BLOCK CHAIN BASED CRIMINAL RECORD DATABASEMANAGEMENT

Mrs. D. KEERTHI REDDY

Assistant Professor

ARUN, V.VINOD KUMAR, S. GOPAL KRISHNA, K. RAKESH

SRI INDU COLLEGE OF ENGINEERING AND TECHNOLOGY

Sheriguda (V), Ibrahimpatnam (M), RangareddyDist – 501510

ABSTRACT

With rapid urbanization and the advancement of cities and towns, the graph of crime rates isincreasing gradually. Blockchain can replace those piled up criminal records with a networkwhere documents are easily accessible and could not be tampered with, making them safe andSecure. Blockchain is a P2P (peer-to-peer network) that helps in the decentralization of data.This system will be based upon the immutability characteristic of blockchain to ensure theintegrity and security of data. This blockchain based process can reduce corruption risk factorsby making it easier for third parties to monitor tamper-evident transactions and enabling greaterobjectivity and consistency, thus enhancing criminal record transparency and accountability.Furthermore, timely access of authentic criminal records to respective administrative authoritieswill make law enforcement effective.

Index : peer to peer network, crime rate increasing, crime record transparency and accoutablilty.

1.INTRODUCTION

Criminal records play a crucial role in the interrogation and detection of crime. For manyyears, our country's judicial system has been dealing with securing those criminal recordsmore profoundly in which accessibility becomes easy and security becomes intact. Even forhigh-level governments, managing and using these data can be a burden. Different state lawenforcement agencies have separate databases, which hinders data exchange between variousgovernment agencies. A stumbling block is encountered when some states do not bothersending the numbers or sending them long after the volume was released. In addition, longdelays in the publication of crime statistics have prevented policymakers from takingappropriate action in the required time. The existence of such multiple databases alsoincreases the cost of its security, so the possibility of illegal modification is graduallygrowing.

Justice is one of the three pillars of any government. In this regard, an information storagesystem will potentially improve the existing system and meet all the requirements for anefficient judicial system. In this article, we analyzed the possibility of implementing ablockchain-based system to manage citizen's criminal records. Blockchain technology cancome into force to solve these problems. A Blockchain is originally a chain of blocks with agrowing list of records, called blocks, linked together by cryptography. Each block consists ofthe cryptographic hash that is the unique identity of that particular block. It also includestimestamps and data to be stored. It is a shared and immutable ledger that facilitates recordingdata and reducing the risk of data tampering

2. LITERATURE SURVEY

TITLE: "Using blockchain to improve data management in the public sector,"

ABSTRACT: Blockchain is a new general-purpose technology that poses significant challengesto policymaking, law, and society. Blockchain is even more distinctive than other transformativetechnologies, as it is by nature a global technology; moreover, it operates based on a set of rulesand principles that have a law-like quality—the lex cryptographia. The global nature ofblockchain has led to its adoption by international organizations such as the United Nations andthe World Bank. However, the law-like nature of the technology makes some of its uses byinternational organizations questionable from an international law and foreign affairs perspective.In this light, the article examines the effectiveness and legitimacy of the use of blockchain forinternationalpolicymaking.

ABSTRACT: Blockchain is a shared, immutable ledger that facilitates the process of recordingtransactions and tracking assets in a business network. An asset can be tangible (a house, car,cash, land) or intangible (intellectual property, patents, copyrights, branding). Virtually anythingof value can be tracked and traded on a blockchain network, reducing risk and cutting costs forall involved.

TITLE: Cyber Attack - What Are Common Cyberthreats?,"

ABSTRACT: A cyberattack is where an attacker tries to gain unauthorized accessto an IT system for the purpose of theft, extortion, disruption, or other nefariousreasons.Of course, a large number of security incidents are caused by insiders –whether through negligence or malice. However, for the sake of simplicity, let's assume that acyber-attack is carried out by someone who is not, or was not, a member of your organization.

TITLE: "Criminal Record Management System In the Perspective of Somalia,"

ABSTRACT: Project Report from the year 2019 in the subject Computer Science - Software,Southern University Bangladesh (Department of CSE), course: Computer Science Engineering,language: English, abstract: The project Criminal Record Management System in the perspectiveof Somalia is a criminal record management system that uses to record crime activities ofcriminals. It can be used to report crime activities. This project is mainly useful for law andenforcement agencies in Somalia. The law and enforcement authority can preserve records of thecriminals and search any criminal using the system. This is an online web application withdatabase system in which police will keep the record of criminals who have been arrested. Wehave used HTML, JavaScript, CSS, PHP, MySql and Bootstrap to develop this project. We alsoused binary search algorithm to find a criminal from database. The project's interface is very userfriendly and helpful for authority.

