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# Blockchain-based Organ Donation and Transplantation

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**ABSTRACT:** The current organ gift and transplantation structures present different necessities and hardships to the extent that enlistment & giver recipient planning & organ removal & organ transport & transplantation with legal & clinical & moral & particular objectives. Along these lines a beginning to end organ gift and transplantation system is supposed to guarantee a fair and useful cycle to work on persistent experience and trust. In this paper & we propose a secret Ethereum block tie based reply for engage organ gift and transplantation the leaders in a manner that is totally decentralized & secure & detectable & auditable & private & reliable. We cultivate insightful arrangements and present six estimations close by their execution & testing & endorsement nuances. We evaluate the introduction of the proposed plan by performing insurance & security & mystery examination as well as differentiating our response and the ongoing courses of action.

## KEYWORD:

- Blockchain technology
- Organ donation
- Transplantation
- Decentralization
- Smart contracts
- Data security
- Transparency
- Traceability
- Medical records
- Patient empowerment
- Healthcare interoperability
- Ethical considerations
- Regulatory compliance
- Fraud prevention
- Efficiency

## 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 among humankind's greatest honorable actions to preserve human lives. of individuals through organ transplantation. Towards a fruitful transplant, the organ must be in acceptable working conditions with donor-recipient matching, and its removal should not pose a life-threatening risk to the donor. The initial donation of organs that was successfully 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. In fact waiting awaiting an organ's arrival transplant twenty people die every day, and a new patient is added to the waiting list in every ten minutes. More importantly, accessing the organ donation waiting list is a basic requirement for organ allocation. Referral for transplantation can be affected by both geographical and socioeconomic factors. Therefore, the allocation process on the waiting list should not discriminate against certain groups of patients.

Donating an organ is conducted in two different ways, including deceased donation and living donation. Figure 1 illustrates the typical flow chart for donating an organ and transplanting it to a patient. First the giver is examined by



both the transplant professionals at the hospital along with whether the donor is deceased A test for brain death is performed. Meanwhile In the event that the giver is still alive & doctors examine the giver plus ensure because the giver is fit for live donation. Then all medical records are reported to the person in charge of procurement. The procurement organizer is responsible for evaluating the donor's condition to decide should he be a fit donor and ensuring that the giver is properly logged in the medical system. Next if the evaluation was successful shows implies the giver is eligible for contribution the procurement coordinator sends all the information about organ transplants organizer. This step can be performed only should the giver gives consent to donate to a nameless person. After that the match procedure within the available donors and individuals on the awaiting roster is performed by transplanting organs organizer. Consequently a ranked list is generated as an output and provided to the transplantation surgeons. Next the doctor who does transplants decides whether the part is appropriate for the individual based on various factors including the donor's health records and the current health of the prospective recipient. Later upon acceptance by the transplantation surgeon the donated organ the surgeon for the donor is informed about removing the donated organ. Finally the organ that was donated is transported to the patient's hospital and received by the transplant surgeon. But still suppose this situation is for a living contributor & the outcome is planned to donate to a known person by name. In that case, the data will go directly to the transplant surgeon to start the surgery of removing and transplanting the donated organ.

Previously when a patient died or was near death the organization that purchases organs and hospital worked together to perform a preliminary clinical test to decide if the patient could function as an organ donor. This call takes around 15 minutes, and only 6% of these calls result in possible organ donor's being identified. Over the years, this phone call has been replaced by a text letter generated through centralized computer networks that store all the data required for this process. However, the core issue with this strategy is that the security and validity of such data are entirely dependent on the transplantation centers' ability to keep their systems secure and identify potential harm to donors and recipients. The accuracy of the wait-list data is largely dependent on people's faith and trust in these centers' ability to keep it secure from hackers and fraudulent employees. Moreover, transparency is another challenge affecting the success of the organ donation process. According to World Health Organization (WHO) reports, up to 10% of transplanted organs may have been obtained unethically via organ trafficking, but the exact numbers are unknown. The lack of transparency in the current system among participants leads to illegal organ trade and purchases and medical professionals engaging in unethical practices. Moreover, there are hospitals that take advantage of the patient's need for the organ and offer the opportunity to transfer the organ to those who pay a higher amount to the medical facility while ignoring the patient with the highest priority in the queue list. In addition, current transplant systems are also frequently slow, which is unacceptable in such a critical and life-threatening scenario. Such systems are hardly up to date with the minimum security standards. So far, there has recently been a surge in security breaches affecting user privacy and system integrity. In general, modern systems manage data through the use of standard databases; however, most hospitals, health ministries, and other medical facilities lack a standardized data communication system.

