Government Scheme and Funds Tracker using Blockchain

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Abstract -- **India, a fastest growing economy in the world has a great potential in attracting the global customers and adapting to new technologies and changes. Digitalization has a great capabilities which in turn improve and enhance the connectivity in nearly every sector of its economy.But at times the distribution of these approaches is uneven among few sectors of government.Adapting to the latest growing technology will in turn help in bringing the great value and a drastic change in the mode of operations/work for the large group of people out there.**
Blockchain is one such technology.Due to its feature like decentralized approach,secure,immutable,tamper proof nature it is being adopted by each and every sector globally.Funds in India,on the contrary, is a heated topic and various schemes issued in public interest are allotted tons of money as funds.Due to the lack of transparency,Blockchain can be used to bridge that gap and to provide the fully secure,immutable environment for funds tracking.

Keyword - Blockchain,HyperLedger,IPFS,Blockchain applications

I. INTRODUCTION

Blockchain the word heard most in today's competitive and fast growing world.But sadly very few are completely aware about the technology.Some of us refer the crypto-currencies like Bitcoin,Ethereum to be the blockchain,some finds that these works on the principle of blockchain and what not. To make things clear in your mind we first put some light on the topic.

The idea of Blockchain was put forward by 'Satoshi Nakamoto' in his white paper. He is also the presumed pseudonymous person behind the development of bitcoin as well.Blockchain is a mechanism of recording information in a way that makes it difficult or impossible to change,tamper or modify the records.

It is also referred to as the Digital ledger, same as the ledger maintained by financial institutions for keeping the track of records.In similar fashion blockchain is essentially digital ledger which is maintained in a decentralized and distributed environment.

Each block in a blockchain is linked to one another forming a chain of networks,that's why the name "Blockchain".Each block has certain information like number of transactions and every time a transaction happens the record gets updated in participants peer network.This way of storing data in

decentralized manner is often referred to as **(DLT)** which stands for **"Distributed Ledger Technology"**.This mechanism ensures that integrity of the data is maintained throughout the network.

Today in this era of technology and digitization the world is getting digital in every aspect.Technology has completely changed the way the people see a world or country and has led humanity to evolve like never before.In this paper we will be discussing the concept of blockchain and its implementation for the government funds tracking.

India is among the largest democracies globally with 1.3+ Billion population, a major section of population is economically backward.The Government of India and the State Government's issues different policies and schemes on a large scale for the economically lower-class population to benefit from it. At times the Centre and the State Governments issue some policies and schemes which most citizens are unaware of and the benefit of it is not availed by the citizens. There are cases where there are clashes in the State policies and Centre Government policies to overcome this gap and to find and track the best scheme for the citizens to avail benefit of these Government Schemes, Fund Tracker (State and Central) is to be made using blockchain technique.

II. LITERATURE SURVEY

There are no practical implementations on this technology for the development of rural area people, there are many different implementations on smaller parts which can be accustomed into one to create a "Government fund tracking system for Schemes".

TABLE 1. Advantages, Disadvantages and Research Gap

Paper Title	Literature Survey		
	Advantages	Disadvantages	Research Gap
1."An investigation into fraudulent tools in the Bitcoin	How to implement the blockchain technology to detect the	They are more concerned with the money laundering	No implementation and mentioning about the government

