

## GIVE THE GIFT OF HEALTH: HEART2HEAL

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**Abstract—** “The measure of life is not its duration but its donation.” Organ donation is a vital medical practice involving the transfer of organs and tissues from one individual to another in critical need. With the growing gap between the number of patients awaiting transplants and the limited availability of donated organs, the importance of organ donation has become more pronounced than ever. The demand for organs continues to rise, while the supply remains significantly low. This imbalance underscores the urgent need to increase awareness and participation in organ donation programs. Living donors play a key role, often donating a kidney or part of the liver, while deceased donors can contribute essential organs such as the heart, lungs, kidneys, pancreas, and intestines. A successful transplant depends heavily on accurate donor-recipient matching, making organ donation a highly specialized field. However, despite its significance, public understanding of the process remains limited. Misconceptions, ethical concerns, and widespread myths contribute to scepticism and hesitation among potential donors. Addressing these barriers through education, awareness campaigns, and transparent communication is essential. Encouraging informed participation and building trust within the community are crucial steps toward bridging the gap between organ supply and demand. By fostering a culture of donation, healthcare systems can move closer to saving more lives and improving the overall effectiveness of organ transplantation programs.

**Keywords—** Organ donation, public awareness, Misconceptions, Registration process.

### I. INTRODUCTION

Organ donation is a life-saving medical procedure wherein organs or tissues are transplanted from a donor—either living or deceased—into a recipient suffering from end-stage organ failure or irreversible damage. This act of donation has the potential to save multiple lives and significantly improve the quality of life for affected individuals.

The history of organ transplantation dates back to the early 20th century, with a major milestone occurring in 1954 when the first successful kidney transplant was performed between identical twins. Another landmark moment came with the development of immunosuppressive drugs in the 1960s, which made transplants viable even when there were genetic differences between donor and recipient. These advancements greatly increased transplant success rates and expanded the scope of organ transplantation.

To ensure ethical practices and prevent illegal activities, several countries introduced legislation to regulate organ donation. The United States enacted the Uniform Anatomical Gift Act in 1968, and India followed with the Human Organ Transplantation Act in 1994. These laws have helped foster transparency and build public trust in the donation system.

Despite technological and medical advances, a significant gap persists between the number of patients needing organ transplants and the availability of donated organs. Living donors can donate a kidney or a portion of the liver, while deceased donors can contribute multiple organs such as the heart, lungs, kidneys, pancreas, intestines, and various tissues. However, successful transplantation relies heavily on compatibility between donor and recipient, making the matching process complex and critical.

Public misunderstanding, misinformation, and ethical concerns continue to hinder wider participation in organ donation. Myths and misconceptions often lead to confusion and hesitation among potential donors. Therefore, raising awareness and promoting accurate knowledge is essential to encourage informed choices and active participation.

A dedicated and informative website can serve as an effective platform to address these challenges. By offering clear, accessible information and an intuitive interface, such a platform can help users understand the organ donation process, register as donors, and engage with the system confidently.

## II. LITERATURE SURVEY

This section includes citations to all the relevant past literature that uses various techniques for the Organ Donation website.

A Decentralized and Cooperative Approach to Organ Donation Management Using Ethereum Blockchain (2024), see [1]

This study leverages Ethereum blockchain technology to enhance transparency, security, and efficiency in organ donation management through smart contracts and decentralized applications. It ensures data integrity, donor-recipient matching, and privacy protection using SHA-based cryptographic algorithms and secure hashing. The tamper-proof storage mechanism strengthens trust and sustainability. However, challenges remain in untested smart contracts and scalability due to data constraints, indicating the need for further exploration of its feasibility in large-scale implementations.

Secure Data Protection for Organ Donation Using Blockchain Technology (2024), see [2]

This study explores the role of blockchain technology in ensuring secure, private, and transparent organ donation transactions through encryption, which enforces immutability. Key features include controlled access, restricted modifications, and faster transaction execution. By regulating donors and aligning with legal frameworks, the system enhances scalability and trust. Integration with the Data Encryption Standard further strengthens security and data integrity. However, challenges persist in terms of development costs, technical complexities, scalability, and regulatory compliance, highlighting the need for further advancements before widespread adoption.

