Evichain: Evaluating and Scrutinizing Crime using Block Chain

Smiley Gandhi, Mohammad Shabaz

Abstract: Evidence and witness play an important role to investigate crime and lawful jurisdiction in any case. But often, the victims do not get justice due to the middlemen and the altered evidences in the centralized network. Block chain is an ideal solution to ensure transparency till the highest hierarchy of jurisdiction using a decentralized peer to peer network to store data which is immutable. It is like a distributed ledger working on the proof of work algorithm that validates each amendment and modification made in a particular chain. Evichain inculcates the transparency and security of the same decentralized network in the crime investigation process. It is an application on which the entire data regarding any particular investigation is stored in a block chain with limited people having access rights. It also includes cases filed by the victims themselves. Every amendment made in the block chain is validated. Also the data access is restricted to the users with that specific private key.

Index Terms: Block Chain, Crypto-Currency, Crime, Investigation, Transparency, Victim, Suspect.

I. INTRODUCTION

It is a mobile responsive block chain based webapp that records the entire progress of any legal dispute right from the beginning to the final verdict which cannot be altered without the consent of the users.

1. The victim can file his/her complaint along with their location and other details using a private key which user is given once he/she registers in block chain.

2. After verification, the investigating officers, who will be registered, will be assigned for that particular case. The investigating officer has the power to add the evidences, charge sheet and other details. If victim has not filed the case, the officer will have the option to file it herself/himself as per the incoming records.

3. The entire proceedings will be recorded in the form of blocks with accessibility restrictions on the data for different users.

4. This entire report with timestamp will be accessible to the judiciary.

5. While the judges can write in the block chain, prosecutor and defense can only read proofs and evidences.

6. After the hearings, final verdict is added in the block.

7. In case of further appeal, the chain continues according to previous steps.

Major Functionalities

1. Using decentralized database of authentication ids over the IPFS network for authentication of the victim, investigating officer and judges.

2. Access to the mobile camera and location to record the real time investigating location.

3. All types of data will be stored over the IPFS network using GNU privacy guard (asymmetric encryption) for the security.

4. Allows officers and forensic experts to request access and analyze other case files over block chain with similar people involved.

Fig 1 shows the Data Flow of Evichain from victim filing case to the judge who gave the final judgment and Fig 2 shows the smart contract among different attributes.
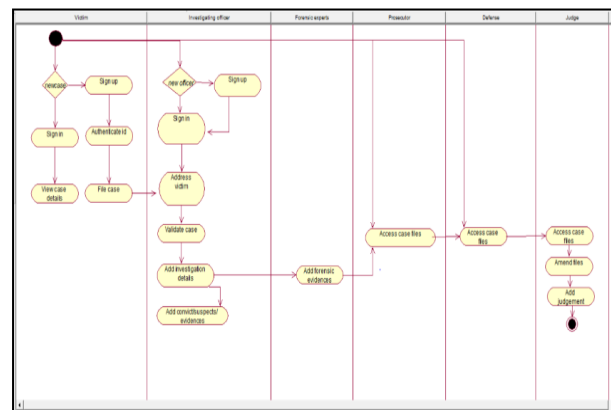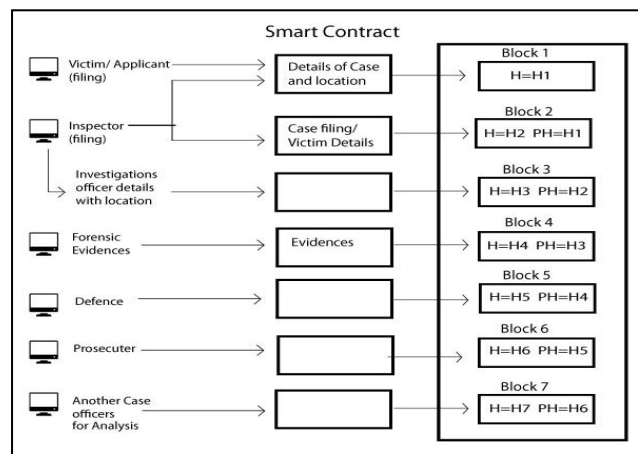

FIG 1. SHOWS THE DATA FLOW OF EVICHAIN

FIG 2 SMART CONTRACT AMONG VARIOUS ATTRIBUTES

Retrieval Number: C5254098319/2019©BEIESP
DOI:10.35940/ijrte.C5254.098319
Journal Website: www.ijrte.org

3992

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

II. LITERATURE REVIEW AND RELATED WORK

Mahdi H. Miraz, and Maaruf Ali [1]: The authors describe crypto currency and the applications of block chain in various fields such as IOT.

