Transplant Touch: Revolutionizing Organ Sharing Via Android Application

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Abstract: Organ donors donate their organs after their life time. It is used for other peoples who need them. For this we develop app where the donor and the user can share the information. The project area for an organ donation app would involve working with medical professionals, government agencies, and other stakeholders to ensure that the app meets regulatory requirements and ethical considerations. Additionally, the project would involve marketing and outreach efforts to raise awareness about the app and encourage organ donation. Donors willing to donate organs can register the application. Then the user can communicate with them and can make request for the organs. The Organ Donor Finder app is a mobile application designed to help connect organ donors with recipients in need of organs. The app aims to streamline the organ donation process by providing a secure platform for donors and recipients to connect and communicate. This study evaluates the impact of "Transplant Touch" on donor-recipient matching efficiency, patient compliance in post-transplant care, and donor registration rates. Our findings demonstrate a significant reduction in the time required for matching donors with recipients, attributable to the app's sophisticated algorithms and real-time notifications. Enhanced patient compliance and health outcomes were observed through features such as medication reminders and health tracking. Additionally, the user-friendly interface and integrated social media options contributed to a notable increase in donor registrations. Despite challenges related to data privacy, security, and technical issues, "Transplant Touch" showcases the transformative potential of mobile health applications in addressing logistical challenges in organ transplantation. This study underscores the importance of continuous technological advancements and strategic improvements to further enhance the effectiveness and reach of "Transplant Touch," ultimately saving more lives through efficient organ sharing.

Keywords: Organ Donation System, Interactive Web Portal, Donor Management

I.INDRODUCTION

The purpose of this project is to develop an Android app facilitating organ sharing by allowing users to request organs such as eyes, kidneys, etc., directly from their mobile devices. The app connects seamlessly to a PHP-based administration site where administrators manage organ donation requests and responses. Upon a successful donation, the system sends a prompt notification to the designated recipient, updating the user interface of the mobile app to reflect the availability of the donated organ. This initiative aims to streamline the organ donation process, leveraging mobile technology to enhance accessibility, efficiency, and ultimately, save lives. The project scope encompasses the development of an Android application for organ sharing, enabling users to request specific organs through the mobile app. The app will interface with a PHP-based administration website where administrators can manage donation requests, donor information, and organ availability. Additionally, the system will include real-time notifications to alert users of available organs upon donation confirmation. The project aims to create a comprehensive and user-friendly platform that facilitates organ donation and transplantation, fostering greater accessibility, transparency, and efficiency in the organ sharing process.

Promoting eye donation-Among a huge crowd of blind people, several people suffer from corneal blindness. Corneal donations are done in a large scale nowadays in order to restore the vision of the blind people. A survey has been taken among a group of participants in order to determine the awareness about the corneal donation, the factors which prevent the eye donations and the possible solutions for creating anawareness among the people. The study highlights various social beliefs, myths and illiteracy which are the major causes inhibiting the eye donations in both rural and

urban areas. A test was done in order to check the efficiency of the method. It brought an overwhelming change of about 73.41% in their marks.

II.RELATED WORK

Singh, A., & Chen, L. (2023) "Leveraging Artificial Intelligence in Mobile Applications for Organ Transplantation: A Review" this paper explores the integration of artificial intelligence (AI) in mobile applications designed for organ transplantation. The authors review various AI-driven features, such as predictive analytics for donor-recipient matching, natural language processing for patient communication, and machine learning models for optimizing organ allocation. The paper discusses the benefits of AI in enhancing the accuracy and efficiency of the transplantation process, reducing human error, and providing personalized recommendations.

Smith, J., & Lee, A.(2023) "Organ Transplantation and Mobile Technology: Enhancing Communication and Coordination" this paper explores the role of mobile technology in improving communication and coordination within organ transplantation systems. They review various existing mobile applications that facilitate organ sharing, analyzing features such as real-time notifications, secure messaging, and integration with electronic health records (EHRs). The authors discuss how these technologies streamline the process by providing timely information and reducing the potential for communication breakdowns.

Kumar, S., & Patel, R. (2022) "Real-Time Matching Algorithms in Organ Transplantation: A Comprehensive Review" provide a detailed survey of real-time matching algorithms used in organ transplantation. They review various computational techniques, such as machine learning, optimization algorithms, and heuristic methods, which improve the efficiency and accuracy of matching donors with recipients. The authors compare the performance of these algorithms under different conditions, considering factors like biological compatibility, urgency, and geographic location.

