



(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)



## **Impact Factor: 8.699**

## Volume 14, Issue 5, May 2025

⊕ www.ijirset.com 🖂 ijirset@gmail.com 🖄 +91-9940572462 🕓 +91 63819 07438





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

### Volume 14, Issue 5, May 2025

#### |DOI: 10.15680/IJIRSET.2025.1405123|

# **Blockchain-Based Management for Organ Donation and Transplantation**

#### Dr. Kiran G M

Associate Professor, Department of Computer Science Engineering, SIET, Tumkur, Karnataka, India

#### Divya D R, Bhavya S, Chithra J P, Nahida K

U.G. Student, Department of Computer Science Engineering, SIET, Tumkur, Karnataka, India

U.G. Student, Department of Computer Science Engineering, SIET, Tumkur, Karnataka, India

U.G. Student, Department of Computer Science Engineering, SIET, Tumkur, Karnataka, India

U.G. Student, Department of Computer Science Engineering, SIET, Tumkur, Karnataka, India

**ABSTRACT**: In terms of registration, donor-recipient matching, organ removal, organ delivery, and transplantation, today's systems present unique requirements and difficulties with regard to legal, clinical, ethical, and technical limitations. Consequently, a complete organ donation and transplant system is necessary to ensure an equitable and effective procedure to improve patient satisfaction and trust. In order to facilitate organ donation and transplantation administration in a way that is completely decentralized, safe, traceable, auditable, private, and reliable, we provide in this article a private Ethereum blockchain-based system. We create smart contracts and describe six algorithms, including how to construct, test, and validate them. By conducting privacy, security, and confidentiality studies and contrasting our solution with other solutions already in place, we assess the effectiveness of the suggested solution.

KEYWORDS: traceability, smart contracts, blockchain, Ethereum, organ donation, and transplantation.

#### I. INTRODUCTION

Organ failure or damage occurs due to an injury or a disease. It affects the quality of life and, in some cases, leads to death. Donating an organ is one of humanity's most honorable actions to save the lives of patients through organ transplantation. For a successful transplant, the organ must be in acceptable working conditions with donorrecipient matching, and its removal should not pose a life-threatening risk to the donor. The first successful organ donation occurred with a kidney transplant between twin brothers in 1954. Since then, the annual number of transplants has steadily increased. However, the demand for organ donations still exceeds the number of donors, More significantly, obtaining access to the waiting list for organ donation is a fundamental prerequisite for organ distribution. Geographical and socioeconomic factors can influence transplant referrals elements. Thus, particular patient groups shouldn't be subjected to discrimination throughout the waiting list allocation process

#### II. RELATED WORKS

#### A. NON BLOCKCHAIN-BASED SOLUTIONS FOR ORGAN DONATION MANAGEMENT

In procedures that are not blockchain-based, different methods and Tools are used to develop solutions that improve the matching process, organ donation, and transplantation management. To illustrate the information workflow paradigm among recipient hospitals, regulators, and donor hospitals, the authors in [17] created a multi-agent software platform. The pre-transplantation tasks are optimized by this platform, potentially increasing process efficiency. It also makes it possible to store the details of possible donors and enhances direct communication between all parties involved in the organ transplant procedure. The built platform was used to mimic an information workflow, and it was expected that three to five hours may be saved.

#### B. BLOCKCHAIN BASED SOLUTIONS FOR ORGAN DONATION MANAGEMENT

The name "Kidner" has been suggested. It offers a kidney-pair donation module instead of the traditional kidney waiting list, which is already in use. For example, when someone wishes to donate his/her kidney to a family member





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

#### Volume 14, Issue 5, May 2025

#### |DOI: 10.15680/IJIRSET.2025.1405123|

but their kidney is incompatible with the person they want to donate to, the system matches the donor's kidney to another patient who also has an inconsistent donor's kidney. The authors of [23] suggested blockchain-based decentralized app for organ donation. Patients use a web application to register their information, including their medical ID, organ type, blood type, and state.