TITLE: "CRAB: Blockchain Based Criminal Record Management System"

ABSTRACT: Criminal records are highly sensitive public records. By incorporating criminalrecords in a blockchain, authenticity and rigidity of records can be maintained; which also helpsto keep the data safe from adversaries. A peer to peer cloud network enables the decentralizationof data. It helps prevent unlawful changes in the data. This paper introduces a criminal recordstorage system by implementing blockchain technology to store the data, which helps to attainintegrity and security. Our system presents ways in which the authority can maintain the recordsof criminals efficiently. Authorities (e.g., Law enforcement agencies and courts) will be able toadd and access criminal data. General users (e.g., selected organizations and/or individuals,airports, visa application centers etc.) will have access to the data so that they can look upcriminal records. Proper and timely access to authentic criminal records is essential to enforce thelaw. The effect of corruption on the law enforcement forces will also decrease, as this will cut offan entire scope of corruption by removing any possibility of tampering with criminal records databy thorough accountability.

TITLE: Proposed E-Police System for Enhancement of E-Govemment Services ofBangladesh",

ABSTRACT: E-government is the ICT based system of government service delivery forachieving good governance which is necessity for good and corruption free nation. E-policesystem is an e-government related service and it makes the communication process a possibility,a great success for modern era which increases the professional efficiency for the governmentpolice administration, so we can apply this system in Bangladesh. The aim of this paper is toupgrade the country's police administration to the world standard. The home ministry would beconnected with the several police units of the city in a fiber-optic based metropolitan areanetwork and a database will be setup for

warrant notices, examining the finger prints using thelatest electronic device etc. There have to be set up a 'Third Eye' software in the special branchesof the police department so that it helps the police supervisors to monitor crime and criminalrecords. There have to be set up an electronic database and an interactive website which willcontain daily press releases, supplement, list of top terrorists and criminals, lists of people underpolice custody and people injured in road or other accidents etc. In this paper we focus on theinfrastructure of an e-police system as well as its steps, challenges of implementation and itsnecessity. For implementing the software we can use JAVA, PHP (especially AppServer) andMySQL.

TITLE: "E-FIR using E-Governance"

ABSTRACT: This feature is made available for the public for better interaction with thepolice. The E-FIR system is proposed to public for indirect interaction with police and toimprove the E-governance facility. E-FIR system with E-portal. E-portal is specially designedwebsite that brings information together from diverse sources in a uniform way. Usually eachinformation source gets its dedicated area on the page for displaying information. Generally,many crimes seen by the citizens but they are afraid to complaint in police station due to fear ofpolice department, lack of time and insensibility. Due to this fear many crimes not reported to thepolice station. Many cases are registered but due to lack of proofs and evidences and lack ofcollaboration of public they are not properly investigated. The aim of this study is to develop anonline system which is easily accessible to police department, public and administrativedepartment and to achieve e-transparency at various levels like publication, reporting, openness,accountability etc. The main objective of the study is to increase police and citizens interactionwithout going to nearby police station. It will help to reduce crime percentage and will save thetime of people. It will also increase government and citizen interaction and will built an informedsociety.

TITLE: "A Transparent Blockchain for Tracking Police Complaints,"

ABSTRACT: Blockchain technology is one the emerging technology today. Using blockchainthe primary goal that is achieved is security. Along with security many other aspects can beachieved using blockchain. Blockchain is nothing but a chain of blocks which are connected byhashing. We can see that every new technology has become a part of our life. This technology isproving to be helpful in all the fields like education, agriculture, business, government and manymore. We can also understand how beneficial it is, as it saves the time, money and human power.But this never-ending technology is lacking to provide security. The Indian Police Departmenthas replaced the manual system with the centralized online process to register the complaint.There are many malpractices in

resolution of complaints. So, to avoid them a system is proposedwhich helps complainer to track the complaint, get ongoing details, and enforce police officers tosolve the complaints within stipulated time to avoid unnecessary delay. The main objective ofthis system is to provide a method to secure the FIR system using blockchain technology. Theprincipal components of blockchain technology viz. security, transparency, decentralization,immutability prove to be helpful for securing this digitalized process. The system usestransparency of blockchain technology as the user can track the complaint at any time. Thesystem uses hashing to provide immutability so that no one can tamper the data entered by thecomplainer. Smart contracts are used to avoid delay in solving the case. This will avoidmalpractices and provide satisfiable results.