In this article, there is enhancement in the solution of security related issues occurs in block chain [2]. This article also conveys the application of block chain in building developing nations [3]. The main limitation of this article is that the authors do not work on those applications of block chain which are still not reached its maturity with a prediction of last five years to be implemented globally. Michael Crosby, Nachiappan, et. al. [4]: In this paper the author describes about the transaction in the public ledger which is verified by concord of a majority of the participants in that particular system. The main proposal of this article is the establishment of block chain in distributed consensus of the present digital world. Manjot Kaur and Vinayak Khajuria [5]: In this paper author finds the hidden nodes in the network. Each node contains sensory information about the environment. Sensor node is deployed randomly in the network and is detected using anchor nodes. This article helps to detect the intrusion and hence improves the security. Mohammad Shabaz and Ashok Kumar [6]: The authors in this paper establish a novel approach to perform sentimental analysis and convey the decision taken after analyzing the unstructured data. The whole methodology is based on the sequence of blocks and every block is linked to its next adjacent block.

The above Literature Review helps us to understand the applications of block chain in various fields and hence concluded to the proposal of Evichain for crime investigation.

III. PROPOSED METHODOLOGY AND IMPLEMENTATION

The tech stack for this block chain based Evichain involves the following frameworks-
1. React.js- Front end framework used to create the GUI of Evichain.
2. Ethereum- It is a decentralized software platform that allows the user to build and run Smart Contracts and Distributed Applications without control from a third party.
3. Truffle- Truffle is a IDE and testing framework for Ethereum. It allows built-in compilation, deployment, and linking of smart contracts and integrated web3.js to interact with the block chain through the RPC.
4. Ganache- Ganache is a local Block chain for ethereum development that can be owned to deploy contracts, develop distributed applications and test run those D-apps on the desktop.
5. IPFS- Interplanetary file system network is used to store all the data to reduce the transaction cost over the ethereum network. This data is secured using GNU Privacy guard (for asymmetric encryption).
6. Metamask- Metamask allows us to run ethereum D-apps in the browser without running on the ethereum node. It includes a series identity vault, providing a UI to manage your identities on different sites and sign block chain transactions. 7. Microsoft Azure- Provides the necessary infrastructure to support development and deployment of the ethereum block chain based applications.

IV. RESULTS

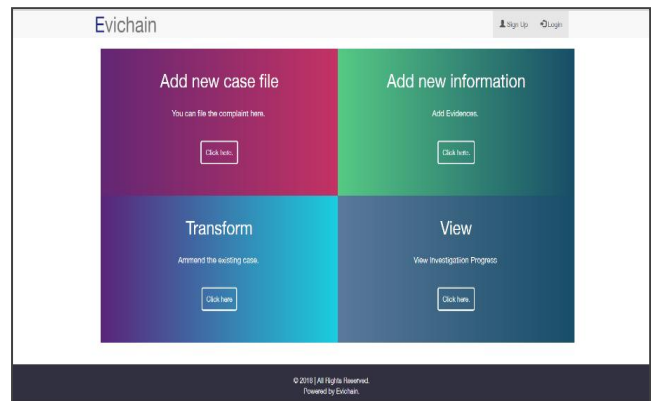1. Users will be provided with the following four options as shown in fig 3.

Fig 3 shows front end of Evichain which include four options.

2. After selecting any option, the dialog box prompts the user to login and sign up. Both victims and new officers can sign up using the existing authentication id and make their case using adding new case file as shown in Fig 4.
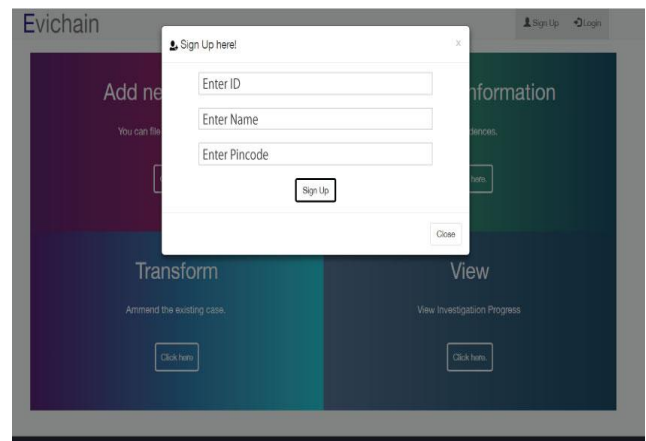

