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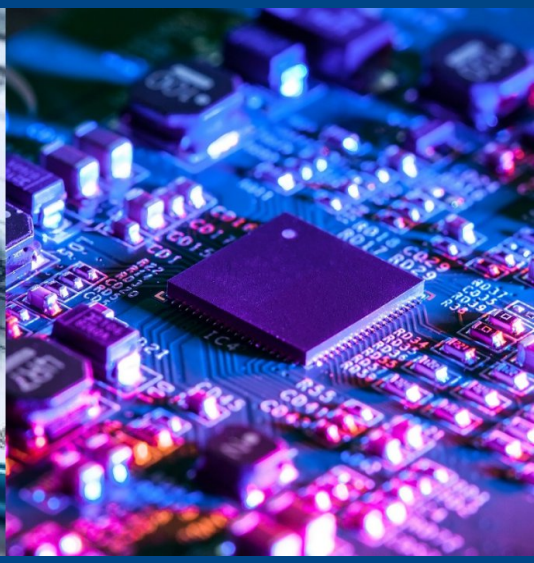

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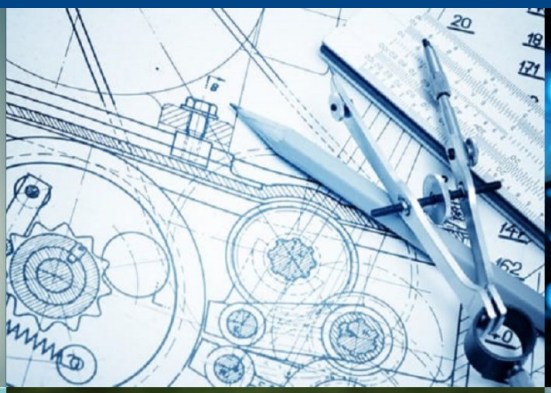

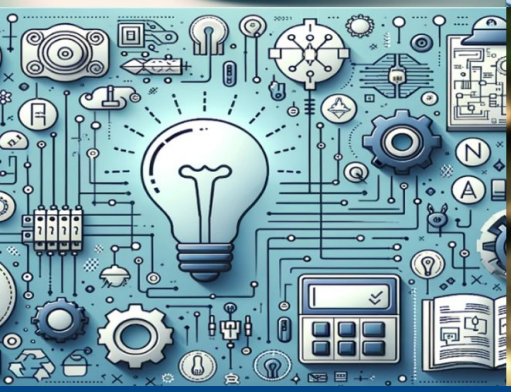

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Blockchain Based Organ Donor & Receiver Matching System

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ABSTRACT: This project presents a blockchain-based web application designed to connect organ donors and recipients in a secure and transparent manner. The system acts as a digital platform where users can register as donors or receivers and find suitable matches based on criteria such as blood group, organ type, and location. By using , the system ensures data integrity and builds user trust.

The application does not involve real medical procedures but focuses on enabling communication between users through a consent-based approach. Sensitive data is protected by storing encrypted or hashed information on the blockchain. A matching system helps identify compatible users efficiently. Additional features include user authentication, request approval, and controlled sharing of contact details. Overall, the project aims to provide a secure, transparent, and user-friendly platform to simplify the process of finding organ donors and receivers.

KEYWORDS: Blockchain Technology, Decentralized System, Healthcare technology, Solidity.

I. INTRODUCTION

Organ donation is a critical process that helps save lives, but finding suitable donors and recipients remains a major challenge. This project introduces a web-based platform that connects donors and receivers efficiently. By using , the system ensures secure and tamper-proof data management. The platform focuses on matching users based on key medical criteria while maintaining privacy. It also enables safe communication between users through a consent-based approach.