ecosystem" by **M. Möser, R. Böhme and D. Breuker**	eCrimes and how proper investigation takes place.	tools or to be precise the trail of Black money	schemes and funds allocation is done in the paper
2. An Overview of **Blockchain Technology: Architecture, Consensus, and Future Trends** help us to understand its future applications in IOT and financial systems by*Zibin Zheng and Shaoan Xie.*	The main advantage of this paper is that it suggests how Blockchain technology can be implemented in IoT and financial systems.	The major drawback of paper is that it take into account only the financial sector	Discusses only the future scope of the technology and not any sort of practical implementation has been done by the author.To we will try to eradicate this issue in our research.
3.**"BLOCKBENCH: A Framework for Analyzing Private Blockchains"** *by Tien Tuan Anh Dinh, Ji Wang, Gang Chen, Rui Liu, Beng Chin Ooi, and Kian-Lee Tan*	This paper discusses how Blockchain technology can be used in a private blockchain and how transactions can be filtered through corruption that protects users' privacy.	This implementation can be implemented in public and consortium blockchain as well but no mention about the same has been done in the paper.	didn't address the problems and how to implement this in Government Infrastructure and how rural development can be addressed with solution
4.**"An Online Identity and Smart Contract Management System"**	Proposed the smart contract based framework and how it can be used to achieve social dependency networks.	This paper only discusses a problem such as combining online information with dignity information.	It is all theoretical explanation about the same and no practical model or implementation has been done.
5. **"Ensuring data integrity using blockchain technology"** *by I. Zikratov, A. Kuzmin, V. Akimenko, V. Niculichev and L. Yalansky.*	A detailed research paper primarily focuses on how integrity is maintained in the Blockchain.	This is a simple learning-based paper that explains blockchain functionality in terms of how to save, retrieve and share files on low-level networks.	This paper presents some useful insights but lacks practical implementation and or just a prototype implementation.
6. **"Democratic Centralism: A Hybrid Blockchain Architecture and Its Applications in Energy Internet,"** *by L. Wu, K. Meng, S. Xu, S. Li, M. Ding and Y. Suo*	This paper discusses and analyzes the construction of private and public blockchain security based on traditional analysis blockchain structures	This only deals with the security architecture and not with the implementation of the blockchain.	Not able to address or suggest how to implement that in the real time world.Though the insights are useful but not satisfying.
7.**"The Security and Performance of Proof of Work Blockchains"** *by Arthur Gervais, Ghassan O. Karame, Karl Wüst, Vasileios Glykantzis,Hubert Ritzdorf, and Srdjan Capkun*	Provides some useful information about the security and performance of various parameters such as block size, distribution time etc.	These only provide the strategic insights based on the analysis done through the framework.	Does Not have any implementation tool in the government infrastructure.
8.**Blockchain Technology Innovations paper**	This paper presents some useful insights about how the fund management can be done using the Blockchain and also addresses the Cyber Security threats on the same.	It is just a paper which is based on the survey so it lacks some practical implementation.	Lack the practical or prototype information about the model and also its general survey paper.
9.**A global consortium to focus on the application of distributed-ledger technology (DLT)** by *C. Khan, A. Lewis, E. Rutland, C. Wan, K. Rutter and C. Thompson*	This paper helps us to get an idea of how the Distributed Ledger can help banks fight low interest rates and reduce pressure on their operating costs.	The only drawback that we found this paper lacks is the practical feasibility of the application in the real time world.	No mention about the Govt funds management and rural development information using the same technique

III. PROPOSED SYSTEM

A. SYSTEM REQUIREMENTS

These are a few tools and frameworks that you need to install.

```
Ganache      v2.5.4
NodeJS       v10.19.0
Geth         Version: 1.10.1-stable
Meta Mask    v9.5.4
Truffle      v4.0.7 (core: 4.0.7)
```

B. FRONT-END PART

We have developed a portal which provides the user to bid for the schemes that have been listed by the government for selling.For the front-end we have used web technologies like HTML5,CSS3 and JavaScript for adding the dynamicity to the portal and handling the logic part.

This portal acts as the interface where the sellers(govt. Officials) and buyers (the ones bidding for particular schemes) interact and take the advantage of a full transparent and tamper proof system at their disposal.

C. BACKEND PART

The backend of our project is fully developed using frameworks based on Blockchain technology like Ganache,Truffle suite.

Ganache is actually a personal Ethereum blockchain which you can use to run tests,execute commands,and inspect state while controlling how the chain operates.It provides you 10 ethereum accounts with 100ETH each for testing the network.Also each and every transactions taking place in the network is stored in blocks with some details like TimeStamp,hash of the block,and other necessary details required to make the ledger complete.

