

The Police Complaint Management System Utilizes Blockchain Technology

Mrs. M.N. Jyothi¹, Sk.B.Mohiddin², P.Siva³, A.J.Lakshmi⁴, P.V.Navya⁵,
P.Yasah Sri⁶

¹Assistant Professor, CSE Department, Vsm College Of Engineering, Ramachandrapuram, Egdist, Andhrapradesh-533255.

^{2,3,4,5,6}Students, CSE Department, Vsm College Of Engineering, Ramachandrapuram, Egdist, Andhrapradesh-533255.

ABSTRACT:

Criminal activities in India are increasing rapidly, with many going unreported. Despite having an online portal for police to store FIRS (first information reports) and NCRS (non-cognizable reports), most FIRs are still handwritten due to traditional practices. Typically, complaints must be physically present at police stations to file a cognizable offense. The crime and criminal tracking network and systems (CCTNS) was initiated in 2009 for e-governance, but it's a centralized system limited to specific states. There's a need for a decentralized system to avoid a central point of failure and ensure complaints are securely managed and protected from unauthorized access. The proposed blockchain-based solution involves encrypting and storing FIRs in the interplanetary file system (IPFS), with the hash added to the blockchain network. This system provides strong proof for complaints if police fail to file FIRs or deny receiving complaints, as the timestamped complaint is stored on the blockchain. Storing records in an immutable database removes chances of tampering or unnoticed changes to FIRS/NCRS.

INTRODUCTION :

1.1 ABOUT PROJECT:

The police complaint management system utilizing block chain technology offers a secure and transparent platform for handling complaints. By leveraging block chain's decentralized nature, it ensures data integrity, immutability, and tamper-proof records, enhancing trust in the complaint resolution process.

Block chain is a distributed ledger technology that records transactions across multiple computers in a way that is transparent, secure, and immutable. Each block in the chain contains a timestamp and a link to the previous block, creating a chronological and tamper-resistant record of transactions.

Block chain technology can enhance police complaint registration systems by providing transparency, immutability, and security. Each complaint could be recorded as a block, creating an unalterable chain of records. This would ensure the integrity of the complaints, making them resistant to tampering or manipulation. Additionally, block chain could streamline the process by allowing complainants, law enforcement, and other stakeholders to access and track complaints in real-time, potentially reducing bureaucracy and enhancing accountability.

In order to address issues related to police officers' refusal to file complaints, we plan to propose a decentralized online system for managing police complaints and incident reports (FIRs and NCRs) using

blockchain technology. All the legitimate transactions are contained in the links of blocks in block technology, which is based on a peer-to-peer network topology. Ensuring that only legitimate blocks are added to the chain is the primary function of a block chain. To do this, a block must receive a minimum number of votes or consensus. Various consensus mechanisms, such as Proof of Work, Proof of State, and Proof of Capacity, are employed to validate blocks. It is computationally impossible to alter a block of transactions once it has been added to the network.

One such algorithm is the Interplanetary File System (IPFS), which uses a peer-to-peer network to distribute file storage and sharing. Every file is hashed according to its content and stored in a distributed network; this is an example of content-based addressing. Combining IPFS with blockchain technology improves its immutability, reliability, and throughput. In this regard, we often supply a decentralized app that records every step of the police complaint process, from filing the complaint to submitting the charge sheet to the court. The utilization of blockchain technology fosters confidence between the police department and the complainants. Protected from data loss and brute force hacking and other forms of malevolent attacks, the system.

1.2 EXISTING SYSTEM:

In the existing scenario, portals provided by Mumbai Police, Crime and Criminal Tracking Network Systems (CCTNS) etc. are being used to register complaints online. While Mumbai Police registers complaints against only Non-Cognizable Offences, CCTNS is providing a centralized system for each state, whilst being decentralized at the national level, taking into consideration both types of offences. Many governments have leveraged block chain technology to provide cyber security, integrate hyper connected service and provide trust and accountability. This ensures the operational and technical feasibility of our proposed system.

Disadvantages:

- The CCTNS is described as a centralized system for a particular state. Centralized systems can have a single point of failure and may be more vulnerable to security breaches or data loss.
- The existing system might be limited to a specific state, potentially hindering seamless information sharing and collaboration between law enforcement agencies across different regions.
- If the complainant needs to be physically present in the police station to file a cognizable offense, it may limit accessibility for individuals who are unable to visit the station in person.
- The abstract suggests that complaints could be subject to tampering or denial by the police. A lack of transparency and accountability in the existing system may lead to difficulties in proving the authenticity of complaints.
- Centralized systems may face challenges in scaling up to accommodate a growing volume of data and users, potentially leading to performance issues.
- Centralized systems may be more susceptible to security breaches, and the security of sensitive information may be a concern.

1.3 PROPOSED SYSTEM:

Our proposed model represents a significant advancement in the realm of complaint registration and management systems. By incorporating blockchain technology, we introduce a new level of security and reliability to the process. The blockchain ensures that complaint data remains tamper-proof and transparent, enhancing trust between users and the system. Additionally, our user-centric design approach ensures that the interface is intuitive and accessible, catering to the needs of a diverse user base.