## II. LITERATURE SURVEY

The recommended system according to L A Dajim, is a decentralised programming for organ donation system built on a block chain. Patients would be able to enrol their details via a web-based application which would include their clinical ID blood type organ type & state. However the earliest in earliest out principle would be applied by the system in the unlikely event that a patient is in poor condition.

A Powell suggested that organ gift and transplantation systems have unique prerequisites and hindrances to the extent that enlistment provider recipient planning & organ departure & organ movement & transplantation, which are completely hampered by legal & clinical & ethical & specific limits. To deal with understanding experience and conviction beginning to end organ gift and transplantation stages are principal to ensure a fair and compelling system. We offer a classified Ethereum block chain-based system for regulating organ gift and transplantation in a completely decentralized & secure & perceivable & auditable & private & trustworthy way. We go with keen arrangements and three electronic modules for detail endorsement.

We survey the presentation of the proposed arrangement by leading protection & security & privacy appraisals and contrasting it with the present system.

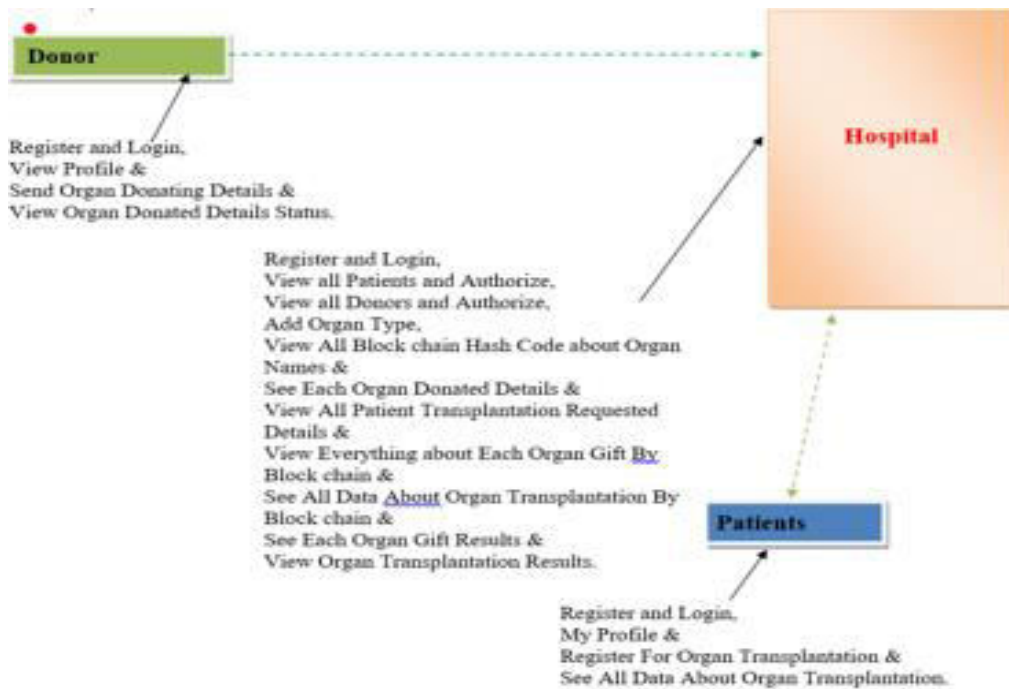
Block chain & transplantation & organ donation Ethereum & Decentralized are some of the terms used. The procedure of physically taking an organ or tissue from one person and implanting it into another person is known as organ donation. Transplantation is required when the recipient's organ fails or is damaged due to illness or accident.