TITLE: "BLOCKCHAIN BASE CRIME RECORD MANAGEMENT SYSTEM

ABSTRACT: Criminal records are highly sensitive public records. By incorporating criminalrecords in a blockchain, authenticity and rigidity of records can be maintained; which also helpsto keep the data safe from adversaries. A peer to peer cloud network enables the decentralizationof data. It helps prevent unlawful changes in the data. This paper introduces a criminal recordstorage system by implementing blockchain technology to store the data, which helps to attainintegrity and security. Our system presents ways in which the authority can maintain the recordsof criminals efficiently. Authorities (e.g., Law enforcement agencies and courts) will be able toadd and access criminal data. General users (e.g., selected organizations and/or individuals,airports, visa application centers etc.) will have access to the data so that they can look upcriminal records. Proper and timely access to authentic criminal records is essential to enforce thelaw. The effect of corruption on the law enforcement forces will also decrease, as this will cut offan entire scope of corruption by removing any possibility of tampering with criminal records databy thorough accountability.

TITLE: "Analysis of implementing blockchain technology to the Argentinian criminal records information system,"

ABSTRACT: Blockchain is an innovative technology that allows a untrusted node network toshare transactional data consistently while removing the need of a centralized authority. In thispaper we propose a system to store citizen criminal records in a decentralized way by using apermissioned blockchain, taking advantage of some of its characteristics to ensure privacy,security, immutability, and disponibility of stored sensitive data. This system would overcomethe current one since it can cryptographically guarantee that data, once stored, had not beenmodified but by a competent authority. It also improves the delivery of the records to itsdestination which can be geographically spread throughout the territory.

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3. PROBLEM STATEMENT

The current system for managing criminal records faces numerous challenges in terms ofaccessibility, security, and integrity. Traditional methods of record-keeping often involvecentralized databases that are vulnerable to tampering, corruption, and unauthorized access.These systems are not only susceptible to data breaches but also lack the transparency andaccountability necessary for efficient law enforcement. Manual record updates and maintenanceprocedures are time-consuming, and the risk of errors or intentional manipulation exists.Additionally, the lack of a standardized and secure platform for sharing criminal records amongadministrative authorities hinders the timely and effective exchange of information crucial forlaw enforcement agencies. The existing system falls short in adapting to the evolving landscapeof urbanization and technological advancements, necessitating a more robust and secure solutionfor criminal record management.

LIMITATIONS

Vulnerability to Tampering: Traditional centralized databases are susceptible to tampering andunauthorized access. This vulnerability compromises the integrity of criminal records, allowingfor the potential manipulation of data, which can result in inaccuracies and misrepresentation ofan individual's criminal history.

Security Concerns: The security of centralized systems is a significant concern. These systemsare often targeted by malicious actors seeking to exploit vulnerabilities and gain unauthorizedaccess to sensitive criminal records. Security breaches can lead to the compromise of confidentialinformation and undermine the trustworthiness of the entire system.Lack of Transparency and Accountability: The current system lacks transparency, making itchallenging to trace the origin of changes made to criminal records. This lack of accountabilitycan contribute to a lack of trust in the accuracy and reliability of the information stored in thesystem, both among law enforcement agencies and the general public.

Inefficient Data Exchange: The manual and bureaucratic processes involved in updating andsharing criminal records among administrative authorities lead to inefficiencies. Timely access toaccurate information is crucial for effective law enforcement, and the existing system'slimitations in data exchange can impede investigative processes.

Dependency on Centralized Authorities: The reliance on centralized authorities for recordmaintenance and updates poses a single point of failure. If the central system

experiencestechnical issues, downtime, or corruption, it can disrupt the entire criminal record managementprocess, causing delays in accessing critical information.

Lack of Adaptability to Technological Advancements: As technology advances, the existingsystem may struggle to keep pace with modern requirements for efficient and secure datamanagement. Integration with emerging technologies is often challenging, leading to a systemthat may become outdated and less effective over time.

Limited Accessibility: The current system may not provide easy and secure access to authorizedpersonnel when needed. This limitation can hinder the timely sharing of information among lawenforcement agencies, potentially impacting the swift resolution of criminal investigations.

