



ANONYMOUS CRIME TIPPING USING BLOCKCHAIN

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Abstract - In the present world, the crime rate is always increasing across the globe along with the advancements in the technology to tackle them. However, even after these technological advancements, most people are hesitant to report about a crime incident that they have witnessed because of the fear of getting into various troubles. Our research aims to make people aware about their social responsibility to tell about any crime incident they have witnessed, without fearing any external threat. We are using Blockchain that can simplify crime documentation as well as be cost effective decentralized storage. Hence, along with the server cost reduction, the actual information is also kept safely. In addition to this, we are also exercising a technique to give trust score to the tips to recognize its genuineness based on the tipper, the location and the crime. The web-application apart from being user-friendly, it is also very essential to Crime investigation officers who work on the very basis of this witness information. This web app can help in gaining essential clues as well as having prior knowledge of some extremely dangerous crimes such as terror attacks and bomb blasts which could pose serious national threats.

Index Terms – anonymous, blockchain, crime, culprits, fake, genuine, india, tips, web-application, whistleblowers, witness.

I. INTRODUCTION

Today, the entire world is filled with different kinds of temptations. There have always been both right as well as wrong simultaneously. The law enforcement authorities utilizes a variety of methods to find any substantiate evidence of the crime in order to punish the criminals. One of these methods that seems to be the most valid one is anonymous reporting. There are various countries such as India, United States of America, China, Singapore and Australia that have developed crime reporting system on the base network to create a more accessible environment for reporting. The major problem that causes the gap between the law enforcement and the substantiate evidence is the possibility of revenge from the criminals. On the very basis of this revenge from the criminals it becomes difficult to encourage people to report about any witnessed crime [3].

Based on the above discussed problem, it becomes important to safeguard the substantiate witness from this revenge of the criminals. This makes anonymity as the most important security demand in any crime reporting mechanism. But we must also consider the fact that anonymous tips might result in huge number of fake tips to waste the time of the authorities and cause trouble to innocent people on purpose. Therefore, we present the idea of a decentralized anonymous crime tipping web-application on the blockchain. The reason blockchain-based network is proposed is that its transparent and open, and can has certain required properties like tamper-free and decentralized. Also, using the blockchain network gives a certain trust in the sense that any intervention can't work [5].

We attempt to bring the concept of utilizing an official ID of the tipper without exposing his/her ID to the authorities only for the sake of elimination of fake tips as well as tips given by bots. The concept of trust



score that we utilize can help in identifying fake tips to more extent. We have tried to cover most of the limitations of the present system and opted for their solutions in the most efficient manner possible [2], [5].

II. PROBLEM

According to the reports, the crime rate in India went from 383.3 per lakh population in 2019 to 487.8 per lakh population in 2020. As per a new study in 2021, in the metro cities of India only up to 8% of the various crime victims registered a First Information Report (FIR) to the police. The remaining 92% victims aren't mentioned on any official records possible. This leads to a major question that why is the majority of the victims or even witnesses not reporting about these crimes?

There are numerous challenges faced by the law enforcement officials in order to investigate and solve the crimes. Out of the variety of different factors that limits the effectiveness and performance of the law enforcement officials, a substantiate witness' ability to give reliable information about actions and identity of criminal is the most important one. Working and solving a crime becomes quiet a tedious task for the law enforcement officials without this basic information about the crime from the witness [1], [2]. Most of the people show hesitancy to give information about any crime they have witnessed due to numerous reasons that includes:

- There is absence of trust with regard to the law enforcement officials. People think twice before giving information about any crime as their own circumstances will be investigated as well.
- People take into account that dealing with law enforcement officials is quite difficult and also the officials will be frequently in contact with the witness and think of it as too much of a hassle.
- There may also be a chance that the criminals may somehow acquire the details of the witness and could threaten the witness' family or cause any harm to them.
- Some of the witnesses may also choose to not disclose a crime incident simply because they face trauma even thinking about it [3], [4].