Enhancing Organ Donation Through Blockchain Technology (2024), see [3]

This study explores how blockchain improves the organ donation process by leveraging decentralization, transparency, and smart contracts. Key advancements include decentralized identity management, data encryption, AI integration, and real-time tracking via IoT, ensuring security and efficiency. The system reduces fraud, preserves privacy, and promotes ethical practices. However, challenges such as regulatory barriers, data security concerns, and technological complexity hinder widespread adoption. Additionally, scalability limitations, interoperability issues, and high implementation costs make the integration of electronic health records (EHRs) particularly difficult for smaller healthcare facilities.

“Securing Organ Donation Using Blockchain see [4]”

This methodology employs blockchain to establish a decentralized network of connecting donors with recipients in transparent and secure ways. It includes smart contracts, RFID tags for tracking organs, and a hospital management interface. The system improves efficiency and facilitates

monitoring through machine-to-machine communication as well as through the automated verification of processes along the way to transplantation. However, dependency on technology, possible failures with technology, and the simple fact that people don't accept changes easily in the current health system may affect the implementing and adopting of the proposed methodology.

“Blockchain-Based Management for Organ Donation and Transplantation [5]” This paper discusses a blockchain-based organ donation and transplantation framework based on automation by smart contracts, stages of interaction between the donor and recipient, and multi-agent systems. Adoption of scanning technology for tracking and use of non-blockchain solutions further enhanced system efficiency. Compared with traditional approaches, this method underscores improved transparency, accountability, and scalability to eradicate some of the critical inefficiencies in organ donation management. Incomplete blockchain implementation, fuzzy organ matching criteria, and dependence on secure transplantation centers are amongst the challenges. Moreover, a lack of front-end application usability and deficiencies in its transparency show vulnerabilities to unwanted malicious practices are to be worked upon in future improvements.

“Online Organ Donation Using Blockchain [6]” The private Ethereum blockchain shall be used to frame an organ donation framework to promote security, transparency, and efficient operation. Approaches that would be supportive in the implementation are multi-specialist platforms, workflow optimization, and public awareness campaigns. Challenges, including high complexity in implementation, resistance from the stakeholders, and issues of privacy, may also deter uptake. Other scalability problems, regulatory barriers, and a need for technical literacy only exacerbate organizational adoption problems. In addition, there is a risk of misuse by authorized participants that require robust security arrangements to protect the system's integrity and thus instill trust.

“Organ Donation - Current Indian Scenario [7]” The National Organ and Tissue Transplant Organization (NOTTO) has improved organ utilization in India, especially in heart transplants. The Transplantation of Human Organs Act (1994) provides a legal framework, including brain death certification. However, India's organ donation rate is only 0.26 per million, far lower than Spain's 35.3. Myths, lack of awareness, and no centralized registry hinder donations. Better hospital coordination, awareness campaigns, and government support are needed to close the demand-supply gap. Simplifying donation procedures and educating the public can significantly boost organ availability.

“Organ Donation Awareness [8]” Organ donation rates in Turkey remain low, with only 472 cadaver donors

recorded in 2018 despite 1,969 brain death cases. The majority of transplants (70%) come from living donors, contrasting with countries like England, where 80% are from cadaver donors. Over 22,000 patients await kidney transplants, and nearly 7,000 die annually while waiting, highlighting the urgent need for awareness and participation. Misconceptions about brain death, cultural concerns, and legal consent requirements contribute to hesitancy. Strengthening public awareness campaigns, addressing misinformation, and improving healthcare coordination are key to increasing donation rates and saving lives.

“Organ donation in India and Nurses as a change to lead in Organ Donation: Scooping Review of Organ Donation [9]” India’s organ donation rate remains critically low at 0.34 per million, far behind countries like Spain (35.3) and the USA (26). Public awareness is limited, with misconceptions and cultural beliefs discouraging donation. Nurses play a crucial role in educating families, influencing consent, and bridging communication gaps in hospitals. The opt-in consent system further slows donations compared to opt-out models used elsewhere. Barriers include legal complexities, family reluctance, and limited healthcare infrastructure. Strengthening nursing education, policy reforms, and targeted awareness campaigns can significantly improve donation rates and save lives.

#### IV PROPOSED METHODOLOGY

This website is designed to improve public understanding and awareness about organ donation. It provides a user-friendly platform where individuals can learn more about the organ donation process, register as donors, and track their donation status.