Truffle is actually a development environment,testing framework all in one.It is based on Ethereum and allows the smooth and seamless development of DApps i.e. Distributed Applications.With truffle you can compile the smart contracts and deploy them into web applications and using it you can develop the frontend for your applications.

The smart contracts are developed using the Solidity language that we have used to set the terms of agreement between the buyer and sellers of the schemes.

For the payment gateway we have used the MetaMask which acts as a wallet for your web applications.All the transactions taking place are confirmed using the metamask.

D. PROCESS

Including many projects, maintenance or repairing work and recording employment of the area and many more are included in the role activity of the state as well as central government. A major hurdle that the top government faces is the low level corruption that is sometimes impossible to track which deprives the state of progress. Hence we are going to propose a theory based on the blockchain, which includes the tracking of every other transaction done within the city on the basis of small scale industries or large scale companies. This allows to maintain a crystal clear record with on-demand right to transactional data on a need to know basis.
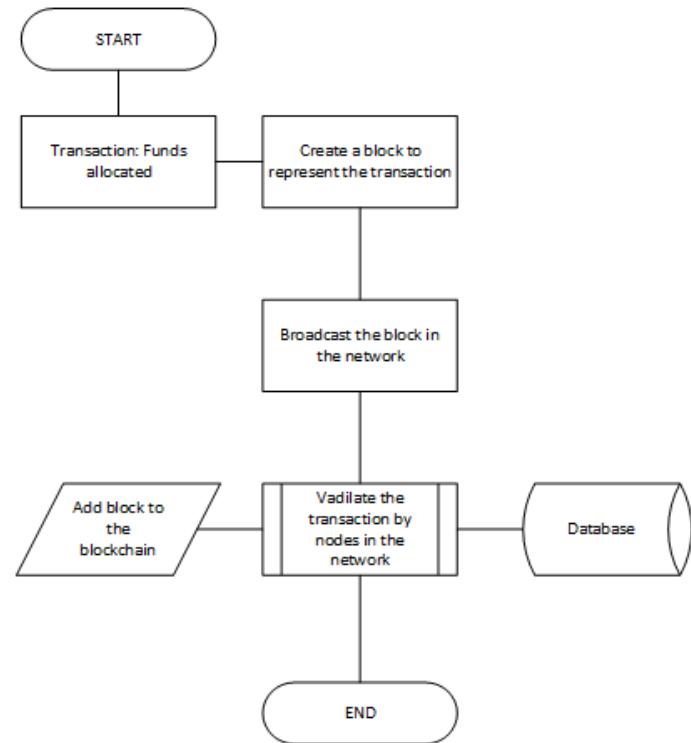

Fig:1 Blockchain process

The system makes use of encryption to secure transactional data using hashes to maintain a block of transactions in a chain manner which is maintained and verified by every node involved to verify the transaction and save the data in a transparent way. The system allows for a full-proof, secure, and authentic fund allocation and fund tracking system to help form an incorruptible government process.

The whole process starts with the transaction done by the payer and ends with the transparent database which is publicly provided. Hence the details of the transaction such as payer, cashier, amount of the pay, why the transaction is done, all is noted and saved in the database. Furthermore a block having the transaction details, is added into the network. After the validation process, the block having transactional details with a checksum is then added into the blockchain network. The transaction then can be rendered into the network. All the transactions and the transactional details, thus published and will be added into the distributed ledger and will be available for the public in order to track the transactions.