BACKGROUND OF THE STUDY

Organ donation plays a vital role in saving lives, yet there is a significant gap between the number of donors and recipients worldwide. Traditional organ matching systems are often centralized, which can lead to issues such as lack of transparency, data manipulation, and delays in finding suitable matches. With the growth of digital healthcare solutions, there is a need for more secure and efficient platforms to support donor–receiver connections. The emergence of has provided new opportunities to address these challenges. Blockchain offers features such as decentralization, data security, and immutability, making it suitable for handling sensitive information. In recent years, researchers have explored blockchain in healthcare applications to improve trust and data management. This study focuses on applying blockchain technology to develop a web-based system that connects organ donors and recipients. The aim is to enhance transparency, ensure data privacy, and simplify the process of finding compatible matches through a reliable and user-friendly platform.

PROBLEM STATEMENT

Organ donation systems often face challenges such as a shortage of donors and difficulty in finding compatible matches. Existing platforms are mostly centralized, which can lead to data security issues and lack of transparency. There is also a risk of data manipulation and unauthorized access to sensitive information.

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In many cases, users struggle to connect with suitable donors or recipients efficiently. The absence of a secure and trustworthy communication system further complicates the process. By leveraging, this project aims to address these issues by providing a decentralized, secure, and transparent platform for donor–receiver matching and communication.

AIM OF THE PROJECT

The aim of this project is to develop a secure web-based platform that connects organ donors and recipients efficiently. It utilizes to ensure data integrity, transparency, and privacy. The system also aims to simplify the process of finding compatible matches and enable safe communication between users

OBJECTIVE OF THE PROJECT

The key objectives of this project are as follows:

To develop a web-based platform for connecting organ donors and recipients.
To implement secure data handling using Blockchain Technology.
To design an efficient matching system based on medical criteria like blood group and organ type.
To ensure user privacy by storing sensitive data in an encrypted format.
To provide a consent-based system for sharing contact information between users.
To enable transparent and tamper-proof record management using blockchain.
To create a user-friendly interface for easy registration, search, and communication.

II. METHODOLOGY

The methodology of this project involves designing and developing a web-based application to connect organ donors and recipients. Initially, user requirements are collected and the system architecture is planned. The frontend interface is developed to allow users to register, log in, and search for matches. A backend system is implemented to manage user data and handle requests.

It is integrated to store hashed user information and maintain secure transaction records. A matching algorithm is developed to identify compatible donors and recipients based on key criteria. The system also includes a consent-based communication feature for sharing contact details. Finally, the application is tested to ensure performance, security, and usability.

III. EXISTING SYSTEM

The existing system for organ donor and receiver matching is mostly based on centralized databases managed by hospitals or organizations. These systems often lack transparency, making it difficult for users to trust the process. Data security is another concern, as sensitive information can be vulnerable to unauthorized access or manipulation.
In many cases, there is no direct communication between donors and recipients, which delays the matching process. Manual verification and outdated record management can also lead to inefficiencies. Additionally, the absence of advanced technologies like limits the reliability and integrity of the system. As a result, the current approach is often slow, less secure, and not user-friendly.

IV. PROPOSED SYSTEM

The proposed proposed system is a blockchain-based web application designed to connect organ donors and recipients efficiently. It allows users to register and search for matches based on criteria such as blood group, organ type, and location. By integrating, the system ensures secure and tamper-proof data management.
The platform includes a matching algorithm to identify compatible users quickly. It also provides a consent-based mechanism for sharing contact details between donors and receivers. Overall, the system aims to offer a transparent, secure, and user-friendly solution for donor–receiver connection.

ADVANTAGES OF PROPOSED SYSTEM

Data Security - Ensures high data protection using Blockchain Technology.
Transparency - Provides clear and trustworthy donor–receiver matching.
Data Integrity - Prevents data tampering and unauthorized modifications.