##### A. System Architecture:

Fig 1 shows a login page that serves as the gateway for users to access a Organ Donation platform (Heart2Heal). Existing users can log in using their email and password, gaining entry to their personalized accounts. New users can register, creating an account to join the community. The page suggests a service offering resources or connections related to Organ Donation. The "About" and "Contact" links imply further information and support options are available

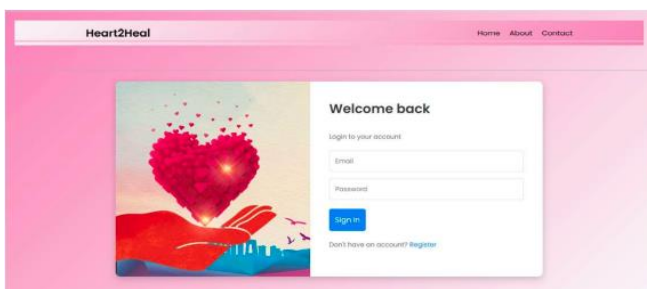


Fig 1: Login page

##### B. User Interface Design:

Fig 2 shows Registration form for Organ Donation website. Users are prompted to select their role (Donor, Recipient, Admin) and provide personal details like full name, email, phone, and password to create an account. Users are prompted to select their role (Donor, Recipient, Admin) and provide personal details like full name, email, phone, and password to create an account. The page enables new users to register and contribute to the successful Organ Donation process.



Fig 2: Registration form

Fig 3 shows the donor dashboards for "Heart2Heal," an organ donation platform, welcoming user in their specified role (Donor, Receiver) It provides an overview of India’s donation activity, displaying total donations, pending donations, and lives saved. Users can initiate organ donations through the "Donate an Organ" button and track the status of their donations via "Check Donation Status." The "Helpful Resources" section offers access to FAQs, donation guidelines, and tips for successful donations.



Fig 3: Donor dashboards

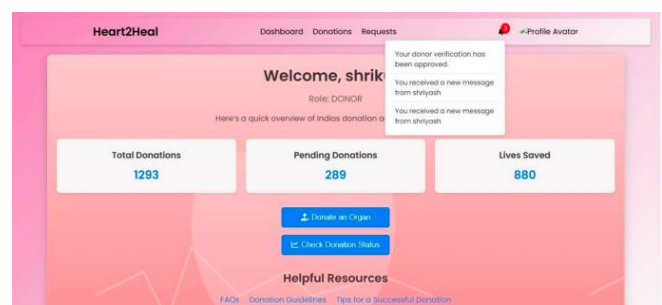


Fig 4: Notification Bar



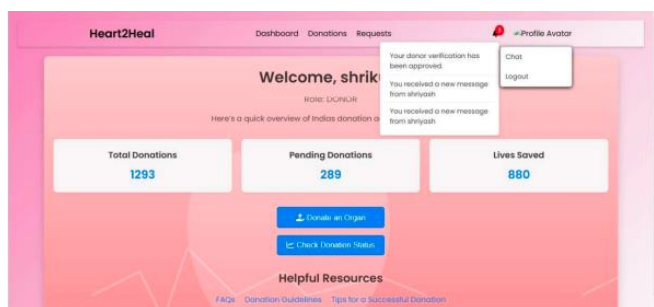


Fig 5: Chat

The dashboard acts as a central hub for donors to manage their contributions and stay informed about the impact of their actions.

C. Database Schema:

Fig. 4. 2 shows that the first query, SHOW TABLES, lists the tables present in the organ database. These include chats, likely for storing communication between users; donors, containing information about individuals willing to donate organs; matches, which tracks successful or pending pairings between donors and recipients; notifications, for system alerts and messages; recipients, holding data about individuals in need of organ transplants; users, which stores user account information; and verification, possibly intended for tracking verification processes.

The SELECT \* FROM users query displays user details. We see columns for id, email, password (hashed for security), phone, and role. The role column indicates whether a user is a DONOR, RECIPIENT, or ADMIN.

The SELECT \* FROM donors query shows information about donors. Columns include donor\_id, address, blood\_type, dob (date of birth), email, status (likely verification status), emergency\_contact, full\_name, gender, legal\_consent, lifestyle\_habits, medical\_history, and organ\_type. We see examples of donor data, including blood types, contact information, and organ types they are willing to donate.

