

Property Registration and Ownership Transfer using Blockchain



Reshma Ravindra Pawar, Geetha.R.Chillarge

Abstract: The high-value property like Land, Home, related to real estate it is essential to have exact records that recognize the present proprietor and give evidence that he is surely the proprietor. Such a record can be utilized to protect the owner's privileges, prevent sale fraud and to make sure that the ownership is correctly transferred to a new owner after sale.

Thus it is essential to maintain correct and complete information and prevent illegal or unjustified, fraudulent changes. Many efforts have been taken already for providing data security to sensitive information. Blockchain is the technology that gives high security to the data. Blockchain technology can store an immutable history of transactional records, so no one can ever doubt the authenticity; records are permanently linked to the system so no one can ever interfere with a record of their own.

This paper gives a comprehensive system on blockchain technology as it can not only be used in financial assets but anything which has some value.

Keywords : High Value Property, Property Registration, Blockchain Technology, Ownership Transfer, Digital Signature, Authentication.

I. INTRODUCTION

A huge impact in the developing world is that to uplift the poor and Backward society and that uplifting will be possible by stopping frauds, changes in system which fails to stop corruption and so much more. The corruption and fraud is in every field we can see. The civilian sector is also not Exception. The civil sector includes the construction, selling, Buying, deals etc. who has the High value that should be record properly in the system. The educated people or the people who has knowledge about proprietorship, they can take care of property and maintain their records But what about Illiterate people? The illiterate people don't have much more knowledge about their property status and about frauds. Property frauds like double spending will be avoid using Blockchain Technology. Also, Today's property registration System using paper base process for documentation and after that the records maintain on local server. The registration offices make records in the form of paper. If the Earthquake or any disaster devastate whole system or country then the recovery of the system is very difficult in fact it's not possible,

same case happened in Haiti, after the devastating earthquake back in 2010 there were thousands of plots of land where the rightful owner could not be identified and in many instances ownership were in dispute. So, whenever like this situation come the best solution for the permanent records maintain is the Blockchain which has the capability to maintain or preserve the transactions or records. Blockchain works in Distributed manner so; single point of failure will be avoided. Such as history of transactional records are immutable, so no one can ever doubt the authenticity. The records are linked each other via a hash so no one can ever tamper data. Blockchain Technology eliminates the all drawbacks from Today's property registration system and enhance the security level with is features.

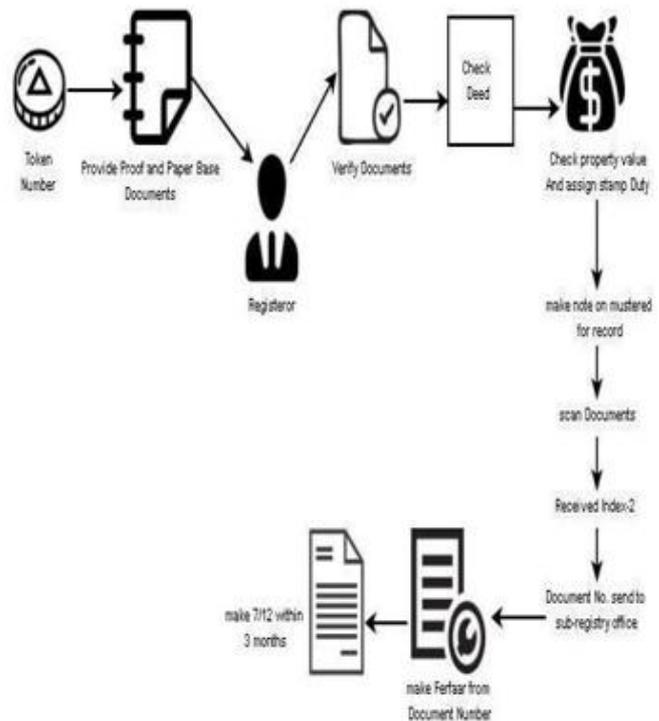


Figure 1: Today's Registration system

II. LITERATURE REVIEW

MiroslavStefanovic et al.[1] discussed about blockchain Technology and the implementation scope in blockchain also mention about it's features where as it's one of the important feature is smart contract which is used in real estate registration in land administration systems (LASs). Suhan Jiang et al. [6] presented the Data Market cooperate search scheme using Blockchain where the smart contract and gas system is very important and ideal aspect in Ethereum. Here this aspect used to separate a query Cost.