The authors of [23] suggested a blockchain-based decentralized app for organ donation. Patients register their details, such as their state, organ type, blood type, and medical ID, via an online application. The system would follow the firstin, first-out (FIFO) principle, unless a patient is in a life-threatening situation. It provided a speedier system, increased openness, and improved security. It should, however, be adjusted for use in other locations based on local laws and requirements. In a similar vein, the authors of [24] created a web-based application that uses FIFO to select an organ donor for each patient in need of a transplant; in the event of an emergency, that patient gets prioritized.

Additionally, a blockchain use case for organ donation was created in [25]. To put it simply, the donor signs an organ donation smart contract to start the procedure and the individual requesting a transplant. A registered physician or nurse verifies and hashes both documents, then generates a confirmed mismatching pair and disseminates it throughout the network. Once a match is found, the network forwards it to a physician for approval. When a match is discovered, the doctor gives his approval and proceeds to create a hash. If the physician creates a hash and adds the confirmed matched pair to the blockchain. Lastly, all the information is provided to physicians and other healthcare experts. The efforts described above have demonstrated how blockchain technology can enhance current organ donation and transplantation administration systems. But Some contributions don't show complete implementation, while others don't take into account all organ kinds or incorporate all required matching criteria.

#### III. PROPOSED BLOCKCHAIN-BASED SOLUTION FOR ORGAN DONATION

Details of our blockchain-based organ donation and transplantation system are provided in this section. an outline of our suggested solution's system architecture is shown in figure 2. it demonstrates that two smart contracts are used in our solution. (scs); specifically, organ transplantation and donation. through a front-end decentralized application (dapp) connected by an application program interface (api), participants can access the features and happenings of these smart contracts. each smart contract has special features that only authorized users may use. these users will be able to access data kept on the chain to examine events, logs, and transporter, and a transplant surgeon are among the participants.

#### A. PRIVATE PERMISSIONED ETHEREUM NETWORK

Improved security and privacy are offered by private blockchains, in which data and transactions are not available to the public and accessible only by those with permission. Businesses may enhance privacy, security, and secrecy by creating their own private-permissioned blockchain using the Ethereum blockchain. Generally speaking, information about transplanting donor organs is kept completely private. For such an application, a private permissioned Ethereum blockchain is perfect since these details include the patients' medical records and family histories.

#### B. BLOCKCHAIN INTEGRATION

The foundation of our suggested solution is the blockchain network. It provides the foundation for permanently documenting events and transactions in order to guarantee data provenance and accountability. It is necessary to implement the created smart contracts on the blockchain to ensure they are accessible at all times. However, it would not be ideal to deploy them on the main network during the testing phase. Therefore, a local blockchain environment, a virtual machine such as the JavaScript-based Virtual Machine, or a test network should be used to test the Ethereum-based smart contracts. The smart contracts in our proposed solution are developed using the REMIX IDE, and they are deployed on the JavaScript-based Virtual Machine

#### C. PARTICIPANTS INTERACTIONS

The interactions between various actors inside the corresponding smart contract are depicted in Figure 3, which can be separated into three stages. A waiting list is created at the start of phase 1, and a new patient is added by an approved physician. The patient's ID, age, BMI, and blood type will all be noted by the physician. Receiving donors who have consented to donate their organs completes phase 2. The test approval function will only be operated by an authorized





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

#### Volume 14, Issue 5, May 2025

#### |DOI: 10.15680/IJIRSET.2025.1405123|

transplant team member, and an event will be delivered right away. An event will be set off in order to announce the registration of a new donor.



FIGURE 1: A high-level system architecture of the suggested blockchain-based organ donation and transplantation









[www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

#### Volume 14, Issue 5, May 2025

#### |DOI: 10.15680/IJIRSET.2025.1405123|

#### **IV. IMPLEMENTATION DETAILS**

This section contains the algorithms and implementation details of our suggested blockchain-based organ donation and transplantation solution. The private Ethereum network upon which the suggested system is based validation nodes, and only participants that are approved are added.

#### A.ORGAN DONATION

The patient's physician, a member of the hospital transplant team, a procurement organizer, and a matching organizer are the four parties that take part in the organ donation smart contract. Every entity can take part by invoking the smart contract's functions and has an Ethereum address. There are several kinds of variables in this smart contract. The Ethereum address is one of the variables, which is utilized to give specific entities—like the procurement organizer and the matching organizer—a distinct address.

