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Blockchain-Based Approach for Tracking Global Criminals

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Abstract - Blockchain is the latest technology, which is now widely used in various fields due to its benefits such as higher tamper-proof security. Each transaction is stored in an immutable distributed ledger on each blockchain node. Criminal records are confidential and should be kept safe from hackers and intruders. Law enforcement agencies or investigative agencies can use these security recordings to analyze and detect criminal activity. Due to the lack of a global online system, Investigative agencies are having difficulty locating and researching the past of anonymous foreign criminal who is committing crimes abroad. This problem will only be solved if investigative agencies have a common global criminal database and applications to extract information. Investigation agencies, Copes, and other organizations can access global crime data using this technology on the distributed node of the blockchain in their nation. Authorities can instantly and efficiently access global criminal histories from local blockchain databases and identify the names and details of anonymous individuals in response to any foreigners suspected of engaging in unsocial activities in their country of origin. This will reduce the time and process of gathering information from the country where the suspect is located. The system would eliminate the possibility of falsification and tamper with criminal records.

***Key Words*:** Blockchain, light, Global Criminal, Criminal information

1. Introduction

Criminal activities over the world are growing day by day. The police departments in every country keep a record of criminal and crime activity in their database. There are a lot of criminals who have hidden their identities while eluding capture and traveling the globe and these international criminals pose a serious threat to every nation's citizen. As a result of the lack of integration in global criminal databases, one of the major challenges for the police departments of any nation is keeping track of transnational criminals. Due to a lack of global infrastructure, the investigation agency of any nation is unable to follow the criminal history and offences committed abroad in his previous countries.

Here is a suggested blockchain-based method for managing a global criminal database. By properly integrating APIs, the criminal database from the policing systems of all the countries will be extracted and stored in encrypted form in a distributed, immutable database of the suggested blockchain-based solution. This decentralized tool tracks transnational criminals and assists investigative authorities in locating the name and other information of suspect foreigners who go by an alias. This blockchain-based solution keeps track of all operations and updates in connected blocks to prevent any form of tampering with crucial databases and is not only secure but also safe from hacking and attacks.

2. Literature Survey

2.1 Paper name: Police Complaint Management System Using Blockchain

Author: Nataasha Raul

Description: proposes an online police complaint management system for managing FIR's and NCR's in a decentralized manner by using blockchain technology. The author proposes a decentralized platform for registering complaints with the help of various technologies like blockchain, IPFS, etc. Blockchain technology is communicating on a peer-to-peer network and recording all the legal transactions in links of blocks.

The proposed system has the following components.

A. Security Module: Proposes security of the system by encrypting the data that are to be stored on the blockchain network with the help of a 16-bit AES algorithm.

B. Blockchain Module: Proposes a Public Ethereum network that is based on the proof of work concept. The smart contract program creates an immutable ledger and ensures proper trusted transactions. The public IPFS network is used to save evidence provided by the user. The registered complaint on the blockchain is visible to all the participants of the network.

C. Web/Mobile Interface: Web and Mobile platform is used to file and manage length reports and documents. The complainant can register and access his complaint detail through the mobile application

Managing Police Complaints in an efficient and secure way is very crucial because it contains sensitive data. The proposed system will motivate people to file their complaints online without their presence to Police Station.

2.2 Paper Name: CRAB: Blockchain-Based Criminal Record Management System**:**

Author : Abdullah Al Omar, Shahriar Rahman:

Description: The author proposed a criminal record storage system with the help of blockchain technology to store the data with integrity and security. The proposed system allows to maintain the records of criminals. Authorities (Law enforcement agencies and courts) will be capable to update and access criminal data. General users (selected organizations and/or individuals, airports, visa application centers, etc.) will have access to the data so that they can look up criminal records [1].

This system will implement the data provenance architecture. Blockchain is used to ensure the security, privacy, and integrity of data. CRAB makes the stored information accessible to courts, selective government organizations and individuals, all police stations, visa application centers, airports et

Public records are not secured and are often found tampered. This system removes the impact of the problem by implementing decentralized data storage. Digital signatures validate data contents.