4. PROPOSED SYSTEM

The proposed "Blockchain-Based Criminal Record Database Management" system offers atransformative solution to overcome the limitations of the existing criminal record managementsystems. By leveraging the power of blockchain technology, the proposed system aims torevolutionize the way criminal records are stored, accessed, and shared.The key innovation lies in the use of a decentralized, tamper-proof blockchain network. Thisensures the immutability of criminal records, eliminating the risk of unauthorized tampering andenhancing data integrity. Each record, once added to the blockchain, becomes a permanent andunchangeable part of the ledger, providing a transparent and auditable history of all transactions.The peer-to-peer nature of the blockchain facilitates decentralization, reducing the dependency ona single central authority. This not only enhances security but also ensures the system's resilienceagainst potential attacks or system failures. The use of cryptographic techniques furtherstrengthens the security measures, making it highly resistant to unauthorized access.The proposed system addresses the lack of transparency and accountability in the existing systemby enabling a transparent and traceable audit trail of all record modifications. This not onlyinstills confidence in the accuracy of the information but also allows for accountability in case ofany discrepancies.

ADVANTAGES

Immutability and Data Integrity: The use of blockchain ensures the immutability of criminalrecords. Once recorded, data cannot be altered or tampered with, ensuring the integrity andaccuracy of the information. This feature enhances trust in the system and the reliability ofcriminal records.Enhanced

Security Through Decentralization: The decentralized nature of the blockchainsystem reduces the vulnerability associated with centralized databases. Distributed across anetwork of nodes, it becomes significantly more challenging for malicious actors to compromisethe system. This enhances the overall security of sensitive criminal record data.

Transparency and Accountability: The transparent and traceable nature of blockchaintransactions ensures accountability in the management of criminal records. Any changes orupdates to records are visible on the blockchain, providing a clear audit trail. This transparencyfosters trust among users and regulatory authorities.

Efficient and Timely Data Exchange: Smart contracts automate the updating and sharing ofcriminal records, streamlining the process and reducing manual intervention. This automationleads to more efficient and timely exchange of information among law enforcement agencies,enabling quicker responses to criminal investigations.

Adaptability to Technological Advancements: The modular and flexible nature of blockchaintechnology allows for easy integration with emerging technologies. This adaptability ensures thatthe system remains relevant and can incorporate future advancements in data management andsecurity, providing a sustainable and forward-looking solution.

5. METHODOLOGY

User Authentication and Access Control:

This module ensures secure access to the system byimplementing robust user authentication mechanisms. Access control features define user rolesand permissions, allowing authorized personnel, such as law enforcement officers andadministrative authorities, to access specific functionalities based on their roles.

Criminal Record Creation and Updation: The system includes a module for creating andupdating criminal records. Authorized users can input new records or update existing ones withrelevant information. The immutability of the blockchain ensures that once recorded, the dataremains secure and unalterable.

Blockchain Integration and Smart Contracts: The core module involves the integration ofblockchain technology, leveraging its decentralized and tamper-proof characteristics. Smartcontracts are employed to automate and enforce business logic related to the creation,

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updating,and sharing of criminal records. These contracts facilitate efficient and secure transactions on theblockchain.

Record Search and Retrieval: This module allows authorized users to search for and retrievespecific criminal records based on criteria such as name, identification number, or incidentdetails. The decentralized nature of the blockchain ensures that the information is easilyaccessible while maintaining security and integrity.

Audit Trail and Reporting: The system includes an audit trail module that logs all transactionsand changes made to criminal records. This transparent and traceable record of activitiesenhances accountability and provides a basis for comprehensive reporting. Reporting featuresallow authorized administrators to generate insights into system usage and any modificationsmade to records.

