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**ABSTRACT**

India has the second largest agricultural land in the world. Land is to be considered the most important aspect of production, especially agricultural production. There are lots of free lands possible for agriculture that are wasted in our state. People don't have time to look after their lands and farmers have less knowledge on availability of lands. All they can do is to seek help from a middle man. This paper suggests a system that helps farmers to easily lend lands from landlords in a less time. The system will act as a bridge between landlords and farmers. We are suggesting the emerging blockchain technology, which provides transparency and security for transactions.

Keywords : Blockchain, Ethereum, Metamask, Solidity.

1. INTRODUCTION

India is very rich in agricultural lands. But we have to think twice whether we are using them wisely or not. Nowadays, people have lack of knowledge in agriculture and farming and also they think that working on the fields as a job for low class people. Main factors we have to check while lending a land is availability, area of land, temperature, irrigation facility, soil type etc. It is more helpful if they get information on previous cultivation.

Currently, land lending process is done by interaction between landlord and farmer. Initially farmer need to find a land suitable for their crop. In most of the cases, there will be a third party for the enquiry of land details. After collecting the land details with help of an intermediate, farmers will make a contact with landlords. After the interaction, they can fix a rate for lending. Then they will make an agreement for a fixed period of time. If more than one farmer approaches for same land, then the final decision goes to landlords.

In this existing system the landlords and farmers want to make a payment for third party. The rate of land can be changed according to choice of landlord. This is a time consuming process. Sometimes farmers will be cheated by

fraud records. In order to overcome all the above situations, we are using blockchain technology for lending purposes.

2. BLOCKCHAIN

Blockchain offers the option of creating a fraud proof structure for transacting exchanges. A typical blockchain consist of transaction and blocks. Transactions are the actions take place between two people and details are stored in blocks. Every block has a timestamp. Every block contains a cryptographic hash that links them to the previous block which looks like a chain. Chains are impossible to predict so it is easy to detect tampering. There are many advantages of blockchain which should be noted. Blockchain offers the potential to process transactions faster. The blockchain is completely open to public, which is completely private where some of the clients only can access or allows to get access to the blocks. Bitcoin is an example of open source public blockchain that allows anyone to join. The secure, decentralized and autonomous capabilities of blockchain make it an ideal component for all the private transactions. In a blockchain, no one can change any stored data. If we want to make a change, then change all the subsequent blocks after it. Use of blockchain in various sectors is increasing in day to day life. Nowadays, blockchain is very popular in automotive industry. Blockchain can enable secure and automatic digital payments for tolls, parking, electric vehicles charging, car sharing and in vehicle services. It is attracting attention of many shareholders. The transfer of assets, digital application and distributed information records created using smart contract are some of the common application of blockchain. In the current business scenario, blockchain is an inevitable factor. Blockchain is transforming our society It has an ability to interrupt different industries such as finance, banking, supply chain as well as health care .Blockchain have a wide application in smart appliances .For example, a code connected to our appliance can be linked to the internet and alert us when cookies are ready or laundry has stopped. This alert can keep our appliances in good condition, can increase energy efficiency and save money.

3. RELATED WORKS

Technology helps farmers to decide which crop is apt to cultivate in their place by considering pH of soil, soil type, weather required, water consumption etc.. Here farming efficiency and crop productivity can be increased. The farmers get more knowledge on crop they cultivate and get proper information in a timely manner [1]. The blockchain in automotive industry is very popular now a days. The automotive industry demands more personalized, integrated, and on-demand services including shared, connected, and autonomous environment, for example smart parking system, e-healthcare etc. The automotive industry is closely linked to new technologies. One of the biggest issues in the automotive supply chain industry is counterfeiting products. This leads to dissatisfied customers and affects trust in the brand. Recently, Blockchain technology becomes a revolution and attracts the attention of many shareholders. The most common applications of blockchain technologies are their use in the transfer of assets and digital applications and distributed information records created using smart contracts, considered an ideal way to program logical business and operations.

Blockchain technology is a fundamental technology that has opened up a world of innovative opportunities for the automotive industry. It has an impact on all sectors of the industry and it is not surprising that the automotive industry has also been influenced by this revolution [2].

