig 2: Structure of Blockchain

B. System Architecture

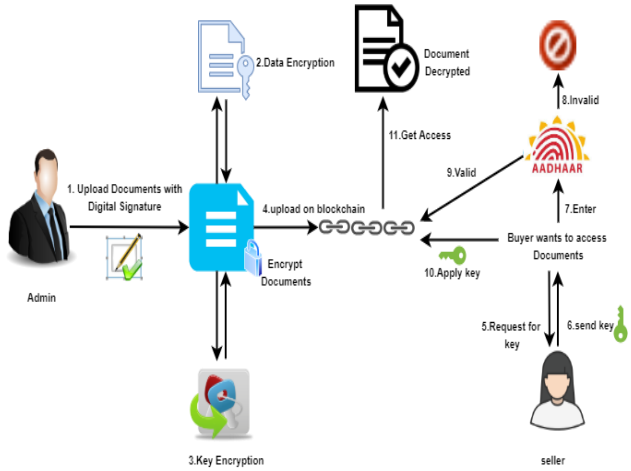


Fig 3: System Architecture

The proposed registration system works in Distributed manner where each and every node get replica of transaction ledger so there is not chance to data lost. The working of proposed system:

1. The Admin verify digital documents and provide Digital signature to documents.
2. After that Documents Encrypt by AES algorithm and generate a key to particular document.
3. That key should have higher security so encrypt that key using RSA algorithm and generate the pair of public and private set of key.
4. Upload Encrypted documents in the Blockchain.
5. If any Buyer wants to access documents then He/She request to seller for key.
6. After Sending key by seller, Buyer has to Enter AADHAR card number.
7. If AADHAR is invalid then denied access.
8. If AADHAR is valid then only Buyer apply keys to Decrypt Documents.

C. Algorithms

1.The Inter-Planetary File System(IPFS)

It is decentralized file sharing platform used for storing files,blocks and raw pieces of data and aims to recognize the content based on content Id. After uploading the file to IPFS, It divides the files in to two parts, each of which contains most 256 KB ofdata.Each portion is identified by a cryptographic hash called as QM hash or Content Identifier (CID). Every chunk is identified by a cryptographic hash, also named content identifier that is computed from its content.

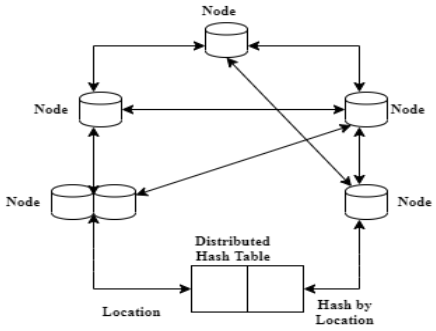


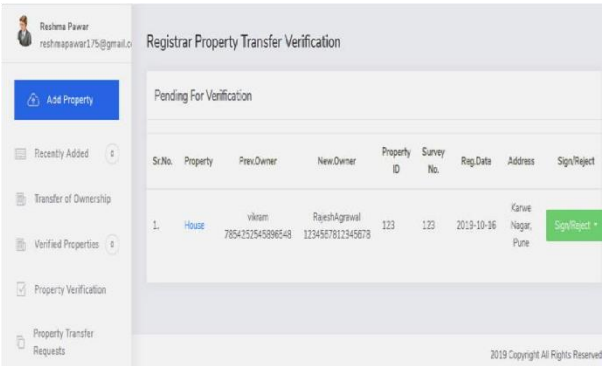
Fig4: IPFS Structure

2. Proof of Work

The Transaction when ready to add into ledger, the replica of transaction broadcast to nodes in network where the decision of add and reject transaction is taken by miners. Now, the miners are the nodes who has the high power for the processing. Using consensus algorithm the miners take decision on transaction called ―Proof of Work‖. If the transaction approved by miners by majority voting in the number of 51% or more than that then only the transaction add into ledger of blockchain. Otherwise it will be rejected. Using consensus algorithm the only genuine transactions will be added into blocks. So, it maintain strict decision making. In our project it helps to avoid the duplication of transaction for the same person.