The SELECT \* FROM recipients query displays recipient information, including recipient\_id, blood\_type, organ\_type, status (likely indicating the urgency or verification status of the recipient's request), and user\_id.

Finally, the SELECT \* FROM matches query shows a single entry in the matches table. This table tracks pairings between donors and recipients, with columns for match\_id, status (e.g., pending), donor\_id, and recipient\_id.

The notifications table in this database serves as a central hub for managing communication and updates within the organ donation system. Each row in this table represents a specific message or notification delivered to a user.

The notification\_id column acts as a unique identifier for each message, ensuring that no two notifications are the same. The message column stores the actual content of the notification, providing details about events, updates, or communications. For instance, we see messages like "You received a new message from raj," indicating direct communication between users. Other messages, such as "Your donor verification has been approved," convey important status updates related to the donation process.

The status column likely indicates whether a notification has been read or acknowledged by the user. A value of "0" might signify an unread or pending notification, while other values could represent different states. The timestamp column records the exact date and time when the notification was generated, providing a chronological record of events. This helps in tracking the sequence of actions and communications.

Finally, the user\_id column links each notification to a specific user in the system. This ensures that notifications are delivered to the correct individuals. By using foreign keys, the system maintains referential integrity, linking notifications to existing users.

D. Workflow Implementation:

Fig 6 shows the "Donate an Organ" page initiates the donation process. Prospective donors fill out a form with personal details: full name, date of birth, gender, phone number, email, and address. They specify the organ they wish to donate (e.g., kidney) and their blood type. Medical history and lifestyle habits are also recorded.

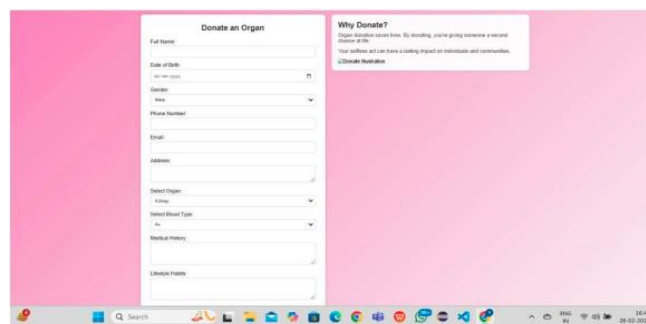


Fig 6: Donor an Organ page.

A "Why Donate?" section highlights the impact of organ donation, emphasizing saving lives and contributing to communities.

After submission, the information is likely processed to assess donor suitability and initiate further steps like medical evaluations and matching with potential recipients. The process aims to facilitate informed and responsible organ donation.

Fig 7 shows the "Donation Status" page provides a clear overview of a donor's current standing within the organ

donation system. It immediately informs the user about the specific organ they have committed to donating, in this case, a "Heart," and their corresponding "Blood Type," which is "A+." Crucially, it displays the "Verification Status" as "Verified," indicating that the donor's eligibility has been confirmed through the necessary procedures. However, the "Matching Updates" section reveals that "No matches found yet," meaning a suitable recipient has not been identified at this time. This status is likely to change as the system actively searches for a compatible match.

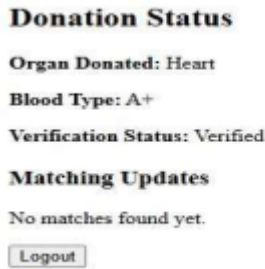


Fig 7: Donation status page.

Finally, the presence of a "Logout" button allows the user to securely exit the platform, ensuring privacy and control over their account. This page serves as a concise and informative summary of the donor's progress, highlighting both their verified status and the ongoing search for a recipient.

Fig 8 shows that the page is an Verification Screen (Admin dashboard), evident from the "Welcome, riya" message and the clear separation of donor and recipient verifications. The dashboard shows "Pending Donor Verifications: 0" and "Pending Recipient Verifications: 2". This indicates there are no donor applications awaiting verification, but two recipient applications need attention. It tells recipient details two pending recipient applications are displayed.