Revised Manuscript Received on April 30, 2020.

* Correspondence Author

Reshma Ravindra Pawar*, Computer Engineering Department, Marathwada Mitra Mandal's college of Engineering, Pune, India. Email:reshmapawar175@gmail.com

Geetha.R.Chillarge, Computer Engineering department, Marathwada Mitra Mandal's college of Engineering, Pune, India. Email:geethasb@mmcoe.edu.in

© The Authors. Published by Blue Eyes Intelligence Engineering and Sciences Publication (BEIESP). This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

There are 2 parts: One for data Owners and other for miners on the use side, the proposed system makes use of grouping strategies to increase efficiency and save cost.

Using grouping strategy the mechanism split the total cost among the users so, this strategy shares incentive to avoid free loader or piker.

Wei-Tec Tsai, et al. [3] proposed a microfilm in China using Blockchain Technology. The information which is stored in blockchain that no one can tamper or change without being notified and it provides flawless setting for protection of IP. A detail literature review of the blockchain structure and its features of blockchain technology are given in [4] [7]. The smart application of blockchain technology is given in [8].

Jacques Vos et al. [10] proposed the Blockchain Technology in various fields also the impact on various fields of blockchain and discuss the functioning of blockchain technology.

PasuPoonpakdee et al. [11] proposed an alternative method for improve the efficiency of distributed consensus in the Blockchain. The epidemic algorithm method adopt to perform information distribution in the ledger of chain or network with unicast communication patterns ,the Blockchain is using Broadcast communication patterns where the broadcast pattern consumes high energy with low speed but using epidemic algorithm the information distribution works in optimal speed. However, there are many factors e.g.: message overhead, network topology etc.that has to be concerned.

EpidemicProtocols[11]

The epidemic protocol is a random sampling communication and computation that uses to solve the problems or fixed the errors, especially in an extreme-scale network system.

In general, epidemic protocols has fixed cycle length each node will send value randomly in each cycle. A peer sampling services provided by epidemic protocol. Epidemic protocol provides advantages over centralized paradigms due to fault tolerance, scalability, Decentralization and lightweight properties.

Alex Nort et al. [12] present the Everex Capital transfer system using Blockchain that aims to make easy working System in financial or under banked adults. For that eFiat novel concept comes in Frame, where it uses Crypto currency, each unit has its value and name. Fiat currency based on value and name where user converts their localFiat currencies into eFiat using a currency exchange and transfers the coins to their Everex wallet. This system provides financial services using eFiat without any issues of existing. Donghui Ding et al. [13] propose a security protection scheme for blockchains where it uses the account and multiassets model. The transaction structure designed for anonymous asset metadata which detect the double spending detection and its transfer. The zk- SNARKs algorithm is used to verify the zero-knowledge proof.

III. PROPOSED METHODOLOGY

A. Blockchain Technology

Blockchain is a developed technology that has drawn considerable interest by providing benefits such as decentralization [2] [3] [6], persistence, anonymity, and auditability [2]. It holds immense promise for a variety of applications, including financial services, real estate, supply

chain management, health care, academia cryptocurrency [2], and more.

Blockchain is a Technology where it is used for High or Tight security. The features of blockchain are very impressible and recommendable. Basically, the block chain contains the blocks of data or information that are interconnected to each other in a linear chain. Every block has its own Hash value or Hash Key that each block contains a hash of previous block. [2][4][5][6][7], if any action performs in chain or tries to modify or delete any block the Hashing provide immutable and secure Environment for trasaction safty.

Blockchain can be consider as a public ledger, in which all transactions are genuine, means the transactions that are approved by all nodes by using consensus algorithm called as “Proof of Work”. The consensus works on the miner’s votes for add or reject transaction in Block of linear chain. If the miner’s votes are more than 51% or equal to 51%. Then only the transaction adds into the ledger otherwise it will be rejected. By using this technique, the only genuine and real transaction will be approved. Fraud or fake transaction will be avoided by miners. Blockchain enabled by integrating several core technologies such as cryptographic Hash, Digital Signature based on (asymmetric cryptograph) and Distributed consensus Algorithm [4] [7] [8]. Figure 2 shows the basic structure of blockchain technology.