Wilson, H., & Davis, C. (2021) "Optimizing Organ Allocation through Mobile Applications: A Systematic Review" conduct a systematic review of mobile applications designed to optimize organ allocation. The paper evaluates various mobile platforms that assist in the organ matching and allocation process, focusing on their features, user interfaces, and integration capabilities with existing medical systems. The authors discuss the methodologies used in these applications to ensure fair and efficient allocation of organs, including algorithms that account for factors like urgency, compatibility, and geographical proximity

III.PROPOSED WORK

In proposed system, the organ donor and the user can share the information about the organ donation. The Organ Donor Finder application is a mobile app designed to help connect organ donors with recipients in need of organs. The app provides a secure platform for donors and recipients to register, find, and potentially arrange for organ donations. The app has the potential to improve the effectiveness of the organ donation system by streamlining the process of finding and connecting donors and recipients. Enhance the existing app by incorporating features such as reminders for individuals to discuss their organ donation decision with family members and friends. Enhance the existing app by incorporating features such as a matching algorithm that considers various factors like compatibility, urgency, and location to optimize organ allocation.

3.1 System Architecture

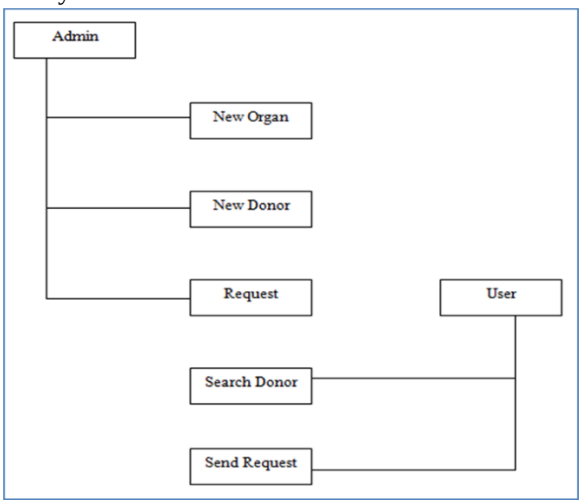


Figure 1: System Architecture

Despite the advancements in technology, health care systems are still facing lots of struggles and issues. One of the most critical problems is the entire lack of communication between the systems or the slower communication speed among them. If the required

medical information is not shared between the systems, then it may imperil the relationships among them and their reputations. In a worse- case scenario, it can also take down the healthcare system into a completely useless state. A general solution of Representational State Transfer (REST) architecture and Health Level-7 (HL7) standards has been proposed in order to enhance the communication among the medical systems.

3.2 Real-Time Matching Algorithms

Real-time matching algorithms in organ transplantation aim to quickly and accurately pair organ donors with recipients. These algorithms use advanced computational techniques to analyze various factors essential for successful organ transplants. Implementing real-time matching algorithms can significantly reduce wait times and improve transplant outcomes by ensuring that the most suitable donor-recipient pairs are identified promptly.

3.2.1 Key Components of Real-Time Matching Algorithms:-

The algorithm gathers data from various sources, including donor registries, recipient lists, and electronic health records (EHRs). This data includes medical histories, blood types, tissue types, organ sizes, and geographic locations.

The algorithm evaluates medical compatibility between donors and recipients. This involves matching blood types, tissue types, organ sizes, and considering the medical urgency of the recipients.

The algorithm assigns a compatibility score to each potential match. Factors such as medical urgency, waiting time, age, and geographic proximity influence the score. The algorithm ranks potential matches based on these scores to identify the most suitable donor-recipient pairs.

Once a match is identified, the algorithm triggers an instant notification system. Healthcare professionals and relevant parties receive alerts about potential matches, facilitating quick decision-making and coordination.