When coming to electronic voting system, each vote is stored as a transaction on the blockchain and each voter gets a transaction ID for verifying purposes. The blockchain consist of information about who was voted for and the location of vote. Each vote is attached to blockchain by corresponding smart contract. When a voter do his vote, the weight of their wallet decreases to 1 and this make him not enabling to do any fraud activity [3]. Consider an identity management system, blockchain plays an important role in identity authentication and reputation management. Because of blockchain, data will be safe and credible. We use smart contract to write system rules to make sure the reliability of user information. We bind users information with a public key address and determine true identity of virtual user on the blockchain [4]. Now a days, most interesting field is the social networks. The role of blockchain in social networks is inevitable. When we considering such medias that matters is its authenticity and integrity. Protection of our data is very important .If we consider Facebook, the studies says almost 300 petabytes of personal information has been collected since its inception. One of its technical features is that it enables reliable transactions without a centralized management mechanism even if there are unreliable participants in the network, and this feature is obtained by the invention of blockchain technology. With its decentralized and distributed ledgers, blockchain can be used to secure user's social data. Blockchain based social medias offer a cryptocurrency, we can buy content and pay for other services. Blockchain consist of data layer, network layer, consensus layer, incentive layer,

contract layer and application layer. When considering data layer, hash functions, different algorithms, data structures are used in order to encapsulate the transactions and code into a new block and this block will be connected to main blockchain. In network layer each nodes can participate in different process like data verification processes, transaction recording processes etc...The consensus layer makes blockchain more efficient even in a distributed layer .Incentive layer combines economic factors into the blockchain frame. Contract layer have scripts, algorithms and smart contracts from codes and algorithms. A time stamp based chain structure, distributed nodes, economy incentive based PoW, exible smart contract are the most creative factors of blockchain [5]

Let's see some application of blockchain in land ownership. When dealing with some high value transactions it is necessary to keep accurate records on them. All the identity and records should be genuine. Well prepared such records keep fraudulent activities less. Satoshi Nakamoto by creating blockchain reduced involvement of a third party during some transactions. When coming to the land ownership recording system, when a property is sold or transferred, the output which belongs to new owner and previous owner is created in same transaction. When somebody needs to identify the owner, he can check through the history of transaction and can find out the unspent transaction output .The owner of that transaction is the current owner. When considering the Bitcoin blockchain, it has less implementation cost. By piggybacking on Bitcoin, we can use its security properties in most efficient ways. Considering a trade of system, we either need a trusted third party or need to depend on cryptography. Both have advantages and disadvantages. If we use blockchain, the transfer history will be securely preserved and owner has to depend on registry for authentication. Registry has a Bitcoin address and we can use it to publish transactions. We have an input coin, data in OP-RETURN output and genesis output which provide a colored coin to owner. Transactions contain input linked to an output of it. We have so many advantages of using a blockchain in various transactions. If we have secured our transactions using blockchain, we don't need any third party to act between this. If we have published a complete list of items in blockchain, everybody involved in that can view the entire blockchain in same manner. Therefore, attacks will be less possible. It is not at all possible to make any changes to history of records [6]. Data in Land Administration System should be very accurate and genuine in all legal affairs. Blockchain technology improves data efficiency in LAS. LAS are mainly for managing data about ownership of property and to provide data for interested parties based on their request .It contains whole details on the property they are dealing with. Mainly two types of data are dealt by LAS, ie. one is legal data which is stored in land register and other is spatial data , stored in cadaster. Land register and cadaster can be integrated but this integration can cause inconsistency between these subsystems. If data in LAS is incorrect then LAN is also in incorrect state. Incorrectness can be accepted if the owner

have any health issues . In such a situation during the period of establishing inheritance LAS is in incorrect state. During the digitalization process of data LAS is in incorrect state. Fraud and corruption in the system is also a reason behind in correctness in the system. By the usage of blockchain, third parties are avoided, reversal of payments in cryptocurrency and everything happens in blockchain is public. Smart contracts in LAS enables processes of property transfer of ownership. There is a problem of \double spending \ in real estate.LAS have smart contract for registering transactions. Contract is drafted in digital format. Seller and buyer can sign contract using their digital signature and their identities are confirmed by notary. If the conditions are met transfer is immediately recorded in blockchain and LAS. Blockchain can keep the time stamping of real estate transaction, after the date property can be sent to interested on owner [7]. Electric vehicles are emerging by replacing traditional vehicles. These vehicles are operated by electric charging and charging can be done using any type of chargers even mobile charger. A mobile charger billing system can be formed by applying blockchain technology. If the user charge his car from any other place than his home, the owner of building has to pay the bill. If it happens in a public area ,it is nearly impossible to identify the one who charged. There are number of such issues which have to be noted.Main problem to solve is to impose the billing to actual users. Blockchain has many limitations. One of the biggest limitations is the size of the data. Blockchain will continue to accumulate previous data records, so the size of the data over time will increase. To reduce the size of the data, a simple way is to delete the old block data which are no longer needed and not required to be maintained. But it can cause loss of data. If any malicious user wants to change the existing charging record, he or she must change not only that block but also all blocks after that block. That is very difficult [8].