6. SYSTEM ARCHITECTURE

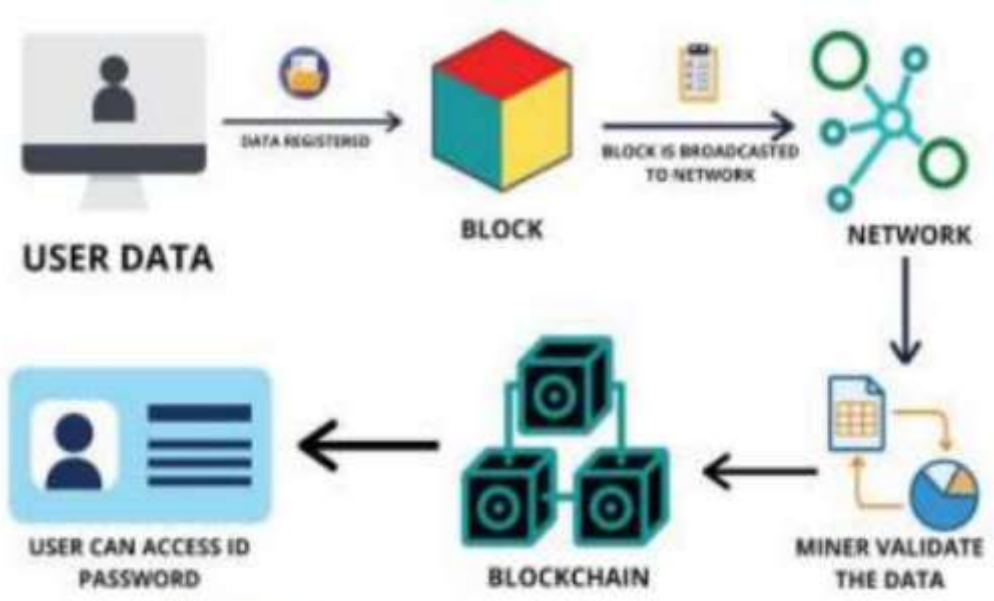

Fig. 5. Working of The System

7.EXPECTED RESULTS

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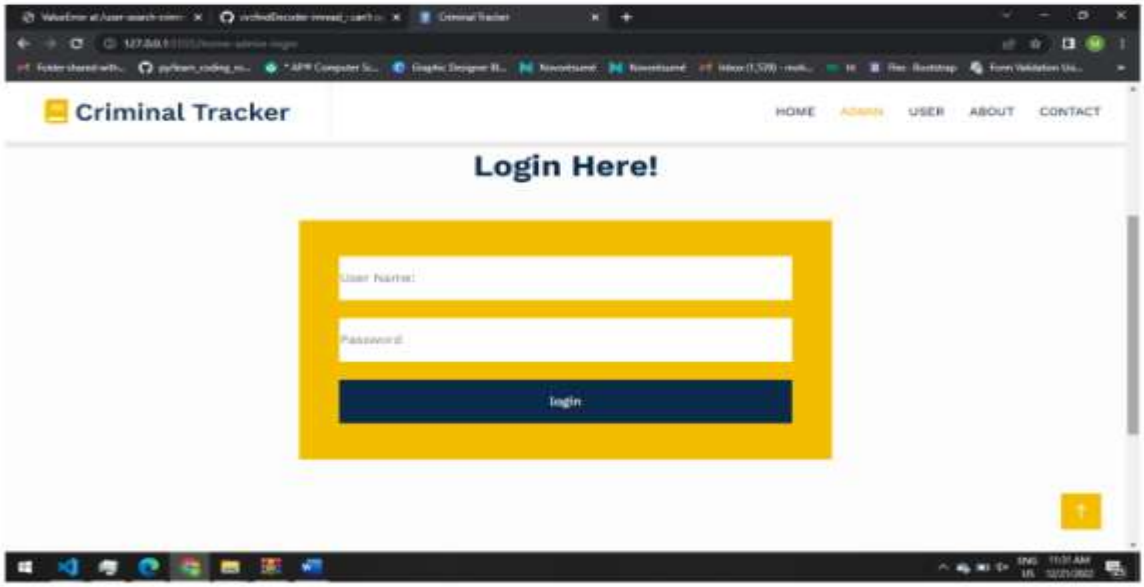