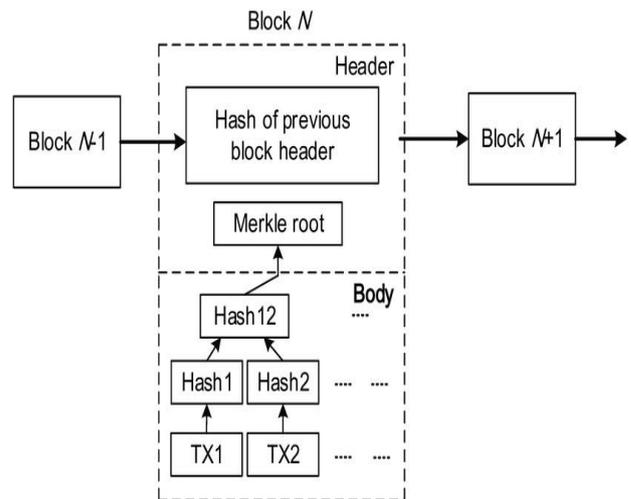


Figure 2: Structure of a Blockchain

Cryptographic hash [2][3][5]: It is the function which maps a given input of variable size to a string (hash) of fixed length and is implicitly a one-way function which is easy to compute the output.

Transaction Data [5]: All the transactions in a given time frame are collected and are added into a block. The data being added records the transactions and the chain of blocks via hash linking creates a trail of transactions and thus making an analogy between a blockchain and ledger.

B. Potential Benefits of Blockchain Implementation

Cost-effectiveness: Initial implementation costs of blockchain registration system would be high, but these system decrease the cost of manpower of the concerned department also, reduced the maintenance cost which is required to preserve whole documents records and blockchain provides combining many processes and system so it increases efficiency through distributed or decentralized processing.

Efficiency: The blockchain is a distributed or decentralized technology. It works in distributed manner where all transaction ledgers will be replicate on every node of system. So, single point of failure will be not possible. Even if anyone node collapse or fail to provide services. Then other node can provide the same services trousers.

Transparency: Registration of property is very valuable assets so; it would be transparent deal between Buyer, Seller and government. Using Block chain, the information will be available to public via a taking permission of owner. So, no one can even view your private record of deal without permission.

Security: Blockchain mainly identify for the tight security purpose. It uses Hashing for the high security of blocks where each block contain a hash of previous block so, block Tampering or deletion is not possible because of blockchain security structure.

C. System Architecture

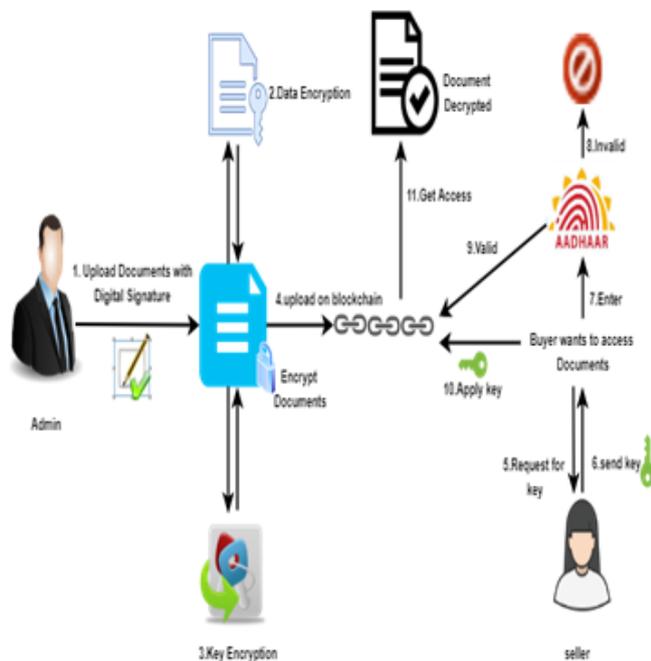


Figure 3: System Architecture

The proposed system provides high security and transparency to the property registration process using blockchain technology. The blockchain has decentralized or distributed nature means that it doesn't rely on single or central point of failure. Also, the History of transactional ledger replicates on the each node of system. So eliminates the risk of it being lost or destroyed.