The second kind is mapping; in our approach, it associates an entity's Ethereum address with a Boolean to indicate that the address requires specific requirements. For instance, mapping is used for doctors and certified transplant surgeons. Additionally, mapping ensures patient validity by preventing duplicate patient selection. Additionally, there is an enumerating variable called "Bloodtype," which holds the various blood kinds, including "A," "B," "AB," and "O." This variable takes uint8 input, with "0," "1, "2, and "3" standing for the various blood types. Furthermore, the enumerated variable "OrganType" takes uint8 input, where "0" stands for "Heart," "1" stands for "Lung," "Liver" is represented by "2," and "Kidney" by "3".

#### B. ORGAN TRANSPLANTATION

The primary partners in the organ transplantation smart contract are the transplant surgeon, the transporter, and the donor's surgeon. Every participant can take part by invoking the smart contract's functionality. It contains a range of variables. For instance, the donor's and transplant surgeons' addresses are stored in public Ethereum addresses. Additionally, it includes a mapping for approved transporters, who are permitted to take the removed donated organ from the hospital where it was donated to the hospital where it was received. Additionally, the "OrganStatus" variable is enumerated and includes every state that the given organ will experience. The smart contract will be deployed by the transplant surgeon. The donor's surgeon's Ethereum address and the removed organ's original condition will be mentioned.

Following the deployment of the smart contract and the assignment of approved transporters, the transplantation tracing procedure starts. Initially, the donated the surgeon removes the organ, which is then delivered to the receiving hospital by the approved transporter from the donor's location. The beginning and conclusion of the delivery process will then be communicated. The transplant surgeon then begins the process of transferring the donor organ after announcing its receipt. Lastly, information on the transplant will be made public, including the patient ID, procedure date, and time.









[www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

#### Volume 14, Issue 5, May 2025

#### |DOI: 10.15680/IJIRSET.2025.1405123|

The entity-relationship diagram that illustrates the primary characteristics and capabilities of any smart contract is shown in Figure 4. Since our system allows for the existence of only one procurement organizer and one matching organizer, they are declared as addresses for Ethereum. Since many of them are in the system, the patient's physician, transplant team member, and patient validity are also stated as mappings. Finally, as there are various types for each, blood and organ types are specified as enumerates. Lastly, the primary operations of the organ donation smart contract are Adding New Patient, Test Approval, Registering New Donor, and Matching Process. The specifics of the transplantation procedure are described by a set of properties in the Organ Transplantation smart contract.

To describe the specifics of the different operations included in our smart contracts, we offer 6 algorithms. The phases of the donor contribution smart contract are shown in algorithms 1, 2, and 3 in that order. However, the remaining algorithms serve as examples of the second smart contract, which is the Organ Transplantation smart contract.



The Organ Donation Smart Contract

Figure 4: Entity-relationship diagram for smart contracts.

The establishment of a waiting list phase, wherein new patients are added, is represented by Algorithm 1. The Assigning PatientDoctors and AddingNewPatient functions algorithm is represented by this algorithm. 2. The transplant team will be assigned by the procurement organizer individuals in charge of conducting medical examinations and tests. Algorithm 3 also illustrates the matching procedure. The MatchingProcess function represents this procedure. The organ matching organizer should also include the following to begin this process minimum age, maximum age, type of donor blood, minimum and maximum body mass index, and type of donated organ The removal of the donor organ is represented by Algorithm 4, which is the first stage of the Organ Transplantation smart contract. An authorized transporter will begin the delivery process right away. Algorithm 5 depicts this procedure.

The donor surgeon is in charge of assigning a transporter as the first function. The carrier will then begin the delivery procedure and concluded upon delivery to the transplant surgeon. Additionally, algorithm 6 depicts the receiving and transplanting procedures, where the transplant surgeon verifies that the given organ was received. After that, the transplant procedure will begin. Lastly, the Organ\_Transplantation function illustrates this procedure, requiring the transplant surgeon to enter the patient ID along with the surgery day and time.