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Efficient Matching - Enables faster identification of compatible donors and recipients.
User Privacy - Supports consent-based sharing of contact information.
User-Friendly Interface - Offers easy registration, search, and communication features.
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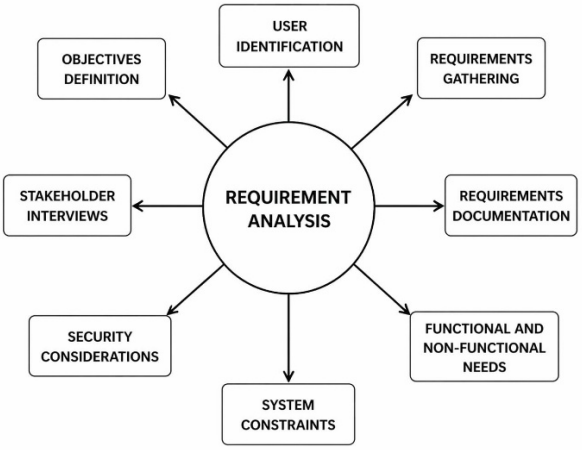
V. DEVELOPMENT PROCESS

REQUIREMENT ANALYSIS

The requirement analysis phase involves identifying the needs and expectations of users for the proposed system. Both donors and recipients require a simple and secure platform for registration and communication. The system must support essential features such as user authentication, profile management, and search functionality. It should also include a matching mechanism based on criteria like blood group, organ type, and location. Security is a key requirement, ensuring that sensitive user data is protected from unauthorized access. The integration of is considered to maintain data integrity and transparency. The system should also provide a consent-based approach for sharing contact details. Additionally, the platform must be user-friendly, reliable, and accessible across different devices.



INPUT ANALYSIS

The proposed Input analysis involves identifying and defining the data required for the proper functioning of the system. The inputs include user details such as name, age, blood group, organ type, and location. Both donors and receivers must provide accurate information during registration. The system also accepts login credentials for user authentication.

Additional inputs include search criteria entered by receivers to find suitable donors. Validation is performed to ensure that all required fields are correctly filled. Sensitive information is secured using encryption techniques before storage. Integration with ensures that important input data is recorded securely and cannot be altered.

OUTPUT ANALYSIS

The Output analysis focuses on the results generated by the system based on user inputs and processing. The primary output includes a list of compatible donors or recipients based on search criteria. The system displays essential details such as blood group, organ type, and location. It also shows the status of requests, such as pending, accepted, or rejected.

Notifications are provided to inform users about match results and request updates. Contact details are displayed only after user consent is given. The outputs are designed to be clear, accurate, and user-friendly. Data related to matches and transactions is securely recorded using to ensure transparency and reliability.

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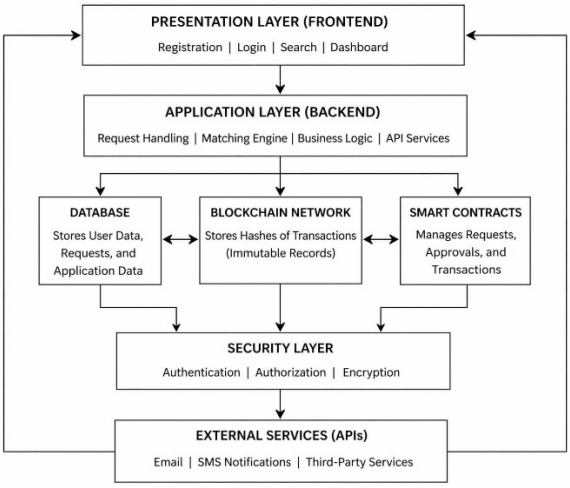
ARCHITECTURE DESIGN

The architecture design of the system follows a multi-layered approach to ensure efficiency and scalability. It consists of a frontend layer, backend layer, database, and blockchain network. The frontend provides a user interface for registration, login, and searching for matches. The backend handles business logic, request processing, and communication between components.

A database is used to store user details and application data securely. is integrated to store hashed data and maintain immutable transaction records. Smart contracts manage operations such as request handling and approval processes. The system uses APIs to enable interaction between the frontend and backend. Security measures such as authentication and encryption are implemented to protect user data. The architecture ensures smooth data flow, high reliability, and transparency. Overall, the design supports efficient donor–receiver matching and secure communication.