4. PROPOSED WORK

In this session we introduce our proposed land lending system that aims at solving the existing barriers in lending process. Blockchain can easily solve these issues. Especially ethereum based blockchain, which is capable of managing and executing smart contracts. Smart contracts can be a setup between landlords and farmers. By this we can standardize and control lending rate in a particular area. The rates and terms will be managed by blockchain and executed by smart contract. There will not be any tempering and manipulation of the data. Farmers do not want to worry about the payments. Blockchain allows payment via digital currencies; thereby they can reduce the transaction charges. This system will help the farmers to find and lend a land for cultivation, by significantly reducing time they spent in search of land. In addition to that this system will provide a facility of listing the land details in a block by landlords. Both landlord and farmer can enter details in blocks. Landlords can mention the details of land such as crop suitable for cultivation, lending rate, duration of lending. Like this, farmers can also enter the details such as period of cultivation, crop of their interest,

affordable rate etc .

Initially, landlords can _x a rate for their land. Also they can change this value for a period of time. Farmers can visit the blocks and check whether land is suitable for their crop. Farmers can also suggest a rate which is affordable by them. If both parties are comfortable, the land is lend. If there is more than one farmer the decision is made by bidding process.

This system consist of frontend and backend. Frontend is the web application which is displayed for the user. All the transactions are occurring at the backend which consist of ethereum blockchain. In ethereum network, ether is used for exchange. In the Ethereum blockchain we are writing code using solidity language, which is a combination of javascript and C++.It is a contract oriented high level language for implementing smart contract. It is designed to target the EVM. The self executable smart contract is as same as writing code in which we can define rules, data models, objects. We cannot discard smart contract after initialization.

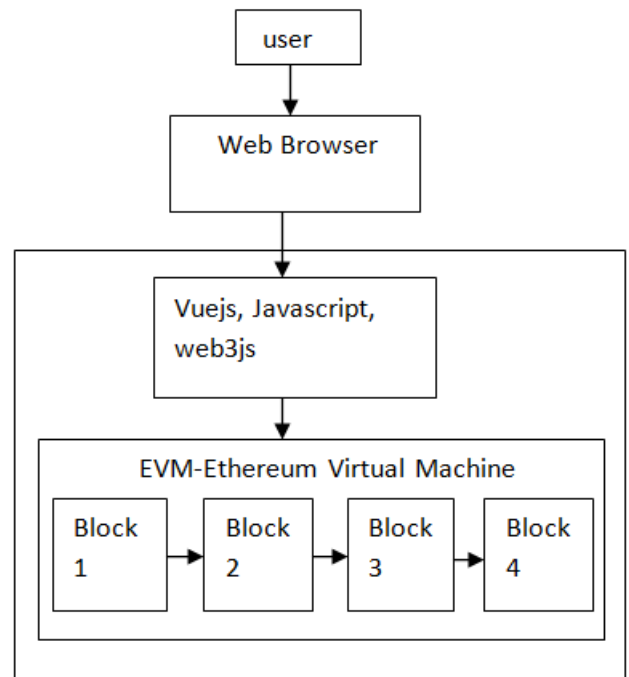


Figure 1: Basic Architecture

For every action new hash functions are created. Each hash function indicates creation of a new block. For example, 0xa93a250cf6c82767172bdf05f27328ca72056e331b7c0bef56b942495f07263e is created while deploying a smart contract. Like this during every buying and selling these type of hash functions are created. Buyers and sellers can only see the details in the blocks. This system will be more useful for farmers. This will provide a platform for easy lending. By using blockchain we provide transparency, authentication and provability in lending platform.

5. CONCLUSION

In this paper we have proposed a decentralized land lending system based on blockchain. The main contribution of this system is to make land lending more easily. This will restrict the frequent changing in land rates by landlords. This system opens up a new model of lending which provides high level of transparency, security and eliminate the chances of fraudulent activities. The lending system mainly focuses on helping farmers in collecting details of the land without the help of a third party. Thereby they can save money.

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