3. *AES Algorithm*

AES is widely used for large size data encryption. AES is one of the symmetric key block cipher algorithm used worldwide for dataencryption.It's particular structure of encrypting and decrypting data make it more securesothatitcannotbehacked.AES can deal with different key sizes such as AES 128, 192 and 256 bit and each of these ciphers has 128 bit blocksize.



4.RSA Algorithm

RSA algorithm is one of the key cryptographic algorithms, used for secure data transmission. There are two keys used in RSA algorithmoneisRSApublicKeyandRSAprivatekey.

5.SHA-256

The SHA-256 algorithm generates a unique fixed size256 bit hash. This is one way function so result cannot be decrypted back to the original value. So benefit of this algorithm is that if anyone trace the key then there is no chance to find original key or message.

Result and Discussions

The property details should be upload into system before start verification process

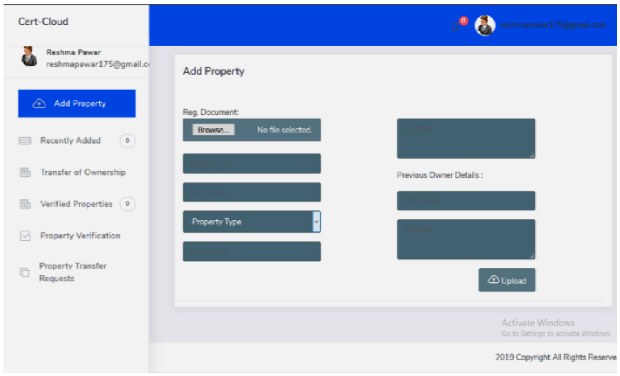


Fig 5: Add property

The property which is available for the sell is sent for the verification process to higher authority by the seller. Figure shows the verified property details like ID, property number, urvey, area , address and registrar

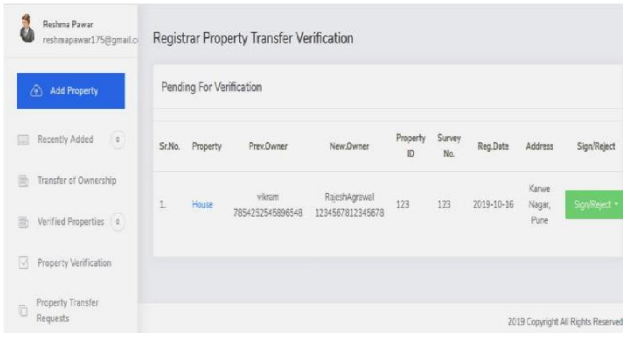


Fig 6: Property Verification

After verification of the property, seller can transfer the ownership to the buyer. The transfer of ownership contains the property details that to be transferred and details of the new owner along with the seller details like selling cost , stamp duty, property area and market value