[www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

#### Volume 14, Issue 5, May 2025

#### |DOI: 10.15680/IJIRSET.2025.1405123|







[www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

#### Volume 14, Issue 5, May 2025

#### |DOI: 10.15680/IJIRSET.2025.1405123|



#### V. TESTING AND VALIDATION

The main features of the created smart contracts for organ donation and transplantation are tested and verified in this part. The evaluation phase is carried out utilizing the Remix IDE. Table 1 lists the participants along with the Ethereum addresses they used for testing and validation. Furthermore, the inputs utilized for the functions are merely guesses for testing purposes and do not represent actual data. The ensuing subsections provide more details on the logs and transactions of the main smart contract operations.

#### TABLE 1. The Ethereum addresses of participants in the testing scenario.

	Ethereum Address		
Patient's Doctor	0x5B38Da6a701c568545dCfcB03FcB875f56beddC4		
Hospital Transplant Team Member	0x14723A09ACff6D2A60DcdF7aA4AFf308FDDC160C		
Procutmrnt Organizer	0x4B20993Bc481177ec7E8f571ceCaE8A9e22C02db		
Organ Matching Organizer	0x03C6FcED478cBbC9a4FAB34cF9f40767739D1Ff7		
Donor's Surgeon	0x0A098Eda01Ce92ff4A4CCb7A4fFFb5A43EBC70DC		
Transporter	0x583031D1113aD414F02576BD6afaBfb302140225		
Transplant Surgeon	0x5c6B0f7Bf3E7ce046039Bd8FABdfD3f9F5021678		

#### A. SMART CONTRACT FOR ORGAN DONATION

Adding New Patient function, which adds new patients to the waiting list, is executed in Figure6.

In essence, this feature enables the Ethereum network to save the information of new patients for the approved physicians, who are the only players permitted to carry it out. The data that is saved as an event on the Ethereum network is displayed in the "logs" field. The patient ID is "12345," the age is "24," the BMI is "23," the O blood type is "3," as was previously stated, and the type of organ required is "2." Furthermore, the new patient ID that has been saved in the Patient ID array is successfully called in figure 7.

1 Patient ID

2 Date of transplantation

3 Time for transplantation

4. The states of the removed donor organ are represented by the particularized enumeration variable Organ state.

5 if (blood unit state == End Delivery)  $\land$  (caller == Transplant Surgeon)

B. SMART CONTRACT FOR ORGAN TRANSPLANTATION

12247





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

#### Volume 14, Issue 5, May 2025

#### |DOI: 10.15680/IJIRSET.2025.1405123|

The specifics of the donor surgeon's announcement on the removal of the donated organ in the event of an execution are depicted in Figure 10. successfully completed the Removing Donated Organ function. In a similar vein, every task related to the delivery and transplanting phases was completed successfully.

#### VI. DISCUSSION

This section assesses our solution's degree of security, privacy, and confidentiality. Generally, Ethereum-based These outline the expenses related to putting smart contracts into place and running them. Nevertheless, our method uses the private Ethereum blockchain to adjust the price of gas to zero. Therefore, there are no expenses associated. Furthermore, a comparison of our solution with other alternatives already in place is carried out. Lastly, we go over how our solution can be applied to different systems and applications.

#### A. SECURITY ANALYSIS

• Integrity: An event-based approach is used in the suggested organ donation management solution, where each Users can follow the donation and transplantation procedures step-by-step thanks to the transaction's recording and storage on an unchangeable ledger. To ensure that the recipient with the highest priority receives the donated organ, for instance, any ranked list of receivers who have been matched with eligible donors is documented as an event. • Accountability and Authorization

The suggested method uses the "Modifier" capability to write Ethereum smart contracts in Solidity language. This feature enables certain individuals to carry out certain tasks.

Availability: Due to the Ethereum blockchain's decentralization, numerous dispersed nodes are in charge of documenting and recording every transactions that take place within the network, guaranteeing the network's synchronization and availability even in the event of a node failure.
MITM Attacks: Every transaction in the ledger requires the sender's private key signature. This makes man-in-the-middle (MITM) attacks extremely rare by ensuring that attackers cannot alter the blockchain.

#### B. SMART CONTRACT SECURITY ANALYSIS

The organ donation and organ transplantation smart contracts were tested and validated against vulnerabilities using a specific tool called Oyente.

#### C. EXAMINING THE EXISTING SOLUTIONS IN COMPARISON

Table 2 presents a comparison of our solution with the current blockchain-based solutions.

