International Journal of Engineering Technology and Management Sciences
Website: ijetms.in Issue: 2 Volume No.8 March - April – 2024
DOI:10.46647/ijetms.2024.v08i02.023 ISSN: 2581-4621

BLOCKCHAIN-BASED MANAGEMENT FOR ORGAN DONATION AND TRANSPLANTATION

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***Abstract*--** Today's organ donation and transplantation systems pose different requirements and challenges in terms of registration, donor-recipient matching, organ removal, organ delivery, and transplantation with legal, clinical, ethical, and technical constraints. Therefore, an end-to-end organ donation and transplantation system is required to guarantee a fair and efficient process to enhance patient experience and trust.

In this paper, we propose a private Ethereum blockchain based solution to enable organ donation and transplantation management in a manner that is fully decentralized, secure, traceable, auditable, private, and trustworthy. We develop smart contracts and present six algorithms along with their implementation,testing, and validation details. We evaluate the performance of the proposed solution by performing privacy, security,and confidentiality analyses as well as comparing our solution with the existing solutions.

Keywords— Blockchain, Ethereum, Decentralized, Organ Donation, Transplantation

Introduction

Organ donation after cerebrum demise has gained momentum in India in the last not many years. Cerebrum demise as a type of death and made the offer of organs a culpable offense. With the acknowledgment of cerebrum demise, it got conceivable to embrace kidney transplantations as well as start other strong organ transplants like liver, heart, lungs, and pancreas.

Donating an organ or organs is one of the most respectable demonstrations of mankind, sparing the lives of the individuals who endure genuine diseases that require organ transplantation. At the point when the human body gets tainted with malady urgent organs in the body, for example, the kidney, lungs, heart, pancreas, liver, or digestion tracts become non-functional, making life deplorable generally prompting passing.

Anybody can get presented to an infection. Making an organ donation is a vital commitment to sparing lives. Organ transplantation tasks started during the 1950s and upset drug, sparing incalculable lives and making life simpler for the individuals who endure long haul sicknesses. On account of givers, they might be alive, dead, or in certain nations, cerebrum dead. Any live individual must be alive and well to give, and gift is took into account organs that won't influence their well being, for example, a kidney, liver, lungs or bone marrow. There are no greatest or least age limits for organ donation, however the organ must be in a decent condition and its misfortune won't present a risk to life. In many nations minors can possibly give organs in the event that one of

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their gatekeepers gives assent. On account of perished organ donation, a giver probably gave their assent while they were as yet alive, for the most part by marking their name in the donation framework.

Literature survey

Organ donation is the most rewarding medical care which has saved many lives. The organ donation rate in India have increased from a dismal 0.05 per million population to 0.8 per million population in a span of few years. Organ donation rates in India are minuscule compared to Croatia's 36.5, Spain's 35.3, and America's 26 per million, respectively. The vast difference between the demand for organs and their poor supply is the main issue of concern.

Over 147,913 fatalities were attributed to road traffic accidents in India, in the year 2017. In nearly 40–50% of road accident fatalities, the cause of death was head injury. If 5–10% of all brain-dead patients are considered for organ harvesting, there would be no requirement for a living person to donate organs.2 In 1994, brainstem death was legalized in India.

The Transplantation of Human Organs (THO) Act of 1994 and the subsequent amendments in 2011 and 2014 form the legislative foundation for brain death declaration and organ donation. The criteria for brainstem death declaration in our country is based on United Kingdom guidelines. Because all the potential donor enter ICU at some point of time, intensivist have important role in giving care to potential organ donor.

EXISTING SYSTEM

In the existing system , the donor details are stored as the database in the blockchain technology. This existing system is a blockchain based website that would secure and automate the organ donation process while protecting sensitive patient and donor medical records using blockchain technology to eliminating any possibility of manipulation.

It is designed specifically for use in the medical field related to organ donations, hospitals, patients, organizing the donation process, and making it accessible while maintaining the integrity of the system. It will provide an easy solution to maintain the anonymity of medical records.

PROPOSED SYSTEM

The proposed system works based on the existing system’s one of the major problem. In this system, the organ donor’s details are stored even if the organ donor dies. If any of the person dies, their tissues such as bone, skin ,heart valves, veins, tendons, ligaments and corneas can be donated within the first 24 hours of death. And even the organs that can be donated after death are heart, liver, kidneys, lungs, pancreas, and small intestines. These details can also be included into the database list. By using these kind of practices, many of the lives can be saved. Traditional organ donation requires a person to be in a hospital and on a ventilator when they are pronounced brain dead. One deceased donor can save up to 8 lives through organ donation. By using this proposed system many of the patients life can be save.

RESULT

The people in need of organ can easily get donors by proposed information tracking using blockchain. It saves time as he can search donors without going anywhere. Using this system, user can get organ in time and can save.

