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Management For Organ Donation And Transplantation By Using Custom Blockchain

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Abstract: The aim of the blockchain-based organ donation and transplant administration system will be to enhance the organ donation procedure's efficiency, security, and transparency. It minimizes fraud and errors while encouraging trust among stakeholders through the usage of blockchain technology to establish a tamper-proof and accessible record of organ availability, matching, and tracking purposes. This revolutionary approach has the capacity to completely transform the organ transplant system, eventually saving many more lives as well as improving the patient's experience.

Keywords - Blockchain, DApp, Organ donation and Transplantation, Smart contracts, PHR (Personal Health Records), Organ Allocation.

I. INTRODUCTION

Blockchain technology desires include improved organ transplantation's functionality, secrecy, and legitimacy. It implies precision and convenience for inspections by registering all organ donation and transplant functions in a distributed, impermeable database. Blockchain constitutes extra security by upholding control mechanisms and digital encryption concerning clinical information, organ inventory, and transplant details. It stimulates organ matching in real time, optimizing the preciseness of organ transmission. Donor affirmations can be detected by smart contracts, promising that decisions made by individuals to donate their organs are recognized. Blockchain technology additionally assists with the oversight of logistics, lessening the prospect of illicit trafficking in organs and confirming adequate care. By digitizing and conserving all necessary papers and records, it eliminates the requirement for paperwork. Besides, individuals with transplants are susceptible to a shorter waiting period as a result of distributed ledger technology, which might prolong lives. All things considered, blockchain technology has immense potential for improving organ donation and transplantation.

II. RELATED WORK

As indicated by [1] In terms of registration, donor-recipient matching, removal of organs, organ delivery, and transplantation, today's organ donation and transplantation systems serve a variety of requirements and challenges alongside legal, clinical, ethical, and technical restrictions. To enhance patient experience and trust, an end-to-end organ donation and transplantation system is therefore required to ensure a fair and reliable system. To manage organ donation and transplantation management with an approach that is entirely decentralized, secure, traceable, auditable, private, and trustworthy, we propose a private Ethereum blockchain-based system in this paper. We build smart contracts and provide six algorithms, each containing information on how to build, test, and evaluate them. We estimate the effectiveness of the suggested approach by carrying out studies of confidentiality, privacy, and security and by comparing it with the existing solutions.

As per [2] There are a lot of differences in current processes because of the lack and immediacy of organs and blood. These imposed conditions for illegal activities, including the sale of organs on the black market. This research study provides a solution that comprises a web-based, secure system for blood and organ donation that allows patients and medical professionals to access information about the processing records for donated blood and organs. Blockchain technology would be applied for managing the database, which would only be easily accessible by authorized individuals. In the end, the suggested approach creates a smart identity created by the Ethereum Smart Contract (ESC) by tracking all registered participants. Blood demand is predicted by the system using a linear regression model with a high R-squared accuracy value of 0.998 over the next 10 years. This reduces blood shortages and waste.

As indicated by [3] The process of an illness's appearance, development, and treatment has been recorded in an electronic health record (EHR). Thus, its medicinal value is excellent. Data sharing and confidentiality are crucial challenges in EHRs because medical data is sensitive and secure for patients. Given that blockchain technology has the advantages of decentralization and tamper resistance, it might be an alternate solution to the issues described above. In order to improve the hospital's electronic health system, we suggest in the paper a medical data sharing and protection program based on the hospital's private blockchain. First off, the plan can meet a number of security specifications, including tamper resistance, openness, and decentralization. So as to preserve patient privacy, an efficient system for storing medical records while gaining access to patient histories has been established. Additionally, a mechanism for matching symptoms is provided among patients.It allows patients who experience the same symptoms to verify one another and produce a session key for future communication about the condition. The PBC and OpenSSL libraries are utilized in the implementation of the proposed method. The suggested scheme's security and performance evaluation are provided at the end.

As per [4] Since the first successful kidney transplant in 1954, organ donation and transplantation have emerged as crucial medical treatments. However, the kidney transportation process is becoming more complex due to the supply-demand discrepancy. Several allocation processes, including blockchain-based ones, have been presented. The international organizations that manage organ donation are working to make the procedure better and help more individuals who are in need. Global rules are necessary because of the large variations in organ circulation policies and standards, and there are still unsolved difficulties. By centrally preserving stakeholder data and matching patient-donor algorithms, blockchain technology can help overcome these difficulties. This paper looks at current methods for allocating organs, with a particular emphasis on decentralized blockchain-based systems. The study addresses kidney allocation algorithms across multiple organ donation systems and talks about the drawbacks of current algorithms and methods.

As indicated by [5] The electronic health record (EHR) is essential for documenting the onset, progression, and administration of medical conditions. However, because of their sensitivity and patient security, data exchange and confidentiality represent major challenges in EHRs. An alternate answer supplied by blockchain technology is decentralization and tamper resistance. In order to improve the EHR system, the report proposes a medical data exchange and protection program built on a hospital's private blockchain. Safety requirements like tamper resistance, accountability, and decentralization are met by this strategy. Additionally, it creates a productive framework for accessing patient histories and keeping medical data. A system for symptom matching allows patients to verify with one another and establish session keys for additional communication. PBC and OpenSSL libraries are used by the suggested technique.

III. SYSEM ARCHITECTURE

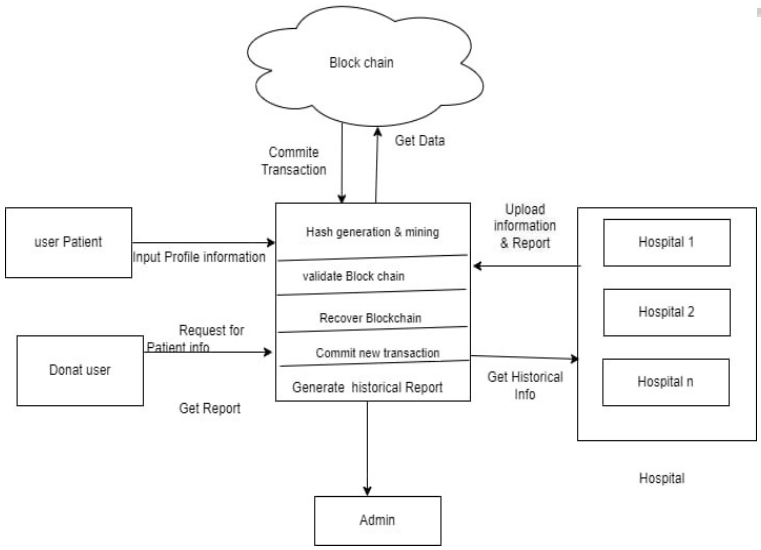

Fig: - System Architecture

Modules and its Working:

The modules in the system are as follows:

Hospital: An organization that collaborates with patients and provides identical data for each medical record. a local organization that encourages data.

Patient: Patients are responsible for setting up their account on the system, importing and reporting their medical records, and accepting data requests (requests to exchange medical records) from professionals.

Giving user: Upload user records.

Decentralized Blockchain: The distributed ledger known as the blockchain is used to show how the system's delegated access rights are currently established. The attribute authorities and the root authority handle permissions for interacting with the blockchain.

IV. CONCLUSION

Blockchain's decentralized and tamper-resistant properties make it an excellent choice for sharing and preserving medical information. In this system, we developed an end-to-end DApp for managing organ donation and transplantation. Additionally, we proposed utilizing blockchain technology to supply patients with decentralized, traceable, reliable, trustworthy, and secure control over their medical data. So as to ensure their correctness, we assessed the suggested contracts in a patient health record (PHR) framework.

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