Property: Wallet
Identified by: fundID
Project Partaker:
projectParticipant
Number: quantity

Participant :
Project Partaker
Identified by: participant ID
Account: Deposit
String: name

Activity: TransferFund
Account: Deposit
Project Partaker:
projectParticipant
Number: quantity
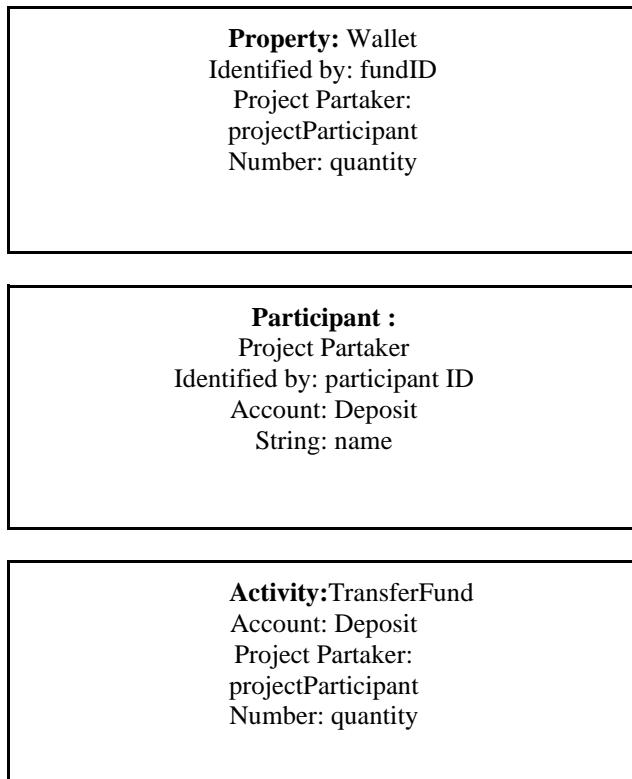
Fig 2: Prototype Model

In this case, the property is a fund, the partakers are the people who take part in the project, here ProjectParticipant and the transaction pays for the various items required for the project, here FundTransaction.