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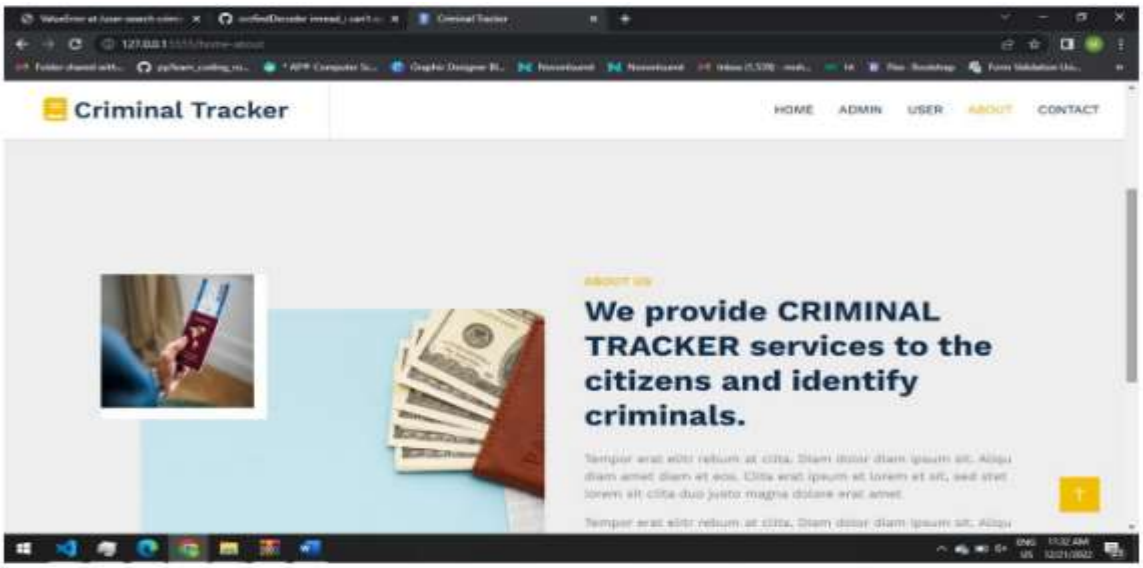

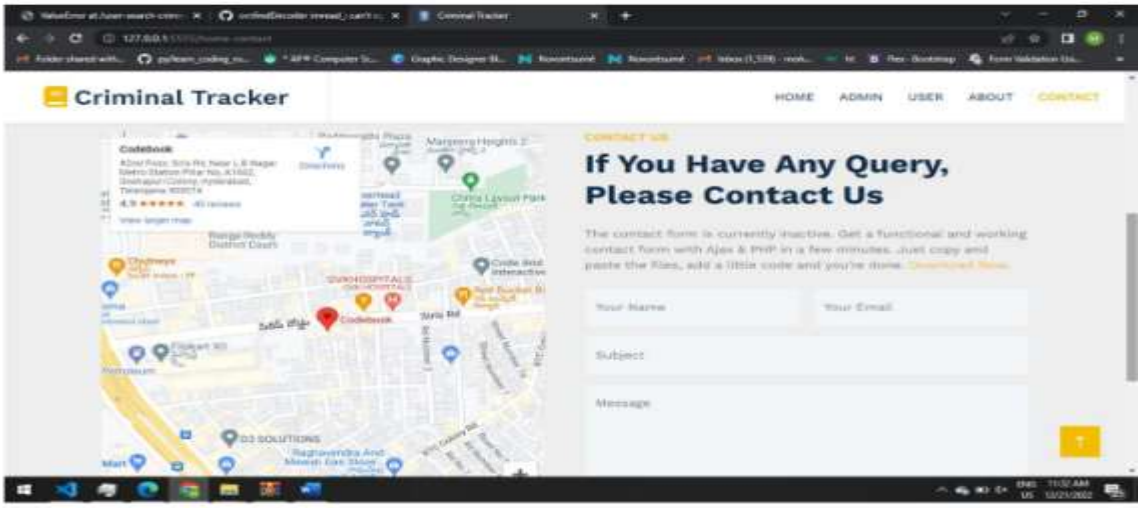

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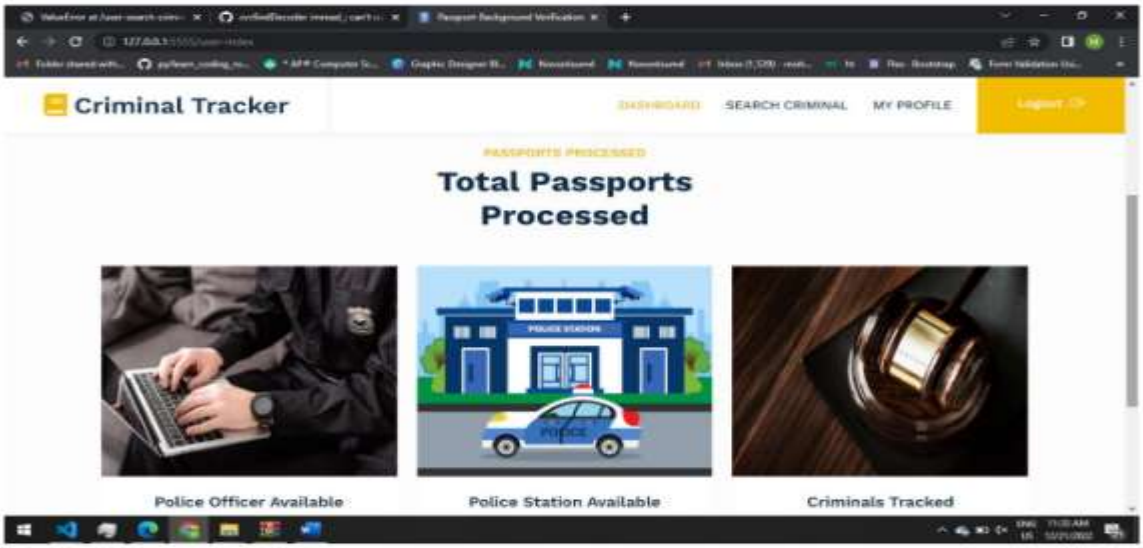