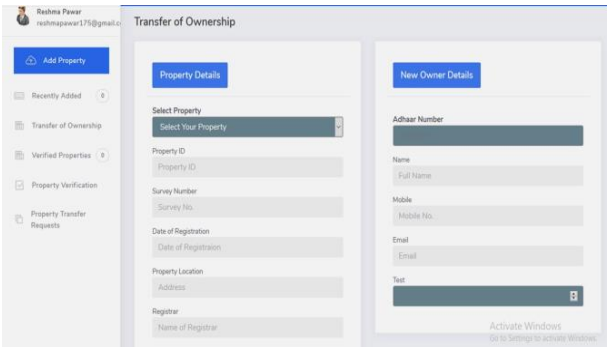


Fig 7: Transfer Ownership

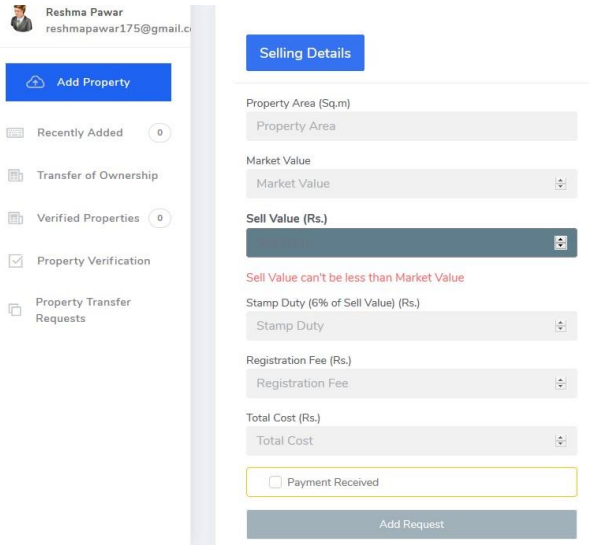


Fig 8: Selling Details

Conclusions

Here an attempt is made to provide a transparent and robust security system for property registration and ownershiptransfer process. When property transfers are secured by theblockchain, we no longer need to rely on a trusted party toverify them.The time between writing purchasing contract as well as registration of pending property title with Lantmäteriet can be reduced from 4 months to a few days. Eventually, this could take place more or less in real time. The Buyer is granted the pending property title, and the property cannot be sold a second time by the seller. Using the technology of blockchain we can register property securely with transparency also it reduced time of registration and cost. Today's system use paper documentation to maintain records where as we used Digitally approved set of documents as a form of deal documentation so its automatically save on blockchain and provide access after getting permission. As the data is sent over blockchain, it made even more secureby the fact that there is no reliance on a central point ofstorage, reducing the risk of it being lost or destroyed.The blockchain is the secure technology in future for the dealing with the money, property and Transfering valuable assests.

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References

[1]. Miroslav Stefanovic, Sonja Ristic, Darko Stefanovic, Marko Bojkicand Dorde Przulj ,—Possible Applications of Smart Contracts in LandAdministration||, 2018 IEEE.
[2]. Wei-Tek Tsai, Libo Feng, Hui Zhang ,Yue You, Li Wang, Yao Zhong,||Intellectual-Property Blockchainbased Protection Model for Microfilms||, 2017 IEEE Symposium on Service-Oriented System Engineering.
[3]. Zhixong Chen ,Yixuan Zhu||Personal Archive Service System usingBlockchain Technology: Case Study, Promising and Challenging||,2017IEEE International Conference on AI & Mobile Services (AIMS).
[4]. Tesnim Abdellatif,Kei-L´eo Brousmiche,||Formal Verification of SmartContracts Based on Users and Blockchain Behaviors Models||, Conference:2018 9th IFIP International Conference on New Technologies, Mobility and Security (NTMS).
[5]. Ibrar Ahmed1, Shilpi2,MohammadAmjad,||Blockchain Technology ALiterature Survey||,IRJET Volume: 0 Issue: 10— Oct2018.
[6]. Suhan Jiang, Yubin Duan, Jie Wu, ||A Client-biased Cooperative SearchScheme inBlockchain-based Data Markets||, 2019 IEEE.
[7]. Jacques Vos, ||BLOCKCHAIN-BASED LAND
[8]. REGISTRY: PANACEA,ILLUSION OR SOMETHING IN BETWEEN? ||,7th Annual Publication,October 30 2016).
[9]. Pauliina KRIGSHOLM, Kaisa RIDANP¨AA¨ and Kirsikka RIEKKINEN,Finland,||Blockchain as aTechnological Solution in Land Administration–What are Current Barriers to Implementation||,Geospatial information for a smarter life and environmental resilienceHanoi, Vietnam, April22–26, 2019.
[10]. Alex Norta ; Benjamin Leiding ; Alexi Lane, ||Lowering Financial InclusionBarriers with a Blockchain-Based Capital Transfer System||,IEEEINFOCOM 2019 - IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPS).
[11]. Singh, Gurpreet,"A study of encryption algorithms (RSA, DES, 3DES and AES) for information security.",International Journal of Computer Applications 67.19
[12]. ElliAndroulaki,ManishSethi,ChristopherFerris, BinhNguyen, EuroSys, .—HyperledgerFabric: A Distributed Operating System for PermissionedBlockchains||,April 23–26, 2018, Porto, Portugal.
[13]. Zibin Zheng and Shaoan Xie,Hong-Ning Dai,Xiangping Chen,Huaimin Wang, Int. J. Web and Grid Services,—Blockchainchallengesandopportunities:asurvey||,Vol. 14, No. 4, 2018.
[14]. https://www.leewayhertz.com/blockchain-land-registryplatform/