Among the most important advancements in contemporary medicine is organ transplantation. Unfortunately the demand for organs donors outnumbers the number of persons who give. Every day, 21 individuals Americans pass dying while awaiting an organ transplant. Transplant & over 107,380 men, women, and children await life-saving organ transplants.

### III. SYSTEM DESIGN



### IV. RESULTS AND OUTCOMES

**Enhanced Transparency:** Blockchain can create a transparent and immutable record of organ donations, including the history of the organ (donor, transportation, storage conditions) and the recipient's status (waiting list position, medical need).

**Improved Traceability:** Each transaction (e.g., organ donation, transportation) can be tracked in real-time, reducing the risk of organ trafficking and ensuring the authenticity of the organs being transplanted.

**Data Security and Privacy:** Blockchain's decentralized nature and cryptographic techniques enhance data security, protecting sensitive information about donors and recipients while allowing authorized parties (e.g., healthcare providers, regulatory bodies) access when necessary.

**Efficiency in Matching:** Smart contracts on blockchain platforms can automate the matching process between donors and recipients based on medical criteria, potentially reducing wait times and ensuring quicker access to organs.

**Reduced Fraud:** Blockchain can minimize fraud and error by verifying the identity and medical history of donors and recipients through a secure and transparent system, thereby increasing trust in the donation process.

**Global Accessibility:** Blockchain can facilitate cross-border organ donation by providing a standardized and secure platform for sharing information across different healthcare systems and jurisdictions.

**Patient Empowerment:** Patients can have more control over their medical records and can consent to the use of their data for research and donation purposes securely and transparently.



**Research and Development:** Blockchain can support research efforts by providing a secure and comprehensive database of organ donation and transplantation data, which can be used to identify trends, improve outcomes, and develop new treatments.

**Regulatory Compliance:** Blockchain can help in ensuring compliance with regulatory requirements and ethical standards by providing an auditable and tamper-proof record of all transactions related to organ donation and transplantation.

**Cost Reduction:** By streamlining administrative processes and reducing the incidence of fraud, blockchain has the potential to lower overall costs associated with organ donation and transplantation, benefiting healthcare systems and patients alike.

While these outcomes suggest significant potential benefits, it's important to note that widespread adoption of blockchain in organ donation and transplantation will require overcoming technical, regulatory, and ethical challenges. However, ongoing research and pilot projects are exploring these possibilities, aiming to realize the full potential of blockchain technology in improving organ donation and transplantation processes.