#### D. GENERALIZATION

During the registration, matching, removal, transportation, and transplantation stages of the donated organ transplantation process, our suggested blockchain-based system demonstrates how blockchain technology may help manage and trace the process. It is possible to adapt the smart contracts that are designed to reflect the many stages of the donated organ transplantation management system to other systems that need accountability, tracing, and tracking for extremely sensitive products. For instance, there are numerous uses for delivery functions in the medical field.

# TABLE 2. A comparison of the proposed solution with the current available solutions.

Features	Our Solution	Alandjani [25]	Dajim et al. [23]	Zouarhi [21]
Blockchain Platform	Ethereum	NA	NA	Ethereum
Smart Con- tract	Yes	Yes	No	No
Mode of Operation	Private	Public	Public	Private
Tracing	Yes	Yes	Yes	Yes
Real-Time Monitoring	No	No	No	No
Implement- ation	Yes	No	No	Yes
DApps	No	No	Yes	Yes





[www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

#### **Volume 14, Issue 5, May 2025**

#### |DOI: 10.15680/IJIRSET.2025.1405123|

#### VII. CONCLUSION

In order to manage organ donation and transplantation in a decentralized, responsible, auditable manner, we have presented in this article a private Ethereum blockchain-based solution. traceable, safe, and reliable way. We created intelligent contracts that automatically record occurrences and guarantee the provenance of the data. We provide information on the implementation, testing, and validation of six algorithms. We examine the suggested solution's security to ensure that smart contracts are shielded against frequent threats and weaknesses. We evaluate our solution against other existing blockchain-based solutions. We go over how our solution can be easily modified to satisfy the requirements of other systems dealing with related issues. By creating an end-to-end DApp, our solution can be enhanced in the future. Additionally, a genuine private Ethereum network can be used to deploy and test the smart contracts. Lastly, the Quorum platform might offer enhanced anonymity due to Our method allows other actors permitted in the private blockchain to view transactions between two participants, whilst transactions between entities can only be viewed by particular participants and no one else.

#### REFERENCES

[1] L. A. Dajim, S. A. Al-Farras, B. S. Al-Shahrani, A. A. Al-Zuraib, and R. Merlin Mathew, "Organ donation decentralized application using blockchain technology," in Proc. 2nd Int. Conf. Comput. Appl. Inf. Secur. (ICCAIS), May 2019, pp. 1–4, doi: 10.1109/cais.2019.8769459.

[2] A. Powell. (Mar. 18, 2019). A Transplant Makes History. Harvard Gazette. [Online]. Available: https://news.harvard.edu/gazette/story/2011/09/atransplant-makes-history/

[3] Organ Donation Facts and Info: Organ Transplants. Accessed: Apr. 18, 2021. [Online]. Available: https://my.clevelandclinic.org/health/ articles/11750-organ-donation-and-transplantation

[4] (Mar. 21, 2019). Facts and Myths About Transplant. Accessed: Apr. 21, 2021. [Online]. Available: https://www.americantransplant foundation.org/about-transplant/facts-and-myths/

[5] Organ Procurement and Transplantation Network. Accessed: Apr. 18, 2021. [Online]. Available: https://optn.transplant.hrsa.gov/ resources/ethical-principles-in-the-allocation-of-humanorgans/

[6] How Donation Works. Accessed: Jan. 7, 2022. [Online]. Available: https://www.organdonor.gov/learn/process

[7] UFO Themes. (Aug. 1, 2017). Organ Donation and Transplantation in Germany. Plastic Surgery Key. [Online]. Available: https:// plasticsurgerykey.com/organ-donation-and-transplantation-in-germany/

[8] Harvard Business Review. (Dec. 13, 2021). Electronic Health Records Can Improve the Organ Donation Process. Accessed: Apr. 8, 2022. [Online]. Available: https://hbr.org/2021/12/electronic-health-records-can-improvethe-organ-donation-process

[9] U. Jain, "Using blockchain technology for the organ procurement and transplant network," San Jose State Univ., San Jose, CA, USA, Tech. Rep., 2020, doi: 10.31979/etd.g45p-jtuy.

[10] M. He, A. Corson, J. Russo, and T. Trey, "Use of forensic DNA testing to trace unethical organ procurement and organ trafficking practices in regions that block transparent access to their transplant data," SSRN Electron. J., 2020, doi: 10.2139/ ssrn.3659428.