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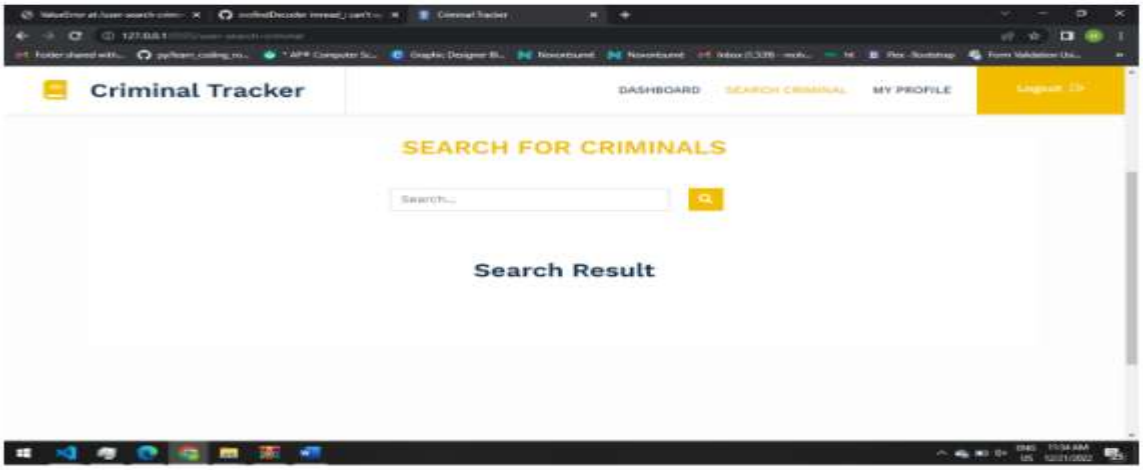
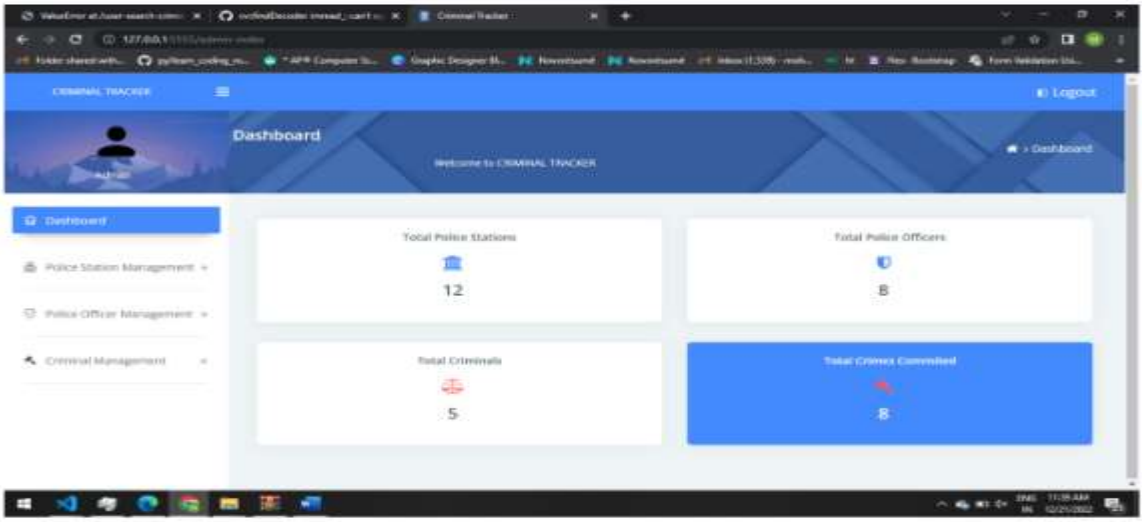