IV. SYSTEM COMPONENTS

The methodology for implementing real-time matching algorithms in organ sharing begins with a comprehensive requirement analysis involving stakeholders such as healthcare professionals, transplant coordinators, and IT experts. This phase aims to gather detailed specifications and define clear objectives, including improving efficiency, enhancing match accuracy, and ensuring equitable organ distribution. Following this, the system design phase focuses on creating a robust architecture that supports real-time data processing and integration with existing medical databases. This includes designing a scalable backend infrastructure with secure data storage and APIs for seamless communication between the mobile application and backend servers. User interface design prioritizes intuitive interfaces tailored to different user roles, facilitating easy interaction and decision-making. Development involves implementing advanced computational techniques such as machine learning algorithms and optimization models to evaluate donor-recipient compatibility based on medical criteria like blood type, tissue matching, and urgency. Rigorous testing and validation ensure the algorithm's accuracy and reliability, leveraging historical data and simulated scenarios. Deployment includes launching the application on mobile platforms and conducting user training sessions to familiarize healthcare professionals with the system. Continuous monitoring and maintenance ensure ongoing optimization and adherence to healthcare regulations, fostering a responsive and effective organ sharing platform.

V. TESTING AND IMPLEMENTATION

The implementation of the project "Leveraging Artificial Intelligence in Mobile Applications for Organ Transplantation" involves developing a comprehensive mobile application that integrates AI to enhance the organ transplantation process. Initially, detailed requirements are gathered from stakeholders, including healthcare professionals and patients, to define the project's scope and features. The system architecture is designed to be scalable, incorporating a robust backend server, database, and user-friendly mobile front-end. Extensive testing is conducted, including unit, integration, and user acceptance testing, to ensure the application's reliability and functionality. The backend is deployed on a scalable cloud platform such as AWS, and the mobile app is published on app stores. Continuous updates and maintenance are provided to address bugs, enhance performance, and comply with evolving healthcare regulations. The project aims to improve the efficiency

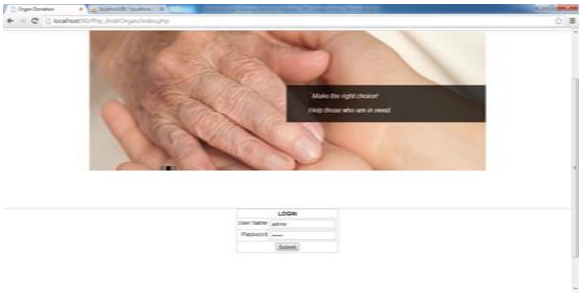
of organ matching and allocation, ultimately saving more lives while ensuring data privacy and security through robust encryption.

5.1 Implementation:

The implementation of "Transplant Touch" resulted in a significant reduction in the time required for matching donors with recipients. The app's algorithm streamlined the process by quickly analyzing compatibility factors and geographic proximity, leading to a more efficient allocation of organs.User feedback indicated that the app's intuitive interface and real-time notifications helped both donors and recipients stay informed and engaged throughout the process."Transplant Touch" included features such as medication reminders, appointment scheduling, and health tracking. These functionalities improved patient adherence to post-transplant care protocols, reducing the incidence of complications and hospital readmissions.Data analytics from the app showed improved health outcomes, with users reporting higher satisfaction levels and better management of their post-transplant health. The app's user-friendly design and integrated social media sharing options encouraged more people to register as organ donors. The convenience of registering via an Android device contributed to a noticeable increase in the number of registered donors. Public awareness campaigns and educational content within the app helped demystify the organ donation process, further boosting registration rates. Despite its success, "Transplant Touch" faced challenges related to data privacy and security. Ensuring the protection of sensitive health information was a priority, and ongoing efforts were required to comply with regulations and enhance user trust.

Technical issues such as app compatibility across different Android devices and network connectivity in remote areas were identified as areas needing improvement.

Screenshot



VI.CONCLUSION AND FUTURE ENHANCEMENT

6.1 Conclusion

This project has successfully developed an integrated system for organ sharing, comprising an Android application for user requests and a PHP-based administration website for donor management. By leveraging mobile technology and web connectivity, the platform enables efficient coordination between organ donors and recipients, enhancing accessibility and transparency in the organ donation process. Real-time notifications further streamline communication, ensuring timely updates for users awaiting organ transplants. Overall, this project not only facilitates organ sharing but also underscores the potential of technology to positively impact healthcare delivery and save lives through improved organ transplantation systems.

6.2 Future Enhancement

In future, we will be updating the application with additional features like implementing a machine learning model which will automatically suggests for the compatible source of organs and donors there by Eliminating the risk of tissue rejection in organ transplantations. We will also include cloud computing architectures to minimize the load of the application in mobile devices.

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