Proposed system works digitally where it presence whole transaction records on blockchain.

This project proposes to:

1. Have all property documents accessible everywhere just by typing the owner's adhaar card no through a decentralized platform and proven block chain security.
2. Have transparent system for document registration and transfer of ownership.
3. Have a less turnaround time for registration document preparation and signing.
4. Digitally sign all documents to maintain the trustworthiness of the property registration process.

D. 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 of data. 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.

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 have the high power for the processing. Using consensus algorithm the miners take decision on transaction called —Proof of Workl. 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.

AES Algorithm

AES is widely used for large size data encryption. AES is one of the symmetric key block cipher algorithm used worldwide for data encryption. It's particular structure of encrypting and decrypting data make it more secures that it cannot be Hacked. AES can deal with different key sizes such as AES 128, 192 and 256 bit and each of these ciphers has 128 bit block size.

RSA Algorithm

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

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 traces the key then there is no chance to find Original key or message.

IV. RESULT AND DISCUSSION

Blockchain technology provides High security while Property Registration and ownership transfer with the help of Hash Cryptography and key cryptography of AES and RSA. Here the AES and RSA are supportive algorithms which are used to provide data and key security tightly. The expected result should be Verify documents successfully, Add property, Verify property, after successfully verification of property transfer the ownership with providing selling details. After successfully complete stages, finally the property register on new owner's name within 30 days.

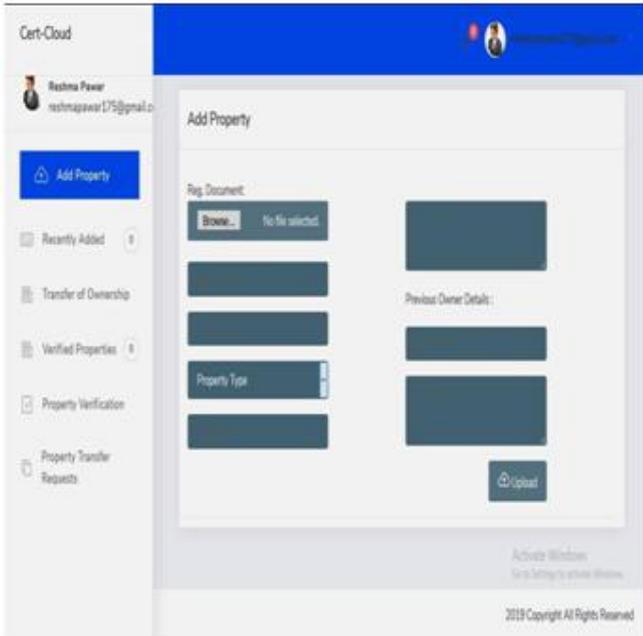


Figure 4: Add property

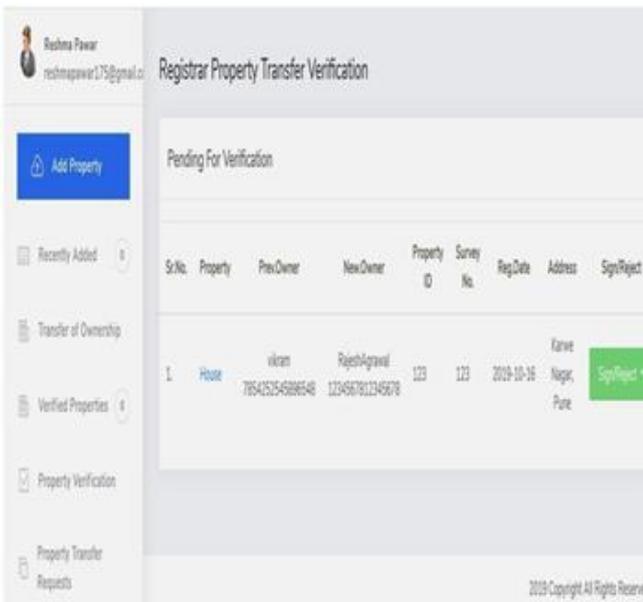


Figure 5: Property Verification

V. CONCLUSION

Blockchain has shown its potential for transforming the traditional industry with its key characteristics like decentralization, persistency, anonymity, and audit ability. Here we present a comprehensive system on the blockchain technology used by researchers in the field of property registration. When property transfers are secured by the blockchain, we no longer need to rely on a trusted party to verify them. Another thing is where we use paper documentation to maintain records their as we used digital contract as a form of documentation so its keeps record of document digitally. It's easy to maintain record and secure to handle .All of the parties can save the digital files and verification records of the entire chain of events digitally. Even it reduced the time of registration and avoids Frauds of double spending.