VI. IMPLEMENTATION

The implementation phase involves developing the web application based on the designed architecture. The frontend is created using web technologies to provide an interactive user interface for registration, login, and search. The backend is developed to handle business logic, data processing, and communication between components. A database is used to store user information and application data securely. It is integrated to store hashed data and ensure secure transactions. Smart contracts are implemented to manage request handling and approval processes. The system is tested and deployed to ensure proper functionality, security, and user experience.

Donor Registration & Input Processing

The registration process allows users to create an account by entering details such as name, blood group, organ type, and location. The system verifies and validates the entered information to ensure accuracy. Input processing handles and filters user data based on matching criteria. Sensitive information is secured through encryption, and is used to store important data securely and prevent modification.

BLOCKCHAIN LOGIC & SHA - 256

The system uses to securely store and manage transaction records. Smart contracts handle operations such as request approval and data verification. This ensures data integrity, transparency, and protection against unauthorized changes. The system uses along with to secure data. User information is converted into a fixed-length hash using SHA-256 before being stored. This hashing process ensures that original data cannot be easily retrieved or altered. Each block contains the hash of the previous block, creating a secure chain. This approach guarantees data integrity and protection against tampering.

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SECURE LEDGER

Secure ledger management is achieved using to maintain a tamper-proof record of transactions. All-important actions are recorded as blocks in the ledger. Data is stored in encrypted or hashed form to protect user privacy. Access to the ledger is controlled through authentication mechanisms. This ensures transparency, security, and integrity of the system data.

ORGAN MATCHING & SEARCH OPERATION

The organ matching and search operation allows receivers to find suitable donors based on specific criteria such as blood group, organ type, and location. The system processes user inputs and filters data to display compatible matches. A matching algorithm is used to ensure accurate and efficient results. Users can view basic details of matched profiles and send requests.

The process is secured using to maintain transparency and prevent data manipulation. This ensures reliable and trustworthy matching within the system.

VII. RESULT

The result of the proposed system demonstrates an efficient and secure platform for connecting organ donors and recipients. The application successfully allows users to register, search, and find compatible matches based on key criteria. The matching process provides accurate and relevant results within a short time.

The integration of ensures data security and prevents unauthorized modifications. Users are able to communicate through a consent-based system, maintaining privacy and control over personal information. The system also records transactions transparently, increasing user trust.

Overall, the platform performs reliably, offering a user-friendly interface and improved efficiency compared to traditional systems. The results indicate that the proposed system effectively enhances the process of donor–receiver connection.

VIII.CONCLUSION & FUTURE ENHANCEMENT

CONCLUSION

The proposed system provides a secure and efficient platform for connecting organ donors and recipients. It simplifies the process of finding compatible matches by using a structured and user-friendly interface. The integration of ensures data integrity, transparency, and protection against unauthorized access.

The system maintains user privacy through encryption and a consent-based communication mechanism. It overcomes the limitations of traditional centralized systems by offering improved security and reliability. The matching process is faster and more accurate, helping users connect and effectively.

Overall, the project demonstrates how modern technology can be used to enhance donor–receiver matching systems. It provides a trustworthy, transparent, and scalable solution. This system can contribute to improving awareness and accessibility in organ donation through digital innovation.

FUTURE ENHANCEMENT

In future, the system can be enhanced by integrating hospital and healthcare organization verification to improve authenticity. Advanced technologies like AI can be used to improve the accuracy of donor–receiver matching. The platform can be expanded into a mobile application for better accessibility.

Integration with national health databases can provide more reliable data and faster processing. Additional security features can be implemented using to further strengthen data protection. Real-time notifications and multilingual support can also be added to improve user experience. Overall, these enhancements can make the system more efficient, scalable, and widely usable.

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