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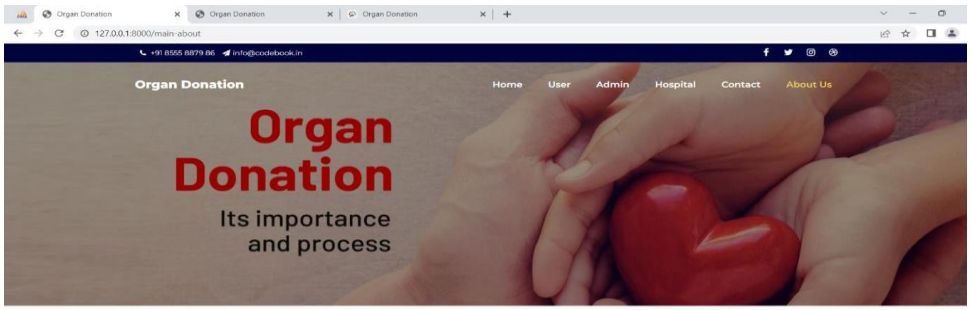

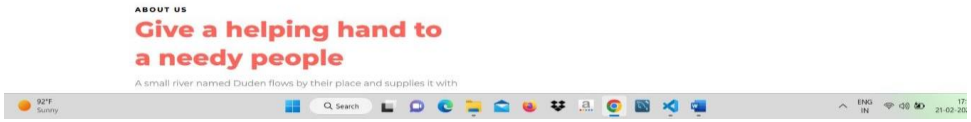

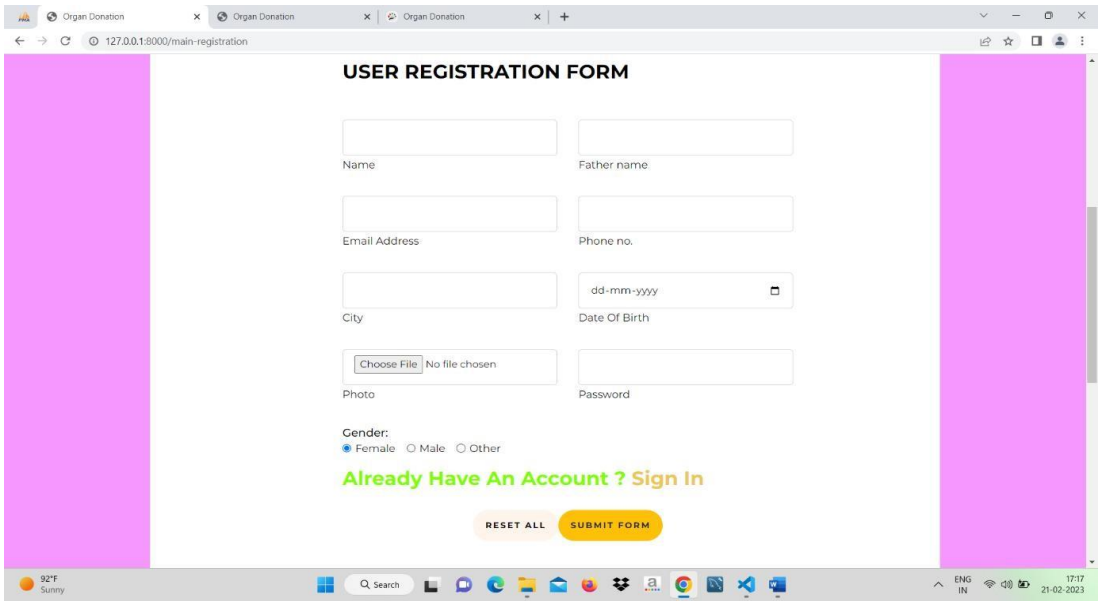

CONCLUSION

In the century, transplantation arose as a stimulating and innovative medical field, which required an enormous effort in various medical disciplines (immunology, infectious disease, genetics, molecular biology, surgical technology, intensive care, etc.). Improvements in transplant outcomes have brought about numerous clinical and ethical dilemmas, and their solutions allowed development in medical knowledge even beyond the transplantation field. It is, therefore an ethical duty of the transplant community to continue to embrace innovation and overcome the limits of current systems in every medical aspect. Currently, medical digitalization is a reality that requires all transplant personnel to play a leading role. Among the several innovations that Information and Communication Technologies could bring to transplant clinical practice, DLT could soon become of pivotal importance in overcoming some limitations of transplant programs. DLT technology, thanks to its security and scalability, could boost transplants' programs and the reduce black market, allowing a real integration between different national health systems with real-time auditability, thanks to its distributed, efficient, secure, trackable, and immutable nature.

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