ACKNOWLEDGEMENT

I would like to thank HOD Prof. Harmeet Khanuja, Department of Computer Engineering and guide Geetha.R.Chillarge and ME coordinator for their support and guidance throughout this work. I express my gratitude towards them for giving me this opportunity. I would also acknowledge the authors of the base paper as well as references for their work and inspiration.

REFERENCES

1. Miroslav Stefanović, Sonja Ristić, Darko Stefanović,Marko BojkićandĐorđePržulj,“ Possible Applications of Smart Contracts in Land Administration”,©2018 IEEE.
2. ZibinZheng and ShaoanXie ,Hong-NingDai ,Xiangping Chen, Huaimin Wang ,“Blockchain challenges and opportunities: a survey”, Int. J. Web and Grid Services, Vol. 14, No. 4, 2018.
3. Wei-Tek Tsai, LiboFeng, Hui Zhang ,Yue You, Li Wang, Yao Zhong ,“Intellectual-Property Blockchain-based Protection Model for Microfilms ”, 2017 IEEE.Symposium on Service-Oriented System Engineering.
4. Ibrar Ahmed1, Shilpi2, MohammadAmjad,“Blockchain Technology A LiteratureSurvey”,IRJET Volume: 05 Issue: 10|Oct2018.
5. MerlindaAndoni, ValentinRobu David Flynn, Simone Abram, Dale Geach, David Jenkins, Peter McCallum, Andrew Peacock, “Blockchain technology in the energy sector: A systematic review ofchallenges and opportunities”,Elsevier2018.
6. Suhan Jiang, YubinDuan, Jie Wu, "A Client-biased Cooperative Search Scheme inBlockchain-based Data Markets", 2019IEEE.
7. PauliinaKRIGSHOLM, KaisaRIDANPÄÄandKirsikka RIEKKINEN, Finland,“Blockchain as aTechnological Solution in Land Administration –What are Current Barriersto Implementation”, Geospatial information for a smarter life and environmental resilienceHanoi, Vietnam, April 22–26,2019.
8. Saranya A1, Mythili R,“A Survey on Blockchain Based Smart Applications”, International Journal of Science and Research (IJSR),2019.
9. <https://chromaway.com/papers/A-blockchain-based-property-registry.pdf>
10. Jacques Vos, "BLOCKCHAIN-BASED LAND REGISTRY: PANACEA, ILLUSION OR SOMETHING IN BETWEEN? ",7th Annual Publication,October 302016).
11. PasuPoonpakdee; JarotwanKoiwanit ChumpolYuangyai ; WatcharaChatwiriya"Applying Epidemic Algorithm for Financial Service Based on Blockchain Technology", 2018 International Conference on Engineering, Applied Sciences, and Technology(ICEAST).
12. Alex Norta ; Benjamin Leiding ; Alexi Lane, "Lowering Financial Inclusion Barriers with a Blockchain-Based Capital Transfer System",IEEE INFOCOM 2019 - IEEE Conference on Computer Communications Workshops (INFOCOM WKSHPs).
13. Donghui Ding ; Kang Li ; LinpengJia ; Zhongcheng Li ; Jun Li ; Yi Sun, "Privacy protection for blockchains with account and multi-asset model", China Communications (Volume: 16 , Issue: 6 , June 2019).

AUTHORS PROFILE



Reshma R. Pawar, M.E. (Computer) Marathwada Mitra Mandal's College of Engineering, Karvenagar, Pune, Maharashtra 411052. Area of Interest : Blockchain, Security.



Prof. Geetha R.Chillarge (Guide) Assistant Professor (Computer) Marathwada Mitra Mandal's College of Engineering, Karvenagar, Pune, Maharashtra 411052. She has pursued Masters in Computer Network Engineering and currently pursuing Ph.D in the area of Security in ad hoc networks. She has more than 15 international publications in various International journals and conferences. Her areas of interest are Computer networks and Security, IOT and Cloud.