

DONORG

ABSTRACT

The DONORG powered by NOTTO (National Organ and Tissue Transplant Organization) is a national decentralized organ donation and organ transplant matching ecosystem. The organ donation is one of the greatest medical marvels of the twentieth century which has saved the lives of several patients.

INTRODUCTION

The DONORG is an Ethereum based permissioned blockchain organ donation and organ transplant matching ecosystem (can be an NGO or a central government funded project like NOTTO) that maintains or act as the central mediator for receiving organs and transplant match assistor for the received organs in India.

PROBLEM AT HAND

The organ donation is a process where one decides to donate organs or biological tissues to a living recipient. This act of care is a sacred process that must be done with at most caution. The scandals regarding harvest of organs from people and matching it with people for huge lump of money and the process of moving patients in the recipient list upwards for money is also an act that undermine the current system. A system that truly matches the recipient with accurate medical (based on medical history, current condition of health, and other factors) and decide if the patient needs a transplant and meets the criteria to be listed. Like for kidney transplant, other than blood group, main criteria is time since patient is on regular dialysis. Similarly, for other organs, criteria are

different based on medical history, current condition of health, and other factors) and a system that can live connect living recipients with living donors for donations of other non-organ essentials like bone marrow, rare blood are also much required. And finally, a single authority having all the control regarding the donor registration, data handling and finally matching of the same needs to be transferred to a decentralized and controlled system where anybody could access the data about recipient list and donation is necessary

PROPOSED SOLUTION

The proposed system is an organ donation decentralized app using Ethereum. It would be a web application for patients to register their information-most importantly medical ID, blood type, organ type and state for both donation and recipient. The Ethereum based ecosystem has a MCN (Medical Center Node). It first has to register with DONORG powered by NOTTO. After the registration it can start to accept potential donor list and potential recipient list via DONORG, validated by the medical centers (nodes) and are only accepted based on consensus between the nodes. The registration details of MCN are also made available in blockchain as solid reference. The NOTTO admin governing these procedures validates the MCN and add their details to blockchain. But offline details and paper works are still needed to be completed in order to get accepted to DONORG. This is done by NOTTO itself as it is a governing body. The donor and recipient are also in need to complete offline tests to get added as a particular donor and recipient. This can be done on any MNC registered with DONORG. Donor and recipient can check their details being added to the DONORG by going to the NOTTO website with their private identification number. A public waiting list is also been added as feature in DONORG in NOTTO website. The system would work on a first-in, first-out basis unless a patient is in critical condition. The donor list and recipient list data are available to public for anytime view. The MCN after this can finally match a donor and recipient after the transplantation has occurred as a matched record. The matched donor details will be removed from both donor list and recipient waiting list and will be added to matched list forever. The offline details are still maintained for additional security purposes. This blockchain based ecosystem provides transparency and avoid any kind of misuse during both organ harvest and organ recipient evaluation.

EXISTING IMPLEMENTATION

Several research papers were published that deals with similar problem and potential solution. The closest existing implementation include [kidner-project](#). The kidner-project is a platform that helps health care facilities finding match for kidney paired-donation. It's a global database, Blockchain-based, secured with cryptographic tools.

NEED FOR ETHEREUM PUBLIC BLOCKCHAIN

The chances of the data regarding donation and transplantation getting tampered when it is handled by a single entity is very high. The ease access of such data to the public is not available or sometimes may not be the original data. The introduction of such system towards decentralized Ethereum platform can vouch for the data integrity and ease live access of original data. Everything could be tied to a blockchain ledger containing verifiable time-stamped records of creation and ownership. These systems could also be used to transfer value between users, detect changes in documents, or prevent data tampering. The Ethereum here in DONORG has been used as a public tamper proof storage ledger system rather than a currency-based transaction ecosystem. The project may be improved upon after the first iteration and as well as by the decision of NOTTO for better security of the ecosystem and feasibility for all the users.