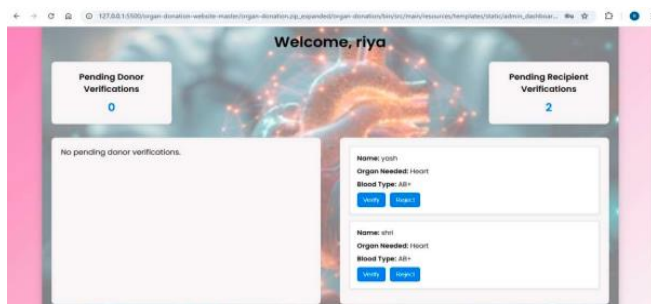


Fig 8: Verification Screen.

For each recipient, the admin has two options Verify (Approves the recipient's application), adding them to the pool of eligible recipients. Reject (Denies the recipient's application, likely due to ineligibility or incomplete information.). The admin would review the details of each recipient, potentially checking additional information not

visible on this screen. After confirming their eligibility, the admin would click either "Verify" or "Reject".

## V RESULTS

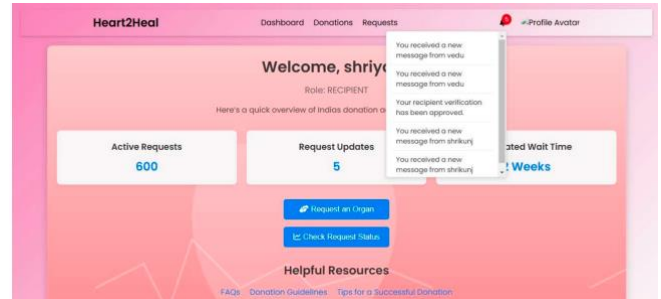


Fig 9: Requests Screen

Fig 9 Shows Requests Screen, this dashboard provides "shriy," a "RECIPIENT," with an overview of their organ donation request on the "Heart2Heal" platform. It displays "Active Requests: 600," indicating the number of recipients awaiting organs, and "Request Updates: 5," showing recent activity related to their request. An obscured "Estimated Wait Time" suggests a timeframe for organ availability. A notification pop-up informs "shriy" of new messages from "vedu" and "shrikunj," as well as the approval of their recipient verification. Buttons allow them to "Request an Organ" or "Check Request Status," and a "Helpful Resources" section offers FAQs and guidelines. This interface provides transparency and facilitates management of their organ donation request.

### Performance Metrics:

Fig 3, Fig 4 and Fig 5 shows Donor dashboards showcase the "Heart2Heal" platform's dashboard, designed to provide a comprehensive overview of its performance and impact. The first image displays key metrics, with "Total Donations" hovering around 1293, "Pending Donations" near 289, and "Lives Saved" around 880. These figures demonstrate the platform's effectiveness in facilitating organ donations and its direct positive impact on saving lives. The second image adds a notification pop-up, indicating the system's ability to provide real-time updates to users, such as verification approvals and new messages. This highlights the platform's focus on communication and user engagement. The third image further reveals user interface elements, showcasing a profile avatar dropdown with options for "Chat" and "Logout." This indicates the platform's commitment to providing communication tools and ensuring user account security. Collectively, these images illustrate a system that not only effectively manages organ donations but also prioritizes user experience, communication, and security, ultimately contributing to its overall impact in saving lives.

## VI CONCLUSION

Heart2Heal represents an important step in making organ donation more accessible and efficient. Our platform brings together donors, recipients, and medical professionals in one secure space. The user-friendly design makes it easy for anyone to register as a donor, track their donation status, and communicate with others in the system, while our intuitive dashboard ensures accessibility for users of all technical backgrounds.

Meanwhile, the secure verification workflow maintains the integrity of the sensitive medical matching process. We've focused on creating a system that's both easy to use and secure. The verification process ensures that all information is accurate, while the messaging feature allows for direct communication between everyone involved.

## VII FUTURE SCOPE

The organ donation website has strong potential for future development aimed at improving its effectiveness and reach. Key enhancements include integration with national health systems like NOTTO or UNOS for real-time organ availability and legal compliance. The adoption of AI-based matching can optimize donor-recipient compatibility based on medical urgency and location, increasing transplant success rates. Additionally, developing a mobile application will enhance accessibility, enabling users to register and receive updates on the go. Collaborating with NGOs and volunteers can further amplify awareness and boost donor registrations, making the platform more impactful and community-driven.

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