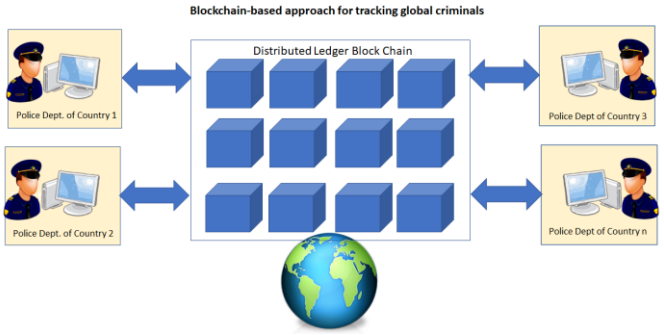
3. Existing System

In the current system, police in every country detain the offender based on the initial crime information provided by the victim to the investigative agency. In current computerization does not offer a way to track the movements, backgrounds, and activities of international criminals in any nation. If a criminal escapes police custody and wanders to a neighboring nation, the police in that nation has no information about the criminal if they are apprehended for a crime. One of the main problems resulting from the lack of secure computer infrastructure is criminal data manipulation. We presented a method that can be utilized by all global police forces for global criminal tracking using an immutable database to address all of these problems.

4. Proposed Methodology

The proposed solution is based on a decentralized Blockchain network to trace global criminals using cutting-edge technology like blockchain and distributed ledgers, etc.

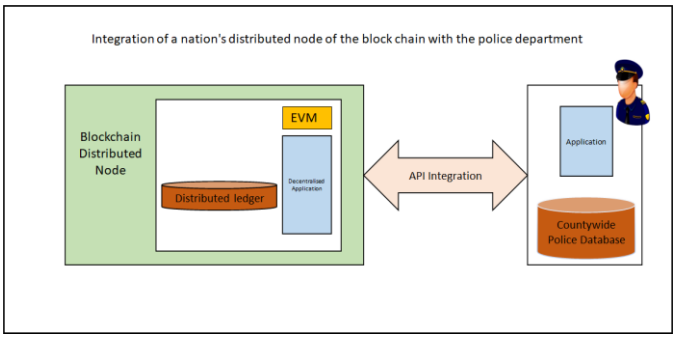
The foundation of blockchain is an immutable distributed ledger where all transactions are recorded in "blocks," and new transactions that maintain a link to the preceding block result in a new block being created in a linear and sequential blockchain. Next, every newly formed block is updated to the pre-existing comparable blockchain of the distributed node network to ensure that every node of the blockchain retains the same sequence of blocks. The figure below shows the worldwide criminal tracking system's detailed architecture. All other nodes of the distributed node validate any transaction carried out by a participant node



The nodes of the Blockchain network have been set up in every country, and they are further connected to the main, centralized database of the Police Departments and investigative agencies of the different countries, which contains information on crimes, criminals, and investigation details. By suitable API (Application Programming Interface) integration between the blockchain network and the national database of the relevant country, the criminal information from the police repository will be retrieved and recorded in the distributed ledger of the local blockchain node. This was taken care of by a decentralized application installed in the Ethereum virtual machine (EVM) of the local blockchain node, which talked with the appropriate nation's police database via an API and put the desired criminal facts in the distributed ledger of the blockchain node. In order to run the application and guarantee security against an uninvited attacker, the EVM offers a distinct runtime environment in the participant node. All other nodes in the Blockchain network's distributed ledger will further replicate the obtained data using encryption. A crucial component of data validations is smart contracts and Hash.