[11] Livemint. The Illegal Organ Trade Thrives in India-and it isn't Likely to End Soon. Accessed: Dec. 21, 2021. [Online]. Available: https://www.livemint.com/Politics/pxj4YasmivrvAhanv6OOCJ/Whyorgan-trafficking-thrives-in-India.html

[12] D. P. Nair. (2016). Organ is Free, Transplant Cost is Problem. [Online]. Available: https://timesofindia.indiatimes.com/life-style/ articleshow/54014378.cms

[13] P. Ranjan, S. Srivastava, V. Gupta, S. Tapaswi, and N. Kumar, "Decentralised and distributed system for organ/tissue donation and transplantation," in Proc. IEEE Conf. Inf. Commun. Technol., Dec. 2019, pp. 1–6, doi: 10.1109/cict48419.2019.9066225.

[14] V. Puggioni. (Feb. 26, 2022). An Overview of the Blockchain Development Lifecycle. Cointelegraph. Accessed: Apr. 8, 2022. [Online]. Available: https://cointelegraph.com/explained/an-overview-of-the-blockchaindevelopment-lifecycle

[15] History of Blockchain. Accessed: Apr. 8, 2022. [Online]. Available: https://www.icaew.com/technical/technology/blockchain-andcryptoassets/blockchain-articles/what-isblockchain/history

[16] M. Hölbl, M. Kompara, A. Kamišalić, and L. N. Zlatolas, "A systematic review of the use of blockchain in healthcare," Symmetry, vol. 10, no. 10, p. 470, Oct. 2018, doi: 10.3390/sym10100470.





www.ijirset.com |A Monthly, Peer Reviewed & Refereed Journal| e-ISSN: 2319-8753| p-ISSN: 2347-6710|

#### Volume 14, Issue 5, May 2025

#### |DOI: 10.15680/IJIRSET.2025.1405123|

[17] V. Ferraza, G. Oliveira, P. Viera-Marques, and R. Cruz-Correia, "Organs transplantation—How to improve the process ?" Eur. Fed. Med. Inform., Cardiff, U.K., Tech. Rep., 2011, doi: 10.3233/978-1-60750-806-9-300. [18] Organ Procurement and Transplantation Network. Accessed: Nov. 27, 2021. [Online]. Available: https://optn.transplant.hrsa.gov/governance/ public-comment/standardize-organ-coding-and-tracking-system/

[19] A. Bougdira, A. Ahaitouf, and I. Akharraz, "Conceptual framework for general traceability solution: Description and bases," J. Model. Manage., vol. 15, no. 2, pp. 509–530, Oct. 2019.

[20] N. Mattei, A. Saffidine, and T. Walsh, "Mechanisms for online organ matching," in Proc. 26th Int. Joint Conf. Artif. Intell., Aug. 2017, pp. 345–351, doi: 10.24963/ijcai.2017/49.

[21] S. Zouarhi, "Kidner—A worldwide decentralised matching system for kidney transplants," J. Int. Soc. Telemed. E-Health, vol. 5, Apr. 2017, Art. no. e62. [Online]. Available: https://journals.ukzn.ac.za/ index.php/JISfTeH/article/view/287

[22] Kidner Project. Accessed: Dec. 28, 2021. [Online]. Available: https://www.kidner-project.com/

[23] L. A. Dajim, S. A. Al-Farras, B. S. Al-Shahrani, A. A. Al-Zuraib, and R. M. Mathew, "Organ donation decentralized application using blockchain technology," in Proc. 2nd Int. Conf. Comput. Appl. Inf. Secur. (ICCAIS), May 2019, pp. 1–4, doi: 10.1109/cais.2019.8769459.

[24] A. Soni and S. G. Kumar, "Creating organ donation system with blockchain technology," Eur. J. Mol. Clin. Med., vol. 8, no. 3, pp. 2387–2395, Apr. 2021.

[25] G. Alandjani, "Blockchain based auditable medical transaction scheme for organ transplant services," Tech. Rep., 2019, doi: 10.17993/3ctecno.2019.specialissue3









# INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH

IN SCIENCE | ENGINEERING | TECHNOLOGY





www.ijirset.com