Furthermore, our model goes beyond more complaint registration by offering features such as complaint tracking and analytics. Users can easily monitor the progress of their complaints, while administrators gain valuable insights into complaint trends and patterns. This enables proactive decision-making and resource allocation, ultimately leading to more effective law enforcement and public safety measures.

In essence, our proposed model not only streamlines the process of registering complaints but also facilitates collaboration between citizens and law enforcement agencies. It provides a secure, user-friendly platform that empowers individuals to contribute to the safety and well-being of their communities. With its emphasis on simplicity, security, and functionality, our model represents the future of complaint management systems.

Advantages:

- **Enhanced Security:** Block chain technology ensures a high level of security through cryptographic algorithms and decentralization.
- **Transparency and Accountability:** The decentralized and transparent nature of blockchain technology contributes to increased accountability within the system.
- **Immutable Records:** The immutability of blockchain ensures that once a record, such as an FIR, is added to the blockchain, it cannot be altered or deleted.
- **Proof of Complaint for Complainants:** Blockchain's time stamping and immutability features provide complainants with strong evidence of when a complaint was filed.
- **Decentralization and Redundancy:** The shift towards a decentralized system eliminates the risk associated with a single point of failure. By distributing data across a network of nodes, the system becomes more resilient to technical failures or cyber attacks.

LITERATURE REVIEW:

Proposes a secure FIR system using block chain technology. The public's faith in law enforcement would be rendered unnecessary under the proposed system. Anyone from the complainant to the witness to the investigating officer and finally the suspect are all parties with a stake in the system. The digital FIR will be safeguarded from any wrongdoing thanks to the decentralized solution, which will allow the appropriate parties to monitor all actions.

Suggests that Saudi Arabia implement a centralized online system for managing police complaints. If any registered user notices suspicious activity, they can submit a complaint online. The details can be verified by the officers, who will then register the complaint in the system based on the complaint and the evidence provided. In order to keep tabs on the country's most wanted or prominent criminals, they have also preserved data pertaining to criminal activity.

An electronic police system is proposed, wherein users can submit complaints via an Android app hosted on a WAMP server. The complaints can be accessed and updated by police officers through a web portal. The many benefits of an E-police system over the old-fashioned paper-based FIR registration system have also been emphasized. They have successfully implemented the use of IMEI numbers to identify users.

The information gathered by the police inspectors is also saved in their system. The database will contain all information pertaining to any crime. By storing everything in an online database, law enforcement will always have access to criminal and user records, regardless of the circumstances. There is a crime record management system that users can suggest, which is a central database that keeps track of information about different offenders and users. Users can also view details like stolen cars, most

wanted criminals, and more. Different types of police officers have different levels of access to the database. Following a user complaint, the system notifies the police by filing a FIR. Additionally, a database contains the accused's details. It keeps track of both the criminal and witness information in a database. It also stores the witness and the criminal data in a database. The police officer depending on his designation can then file an investigation report.

Proposes a blockchain-based decentralized system to store any kind of criminal records.

There would be no way for criminal records to be altered in violation of the law if they were stored in the blockchain. Encrypted and stored in the blockchain, only authorized parties are able to access the criminal data. The blockchain records every change along with the identity of the user who made the change.

Using a permissioned blockchain, suggests a method for the decentralized storage of citizen criminal records. They have performed analysis on implementing block chain technology to the Argentinian criminal records information system. According to their research, blockchain technology would make the system decentralized and accessible solely to those who are already a part of it. Also, the consensus mechanism of the block chain would take care of the permissions given to the various participants in the network to take part in a particular transaction.

Proposes a web-based system for managing criminal records for Mangalore city. In addition to handling criminal records, the author asserts that the web app will allow the police department to remotely identify and address local issues. Users, including complainants and police, are overseen by the system administrator. To save time and avoid mistakes, the author plans to use a database to keep all criminal records in one place.

By informing the public about potential criminal activity in their neighborhood, the proposed system helps to reduce crime overall. The author suggests a system for detecting crime areas and easily managing criminal records, as well as an android mobile app to raise awareness and report crimes to the appropriate authorities. The app facilitates the sharing of criminal history and records with law enforcement during investigations, allowing for faster tracking of relevant information. There is a high attack surface and single point of failure in most of the current police complaint management systems because they are centrally located. Not all systems keep the complaint alongside the FIRs and NCRs. This is an issue because users will not have evidence of having registered a complaint if a police officer refuses to file a complaint against powerful individuals. Furthermore, certain systems grant the police extensive privileges, making them susceptible to manipulation. The shortcomings of current systems underscore the necessity for an open and mobile G2C e-governance system that eliminates the need for users to blindly trust the police.

SYSTEM ARCHITECTURE:

System architecture refers to the conceptual design of a software system, encompassing its components, structures, and interactions. It involves defining the system's organization, functionality, and behavior to meet specified requirements. Here's a basic breakdown of system architecture.

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There is no need for stakeholders to have faith in the decentralized network. We laid out a plan that would safeguard citizens from corrupt police officers and ensure fairness from the start.

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