**Snapshots:**

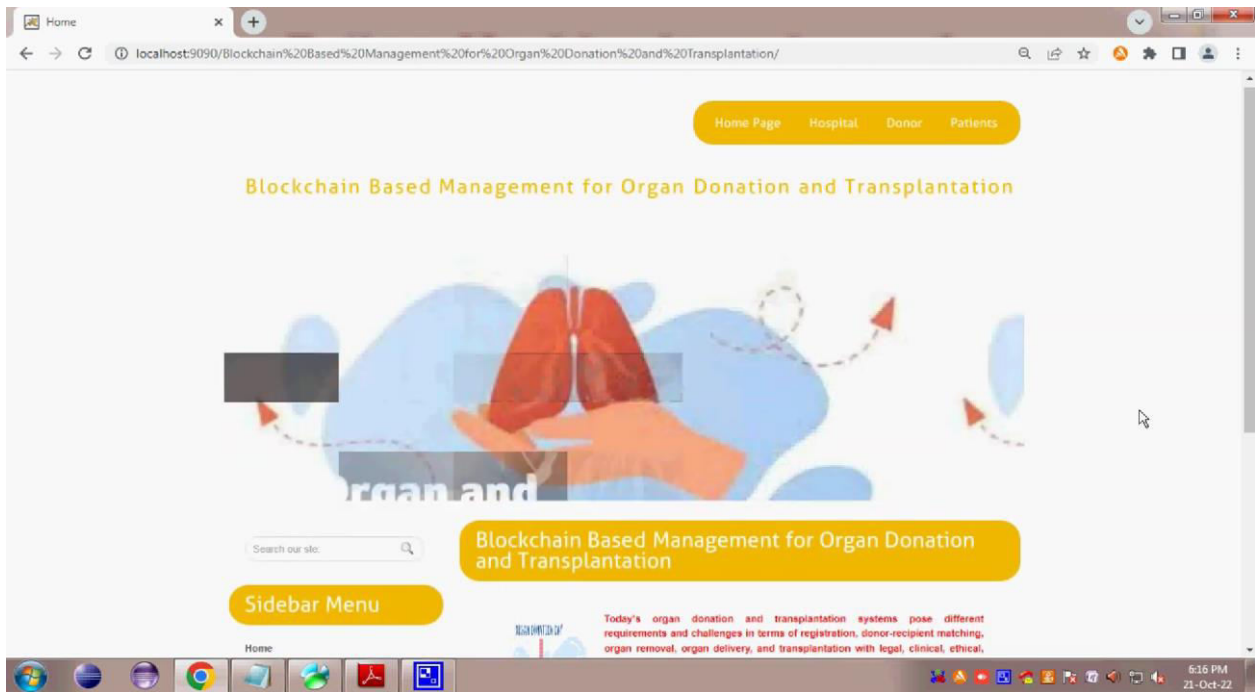


Fig 4.1 : Home Page

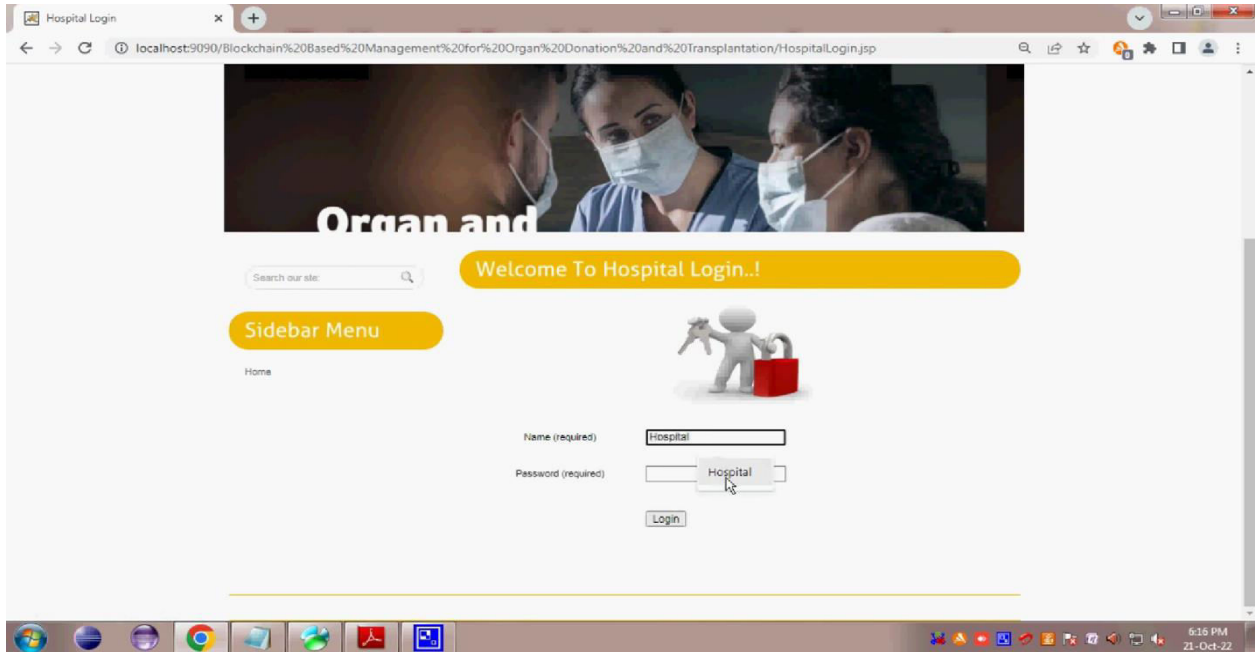


Fig 4.2 : Hospital Login Page

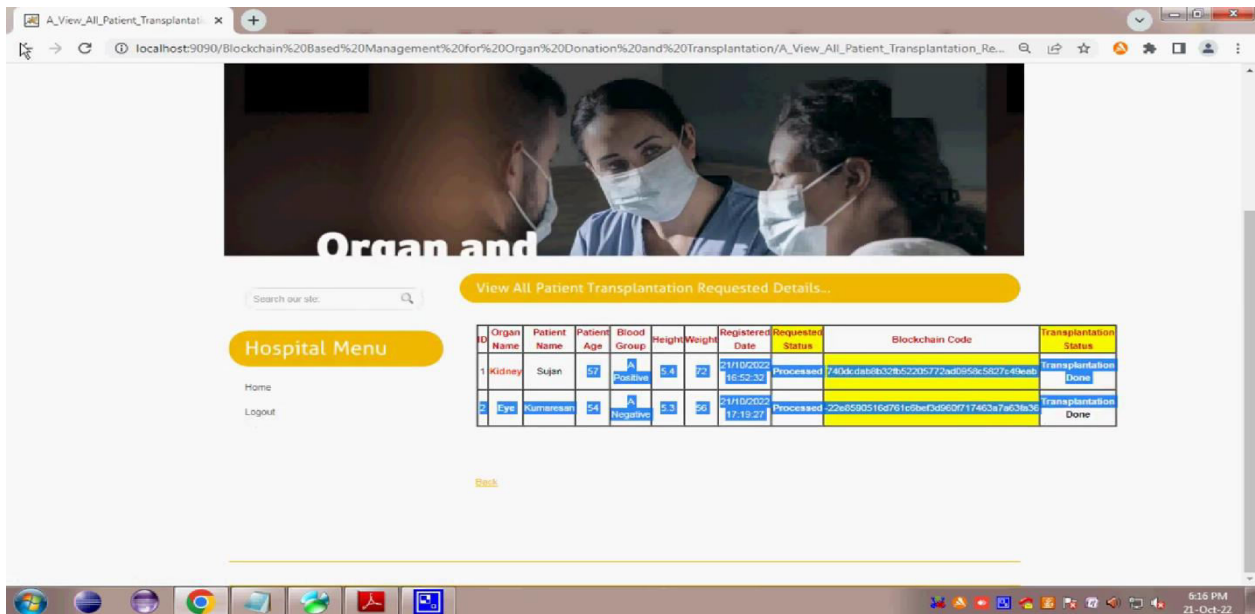


Fig 4.3 : View All Patient

### V. CONCLUSION

In this work, we have advanced a confidential Ethereum block chain framework that gives decentralized & straightforward & auditable & discernible & secure & solid administration of organ gift and transplantation. We made savvy gets that naturally record events and assurance the provenance of the information. We offer six techniques alongside data about their testing & approval & execution. To guarantee that savvy contracts are protected against incessant attacks and shortcomings & we analyze the security of the recommended arrangement. We think about our answer in contrast to other existing block chain-based other options. We portray how our strategy can be effortlessly reached out to fit the prerequisites of different frameworks that face equivalent issues.



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