Simply put, smart contracts are blockchain-based algorithms that execute when certain criteria are met. They are often used to automate the implementation of an agreement so that all parties can be certain of the conclusion right away, without the need for an intermediary or additional delay. A blockchain-based smart contract application ensures that only legitimate

transactions are committed to the network and creates an immutable record.
Hashes are used to safeguard data and are intended to guarantee that the information included in the blocks on a blockchain is not changed. Network participants validate the data that has been encrypted using the hashing function.
The investigation agencies of any country can search, match criminal records, and update criminal tracking information of foreign criminals or suspected persons on the blockchain network once the validated data is available in all blockchain nodes of all countries. This can be achieved by using the appropriate application.
After the information is updated across all other nations' blockchain nodes, it can be accessed during an investigation and used to track down criminals from other nations.
The image below illustrates the specific architecture for integrating a blockchain node with a local criminal database.



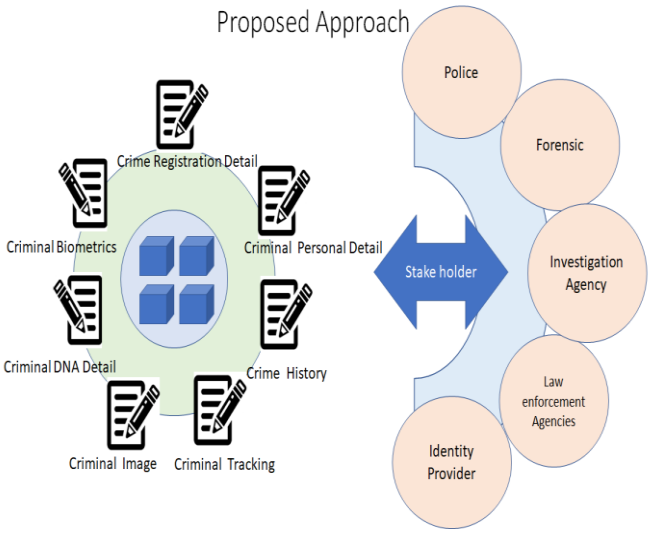
4.1 Global Database of the distributed ledger of Blockchain

Blockchain integration with local databases in every country will allow for the gathering of comprehensive criminal data. Global databases are available over distributed lasers of every node on the blockchain network.
The elements of the global blockchain database are as follows.

1. Crime Registration Detail: Crime registration unique no from all countries
2. Criminal Personal Detail: Criminal identification, Name, Address, Age, identification mark, etc.
3. Crime History: Crime history of criminals in all countries
4. Criminal Tracking: Criminal tracking information is updated by various countries.
5. Criminal Image: Criminal images captured by the different police department
6. Criminal DNA Detail: Criminal DNA detail report from all countries.
7. Criminal Biometrics: Fingerprints etc

4.2 Stakeholder

1. Police/Cope
2. Forensic
3. Low enforcement agency
4. Investigation agency
5. Passport office



5. Benefit

1. Criminal data is decentralized and accessible in all nations.
2. Enhance and expedite investigations into international crimes.
3. The blockchain hash algorithm ensures that data cannot be altered.
4. This is an Immutable database and cannot be altered.
5. International criminal data is accessible with just one click.
6. Mobile devices, desktop computers, and laptops may all access applications.
7. It assists in crime prevention and makes it possible to trace criminals around the globe.

6. Limitation

1. A nation's legal laws and regulations limit the availability of criminal information.
2. Some developing nations still solely use paper for recording crime in their police forces.
3. Regressive nations will not have access to high-speed communication lines.
5. Working on a common platform with people from different countries is one of the challenges

7. Conclusions

Due to a lack of integration in global criminal databases and a lack of infrastructure, it is becoming increasingly difficult for police departments around the world to keep track of international criminal activity. The problem is resolved by the suggested international criminal blockchain-based solution, which offers decentralized criminal information from all nations for global investigations.

This decentralized application of Blockchain solution monitors global criminal activity and assists law enforcement agencies in following their movements and activities. This blockchain-based technology is protected from attacks and hacking in addition to being secure.

References:

1. Abdullah Al Omar, Shahriar Rahman: CRAB: Blockchain Based Criminal Record Management System: Conference Paper · December 2018: https://www.researchgate.net/publication/329489346
2. Nataasha Raul : Police Complaint Management System using Blockchain Technology: Conference Paper · December 2020: https://www.researchgate.net/publication/350080101