Admin:



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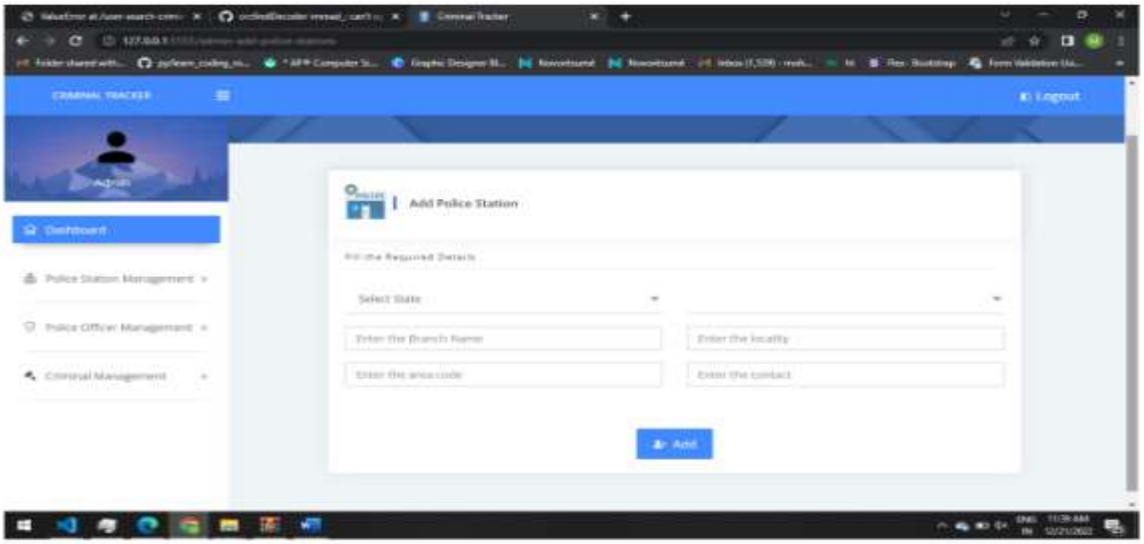

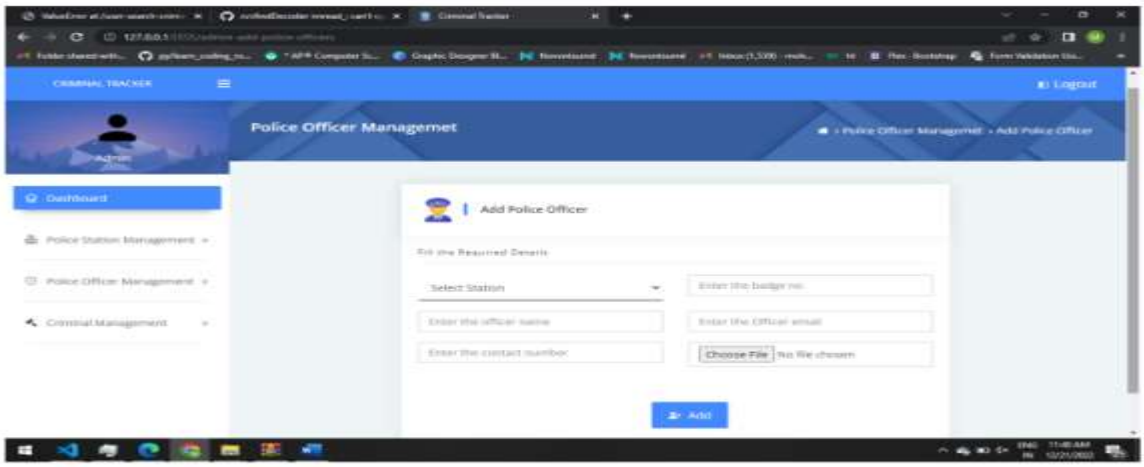

8.CONCLUSION

Storing data in Local databases can be manipulated; therefore, we proposed an immutableblockchain-based system to maintain a criminal record on a decentralized network. To solve thisissue, we have modified our data with digital signature and distributed the data among differententities to maintain data transparency. Easy availability of the information on the network couldpotentially lead us to generate statistical information which will improve the juridical system,justice actions, and internal processes. Blockchain is an emerging technology and can effectivelycreate more robust control over criminal records if implemented carefully. Technology is just araw material that alone cannot bring change, but technology processed with creative ideasrenders a flourished product for the advancement of society.

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