IV. RESULTS
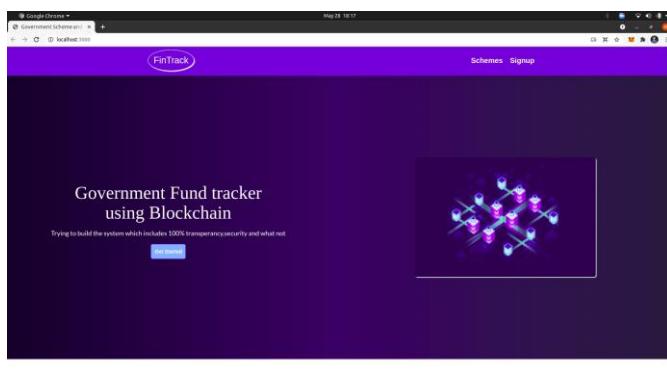
Fig:3 Home Page of the Portal
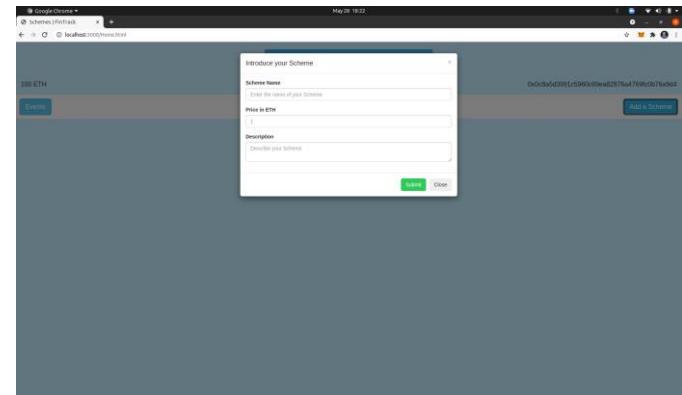
Fig : 4 Prompt for providing the details of scheme
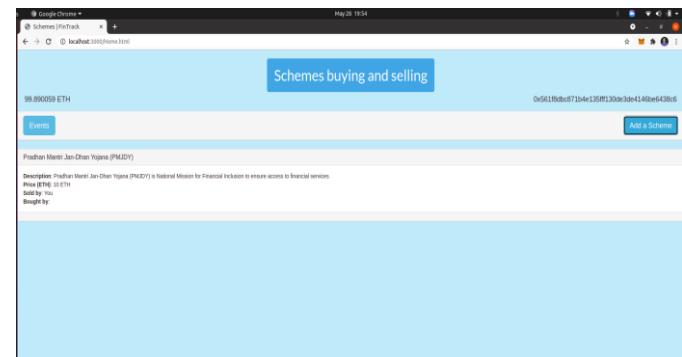
Fig : 5 Scheme Listing Page
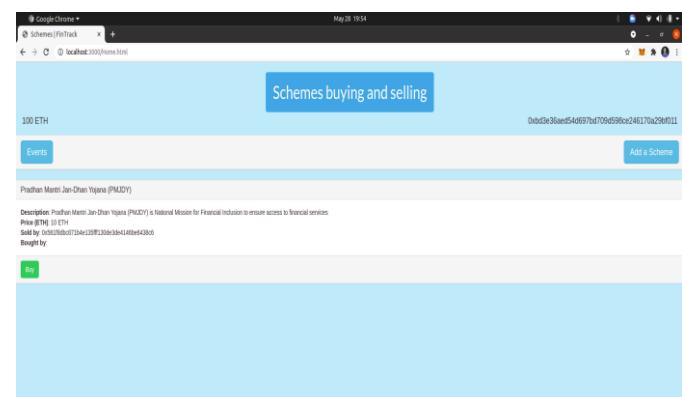
Fig : 6 Scheme Buying Page for Customers
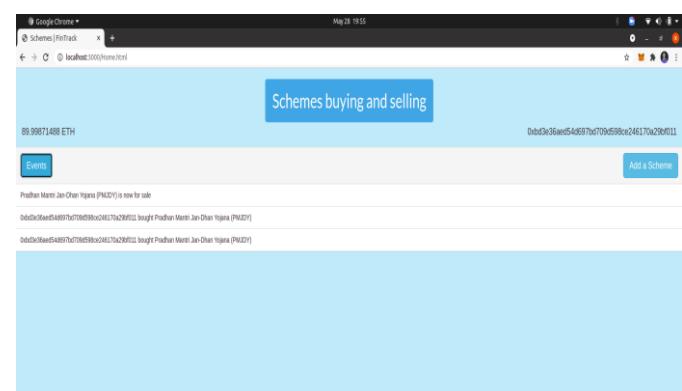
Fig : 7 Records of buying/selling of schemes on client side
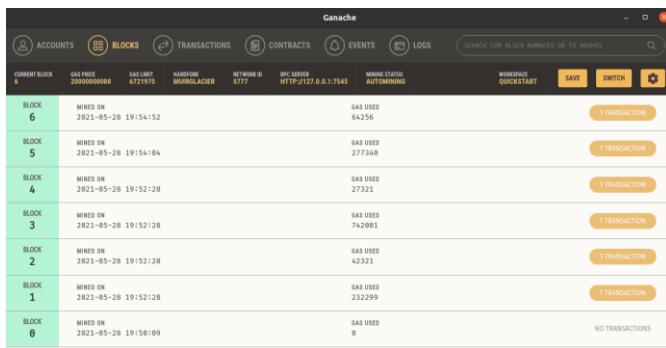
Fig : 8 Networks of blocks forming immutable ledger

V. CONCLUSIONS

The features of Blockchain like immutability, tamper-proof , secured and decentralized approach helps in eliminating the security vulnerability of the application. Hyperledger fabric is like other blockchain technologies which has a ledge,uses smart contracts and is a system by which participants manage their transactions.It provides proper governance and access control and can be scaled up whenever needed.

Consideration of access and privacy while developing. With the further enhancements in the system this system can provide transparency in all the government related transactions.

Depending on the lower part of the community, passing the proposed system will help them to gain a proper understanding of how the schemes will benefit them along with due to the transparency of the system they will also be able to view each and every single transaction taking place.The authorities will establish the credibility of each and every single penny.In this way every single penny of the people of india stays in good hand and the citizen have right to view and question the authorities for the same.

Blockchain technology has an enormous strength in order to store the data in the P2P network. Blockchain Technology expels the potential threats to any kind of modification and alteration to the system.

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