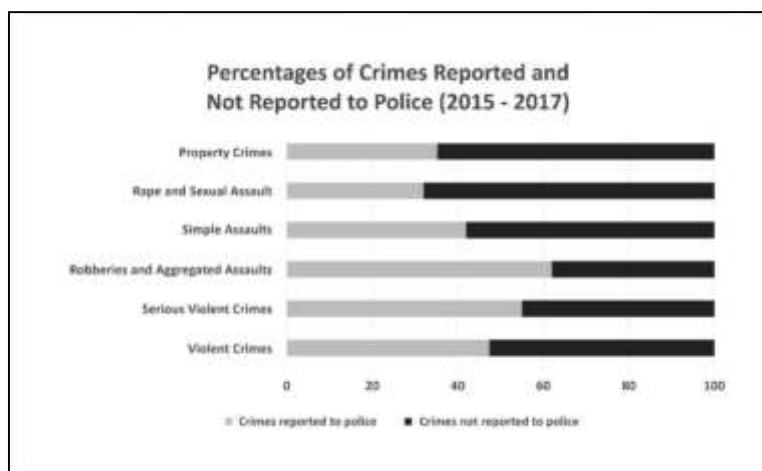


Fig 1. Statistics from 2015 to 2017, showing percentages of crimes reported and not-reported to police
There are also people who don't know if they're supposed to report a crime incident that has either occurred or is about to. There is a lack of knowledge about how, when and who can give information about any crime to the law enforcement officials. In all the cases, we can see that it is more of a social responsibility to report any crime incident rather than just randomly talking to someone about it. There are various ways such as Phone Calls, Letters, Mails, SMS, etc. through which one can report



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any crime incident they have witnessed, but the witness should present clear and actual facts in order to establish the genuineness of the

crime reported. However, despite of the advancements in technology, there still lacks a single-maintained system that connects the people and the law enforcement officials as well as verify the relevance of the crime reported based on concise facts. This seems like a big gap between substantiate witnesses and justice in the world [1].

III. SOLUTION & METHODOLOGY

The solution for this problem that we are developing is a decentralized web-application that enables the user to submit tip-offs about any crime in a completely anonymous manner which will help the law enforcement officials to gain intel on these criminals. We want to provide all the people an equal opportunity to give information about any crime incident they have witnessed without revealing their actual identity. This information is then given a trust score based on the location and type of crime. The information is then forwarded to the law enforcement officials with the trust score who can use this intel and investigate the crime incident, all this while keeping the substantiate witness completely safe and anonymous. This will greatly help in crime solving as well as allow effective documentation of the crime incident [1], [4].

The flow for the proposed system is as follows:

