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Blood Ledger and Donar Chain using Block Chain

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Abstract

"Blood ledger & Organ Donation using block chain" aims to revolutionize the donation and transplantation ecosystem by harnessing the immutable and decentralized power of blockchain technology. This innovative system provides a secure, transparent, and efficient platform for the registration, matching, and tracking of donors and recipients. Leveraging smart contracts, the solution automates key processes like donor-recipient pairing, donation scheduling, and inventory management, thereby reducing administrative overhead and minimizing human error. The integration of blockchain technology ensures data integrity and enhances trust among all stakeholders, including donors, recipients, medical institutions, and regulatory bodies. This pioneering project addresses critical challenges in the donation process, such as fraud, delays, and data privacy concerns, by implementing robust security measures and role-based access controls. Designed to comply with relevant regulations, the system encrypts sensitive medical information and restricts access to authorized personnel only. By providing real-time updates and a transparent ledger of all transactions, the platform fosters a higher level of accountability and trust. The user-friendly web and mobile interfaces ensure that all participants can easily navigate the system, making the donation process more accessible and streamlined. Overall, this blockchain-based solution has the potential to significantly improve the efficiency, security, and transparency of the blood, plasma, and organdonation landscape.

Keywords: Blood Donation, Blockchain, Life Token, Donor Incentives, Healthcare Crisis

I. INTRODUCTION

1. Blockchain and Ethereum Smart Contracts:

Ethereum's blockchain and smart contracts provide a secure, decentralized method of managing donors' and recipients' identities.Individual digital identities may be verified and stored on the Ethereum blockchain for all system participants, including donors, recipients, medical professionals, and donation companies.Smart contracts would then control the circumstances and interactions related to these identities, ensuring that only those with permission can access or modify particular data.When a donor registers, for example, the blockchain can securely store their identification, medical history, and contribution records.This record cannot be altered without authorization since it is unchangeable.The transaction may be facilitated and recorded by an Ethereum smart contract, ensuring the correct match.Once the recipient is located, their identity could be verified in a similar manner.This guarantees



that donor and recipient data are verified and tamper-proof to avoid fraud or errors.

2. Using Hyperledger Fabric for Permitted Data Handling:

Ethereum is great for public data verification and immutable records, but due to privacy concerns, sensitive, confidential medical data might not be suitable for blockchain management. In this case, Hyperledger Fabric is helpful. As a permissioned blockchain, Hyperledger Fabric allows for limited access to the data, ensuring that only those with permission—such as specific hospitals, blood banks, or organ transplant facilities—can access and modify medical records.

II. LITERATURE SURVEY:

I.Patel and V.J. Kim, Journal of Health Informatics (2020) A Blockchain-Powered System for Safe and Open Blood Donation Digital identities for donors, blockchain for transparent blood donation tracking, and smart contracts for automating the donation process. High operating costs, regulatory barriers, and the difficulty of system integration. Thompson, K., and L. Wong, Journal of Medical Ethics (2021) Blockchain in organ donation: enhancing transparency and trust Consensus algorithms to preserve trust, blockchain for safe data exchange systems, and transparent organ donation records. Ethical issues with data ownership, barriers to system adoption, and challenges with energy consumption.. The Journal of Medical Systems In 2019, B. Gupta and I. A. Kumar A Comprehensive Examination of Blockchain Technology in Medical Care Decentralized storage, consensus methods, and smart contracts for healthcare security and interoperability. The use of blockchain technology in healthcare is beset by scalability issues, excessive energy usage, and regulatory barriers. Blockchain-Based Blood Donation System for Secure Data Management by C. Li and D. Wang, published in the International Journal of Medical Informatics (2020) Smart contracts, decentralized storage, and encrypted management data all contribute to secure blood donor information. There are substantial transaction costs, limited scalability, and challenges interacting with existing systems. The Organ Transplantation Journal, F. Smith and E. Davis (2021) A Review of Use Cases and Implementation of Blockchain and Organ Donation The challenges Consensus processes to ensure data integrity, a decentralized ledger to record organ donations, and smart contracts for process automation high energy use, privacy concerns, and inconsistent application. high energy use, privacy concerns, and inconsistent application. IEEE Transactions on Biomedical Engineering, by H. Lee and G. Martinez (2022) An IoT-connected system for real-time monitoring, smart contracts for donor authentication, and blockchain for tracking plasma donation data is a blockchain-based plasma donation management system. challenges with data privacy, interoperability, and network scalability.

III. Proposed Methodology:

A decentralized, secure method of managing donor and recipient identities is provided by Ethereum's smart contracts and blockchain technology.All participants in the system, including donors, recipients, healthcare practitioners, and donation organizations, can have their unique digital identities verified and stored on the Ethereum blockchain. Following that, smart contracts would control the conditions and interactions related to these identities, ensuring that only authorized users could access or modify particular data.



The Hyperledger Fabric Approach to Permitted Data Management:

While Ethereum is great for public data verification and immutable records, privacy concerns might make it inappropriate for managing sensitive, private medical data on the blockchain. The Hyperledger Fabric plays a part in this. Only authorized entities (such as certain hospitals, blood banks, or organ transplant facilities) can access and modify medical records on the permissioned Hyperledger Fabric blockchain.

MODULES:

Blockchain features such as immutability, transparency, and decentralization can be utilized to remove major barriers in a blood plasma and organ donation system:

- **1. Impermanence:** Data (donor/recipient information, donation history) on the blockchain is perpetual and unalterable, ensuring confidence and accountability .Errors and fraud are less likely because records cannot be altered once they have been entered.
- 2. **Transparency:** Blockchain allows all stakeholders to observe and track real-time data on organ matches, donations, and incentives, including donors, recipients, hospitals, and organizations.Collaboration is facilitated and confidence is increased by this openness.
- 3. **Dispersion**: The blockchain is more reliable, secure, and less prone to data breaches as there isn't a single authority in charge of the system. Additionally, it reduces administrative costs by automating processes with smart contracts, increasing productivity.
- 4. Automatic Donor Matching: Blockchain-based smart contracts can automate the donorrecipient matching procedure, reducing human error and accelerating the transfer of blood, plasma, and organs.
- **5. Incentive System:** By offering contributors immediate, transparent rewards, smart contracts can boost donor engagement and participation.

All things considered, blockchain enhances data security, efficiency, and trust in the donation process by addressing issues like delays, misinformation, and a lack of transparency in traditional systems. This could make donation processes safer, more efficient, and potentially save lives.

IV RESULTS:





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V DISCUSSION:

Users can interface directly with the blockchain by linking the frontend with the deployed smart contract using Web3.js.Users will be able to join up, make donations, track the status of their contributions, and view real-time matching results. Implement a simple mechanism for issuing test tokens when users complete tasks such as registering or making donations. To promote participation, implement a cryptocurrency incentive scheme that includes rewards for healthcare providers and donations. Test thoroughly to ensure that matching, contributions, and token rewards work as expected. You should also carry out security audits on the token and smart contract functionalities. Optimize the system to function smoothly and efficiently while consuming gas.

VI CONCLUSION:

This project transforms blood, plasma, and organ donation in a revolutionary way by utilizing blockchain technology and cryptocurrency tokens. The system leverages the decentralization, transparency, and immutability of blockchain technology to ensure secure and efficient donor-recipient matching, interactions, and contributionrecord-keeping.

Additionally, the addition of a tokenomics layer enhances engagement by paying donors and healthcare providers, introducing a new incentive structure to a traditionally nonprofit industry. This approach optimizes donor matching and fosters trust and accountability in the donation process, which enhances healthcare outcomes and boosts donor engagement in a secure, decentralized setting.



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