Fig 4 Shows Signup Dialog box

3. Also the investigating officers can add the details in the form of media and text files as evidences.
4. Investigating officer and judiciary can access the details of a particular case by using the unique case id and their public key as shown in Fig 5.
5. The verdict can be added by the judiciary to finalize the case.
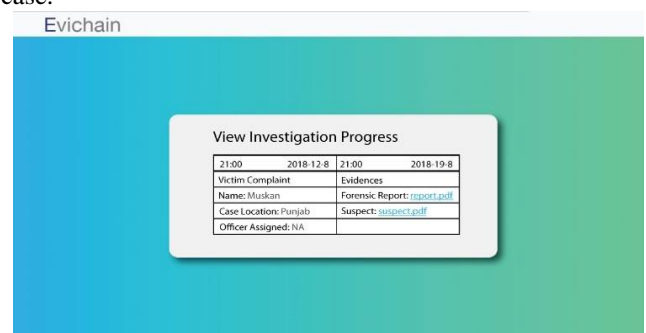

Fig 5 Accessing Case Details by investigating officer

3993

V. CONCLUSION

Evichain aims at providing a transparent and secure way of collecting evidence and ensuring justice. Moreover, it improves the traceability in case of complex cases and reduces the chances of any kind of corruption. This system can be made more efficient by incorporating legal registries like shelter homes and validation proofs of various government run agencies to save poor from corruption by middlemen [7]. Also, this entire process can be speed up using the pattern recognition by analyzing block chain of other investigation cases.

ACKNOWLEDGMENT

REFERENCES

1. Mahdi H. Miraz, and Maaruf Ali, "Applications of Block Chain Technology beyond Crypto currency", *Annals of Emerging Technologies in Computing (AETiC)*, Vol. 2, No. 1, 2018.
2. Mahdi H. Miraz, Maaruf Ali, Peter Excell, and Picking Rich, "A Review on Internet of Things (IoT), Internet of Everything (IoE) and Internet of Nano Things (IoNT),"*In the Proceedings of the Fifth International IEEE Conference on Internet Technologies and Applications(ITA 15),* Wrexham, UK, pp. 219 – 224, 2015.
3. Mahdi H. Miraz, Maaruf Ali, Peter S. Excell, and Richard Picking, "Internet of Nanothings, Things and Everything: Future Growth Trends," (to be published) Future Internet, 2018.
4. Michael Crosby, Nachiappan, et. al., "Block Chain Technology Beyond Bitcoin", *Sutardja Center for Entrepreneurship & Technology Technical Report*, October 16, 2015.
5. Manjot Kaur and Vinayak Khajuria, "Advancement in range based scheme for node localization of underwater acoustics networks", *International Journal of Engineering and Technology (UAE)*, vol. 2.27, pp. 122-127, 2018.
6. Mohammad Shabaz and Ashok Kumar, "AS: a novel Sentiment analysis approach", *International Journal of Engineering and Technology (UAE)*, vol. 2.27, pp. 46-49, 2018.
7. Don Tapscott and Alex Tapscott, "Blockchain Revolution: How the Technology Behind Bitcoin Is Changing Money, Business, and the World", USA: Penguin Publishing Group, 1st Edition, New York, 2016.

AUTHORS PROFILE

Smiley Gandhi has done B.Tech, M..Tech in Computer Science Engineering. She is currently working as Assiatant Professor in Computer Science Engineering at NIET, Greater Noida. Her research area extends upto Digital Image Processing, Big Data Analytics. Under her supervision, many M.Tech Scholars has completed their M.Tech Research. Her Publication includes many UGC, Scopus.

Mohammad Shabaz has done B.Tech, M.Tech and Currently Pursuing Ph.D in Computer Science Engineering from Chandigarh University, Mohali. He is Former Head of Department in Computer Science Engineering at Universal Institute of Engineering and Technology (UIET), Lalru. His research area extends upto Sentimental Analysis, Algorithm designing, Big Data Analytics. Under his supervision, many M.tech Scholars has completed their M.Tech Research. His Publication includes many UGC, Scopus and ESCI. He is also active reviewer of many Scopus Indexed Journal.

Retrieval Number: C5254098319/2019©BEIESP
DOI:10.35940/ijrte.C5254.098319
Journal Website: www.ijrte.org

Published By:
Blue Eyes Intelligence Engineering
& Sciences Publication

3994