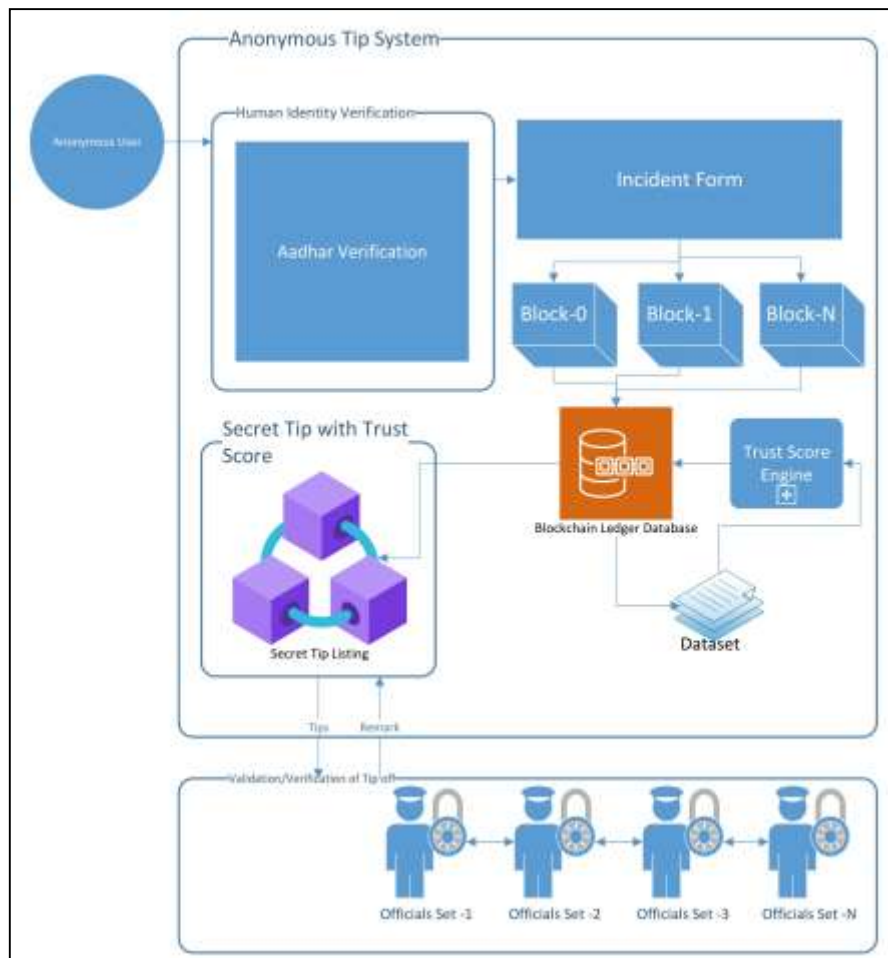


Fig 2. Block Diagram for Proposed System



- The user signs up using the Aadhar verification system, where the Aadhar number is provided by the user and then an OTP is sent to the registered mobile number that the user needs to submit. After this, user logs in using a metamask wallet.
- Once logged-in, the user can submit a tip and provide all the relevant information such as type of crime, location, detailed description of the things witnessed as well as any photograph or video if any regarding the tip.
- Once the tip is submitted, a trust score is generated for the tip based on the user's past tips credibility as well as whether there are other tips for the same location and type of crime in past or present.
- After the trust score has been generated for the tip, the tip details are received by one of the randomly selected official. Then this official can decide based on the trust score whether to investigate or not.
- If the official decides to investigate, then the tip is forwarded to the police station of the location of crime mentioned in the tip. The police can then investigate it and send the investigation report back to the official.
- The official can then check all the details of the tip and investigation and can either approve the investigation report or request for more investigation to be done if any loop holes are found in the investigation.
- Once the investigation report of a tip is finally approved, it is finally stored on the blockchain as a transaction and the user who has submitted the correct tip, has his credibility increased.
- If the tip submitted by the user is investigated and results to be a fake tip, then that user is blocked on the web app for a period of 1 year as a punishment for wasting the resources and time of the police.

Technologies to be used for the development of the proposed system:

- We will be using HTML5, CSS3, JavaScript and React JS to build the front-end of the proposed web-application.
- We will be using Parity to build the Private Ethereum Blockchain Network.
- We will be using MongoDB as our Inter-Planetary File System (IPFS) to store and retrieve information.
- We will be using Solidity to create our Smart Contracts for the proposed system.
- We will be using Self Sovereign Identity (SSI) for the digital identity verification of the law enforcement officials.

IV. CONCLUSION

Our research clearly shows the importance of giving a fair mean to the people for crime tipping while maintaining complete anonymity of the substantiate witness. We often underestimate the importance of a substantiate witness to give crucial information about a crime incident. While a victim of a crime should report it, information provided by a substantiate witness can prove to be a game changer while solving a crime. We have also figured out a way that can help in distinguishing genuine tip-offs from the fake ones considering not all the tips-offs will be legitimate. This could further help the law enforcement officials as the fake tip-offs will be identified early and genuine tip-offs can hold valuable information that can help in solving a crime. We believe that justice is only possible if we give a fair opportunity to all the people that are substantiate witnesses of a crime incident to give valuable information without fearing any threat to them or their families. By utilizing the earlier mentioned technologies, it is possible to develop a decentralized web-application where user can provide tip-offs about crime completely anonymously. This research explains in detail on the techniques and exact high design model that can achieve it. With this



research we hope to cover all the factors that should be considered in crime tipping and we hope to servethe nation with our innovation.

REFERENCES

- [1] Raksha S, Samhitha, Raipalle Shreyaa, & Pranav M S. (2022). Survey on Blockchain-based Anonymous Tip-off System. *International Journal of Innovative Science and Research Technology*, 7(4), 909–913.
- [2] Zou, Shihong & Xi, Jinwen & Wang, Siyuan & Lu, Yueming & Xu, Guosheng. (2019). ReportCoin: A Novel Blockchain-Based Incentive Anonymous Reporting System. *IEEE Access*. PP. 1-1. 10.1109/ACCESS.2019.2915956.
- [3] Wang, Huaqun & He, Debiao & Liu, Zhe & Guo, Rui. (2019). Blockchain-Based Anonymous Reporting Scheme With Anonymous Rewarding. *IEEE Transactions on Engineering Management*. PP. 1-11. 10.1109/TEM.2019.2909529.
- [4] Sharma Ashwani & Sharma Bhuvanesh & Bhardawaj Avdesh. “Design of a Novel Online Crime Reporting System.” in *International Conference on Engineering Technology and Science (ICETS’16)*, 2016.
- [5] https://www.sih.gov.in/sih2022PS?technology_bucket=Mg==&category=U29mdHdhcmU=&organization=QWxs&organization_type=QWxs