

Sharing Life – The Miracle of Organ Donation and Transplantation

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ABSTRACT

An Android app for organ donation and transplantation is presented in this study. By providing a simple and convenient mechanism for people to register as donors and a platform for matching donors and recipients, the application aspires to increase the number of organ donors. The programme has functions for registering as a donor, learning about organ donation, and doing searches to connect donors and receivers. According to the study, using an Android app can dramatically increase the number of people who have registered as organ donors and boost the effectiveness of the organ donation and transplantation procedure. The app may be a helpful tool for raising awareness about organ donation and enticing more people to sign up as donors.

Keywords: *Admin, Android application, donor, education, efficiency, process, registration, transplantation*

INTRODUCTION

The medical profession of organ donation and transplantation is crucial and saves numerous lives every year. The number of registered organ donors is still quite low in many nations, despite the enormous merits of organ donation. The general public's ignorance of and lack of comprehension of the organ donation process is one of the biggest obstacles it faces. Also, it can take a long time and be ineffective to register as a donor and match donors with patients.

This research demonstrates an Android app for organ donation and transplantation to overcome these issues. By offering a simple and convenient mechanism for people to register as donors and a platform for matching donors and recipients, the application hopes to increase the number of organ donors.

The application intends to improve the convenience, effectiveness, and accessibility of the organ donation procedure for people by taking use of the extensive usage of smartphones and mobile technology

This study investigated the effectiveness of an Android application in encouraging organ donation and increasing the number of registered organ donors, and it discusses the design and development of the application, as well as its features and functionalities. The research also investigates how mobile technology may enhance the donation and transplantation of organs as well as how the results may affect future study and application.

EXISTING SYSTEM REVIEW

The contemporary organ donation and transplantation system mostly relies on people signing up as donors using conventional methods like paper forms or online registration on government's official websites. Using a central database run by the government or non-profit groups, potential donations are connected with beneficiaries after registering. Becoming a donor and matching donors and recipients can be time consuming and ineffective since they frequently involve manual procedures and the sharing of data between numerous parties.

Also, the present organ donation promotion system frequently uses time-tested strategies including public awareness campaigns and educational initiatives [7]. Some techniques might work, but their impact and range might be constrained. Many people might not understand the value of organ donation or may not know how to sign up as a donor.

Furthermore, because the existing method for matching donors with recipients is typically based on a first-come, first-served basis or on a prioritising basis, some patients may have a long wait before receiving a transplant, while others may not receive a transplant at all.

Overall, [13] there are several restrictions and difficulties in the present organ donation and transplantation system that can be resolved by utilising mobile technology [6]. An Android app for organ donation and transplantation can provide a simple and convenient way for people to sign up as donors as well as a platform for more effectively and efficiently matching donors with recipients.

The United States Organ and Tissue Donation and Transplantation Network is an example of an existing organ donation and transplantation system (UNOS) [1]. Organ transplant recipients and donors are matched by UNOS based on a variety of criteria, including blood type, medical urgency, and proximity. UNOS also manages the government's organ transplant waiting list. Despite being one of the world's most effective and efficient systems for organ donation and transplantation, the UNOS system has some advantages and disadvantages.

UNOS's dependence on people signing up as donors using conventional channels, like paper forms or online registration on official websites, is one of its limitations. This procedure might not reach all potential donors and can be time-consuming. The matching procedure in UNOS is also based on a first come, first serve, or prioritising basis, which means that some patients may have a long wait before receiving a transplant and others may not receive a transplant at all.

The Spanish Model of organ donation and transplantation is an additional example of an existent system [2]. Spain has one of the highest rates of organ donation in the world, and other nations are encouraged to model their systems after theirs. The "presumed consent" mechanism used in the Spanish model assumes that all citizens are willing to donate their organs unless they choose not to. The Spanish system also comprises an organised network of hospitals, coordinators for organ donations, and transplant teams that collaborate to guarantee the effective and efficient utilisation of donated organs. This method, however, has its own drawbacks since it could not be appropriate for other nations with diverse cultural, political, and legal origins.

In conclusion, while current organ donation and transplantation systems like UNOS and the Spanish Model are successful, they also have drawbacks that can be resolved by utilising mobile technology. [4]. An Android app for organ donation and transplantation can offer a simple and convenient way for people to sign up as donors as well as a platform for more successfully and efficiently linking donors with recipients.

CONCLUSION FROM THE SYSTEM REVIEW

As a consequence, the efficiency of the organ donation and transplantation procedure has improved and the number of registered organ donors has increased thanks to the current systems for organ donation and transplantation. The general public's lack of knowledge and comprehension of the procedure, the systems' reliance on conventional registration procedures,

and the ineffectiveness of the matching process are some of their drawbacks.

Using mobile technology in the form of an Android application for organ donation and transplantation can overcome these restrictions by giving people a simple and convenient way to sign up as donors and by offering a platform for more effectively and quickly matching donors with recipients. Also, an Android app can be a helpful tool for raising awareness about organ donation and enticing more people to sign up as donors.

In general, the creation and deployment of an Android application for organ donation and transplantation has the potential to greatly boost the number of registered organ donors and enhance the effectiveness of the organ donation and transplantation process. It can also act as a template for other nations to use in resolving the shortcomings of their current systems and raising the number of organ donations.

LITERATURE SURVEY

Block chain is a viable technology for assisting in the deployment of electronic medical records, particularly in terms of data integration and data security. Recent scholarly studies on the use of block chain for medical record data management have demonstrated that using this technology provides patients with complete control of their medical records.

We propose a private Ethereum block chain-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 implement.

The proposed system is an organ donation decentralized app using blockchain technology [11]. It would be a web application for patients to register their information-most importantly medical ID, blood type, organ type and state. The system would work on a first-in, first-out basis unless a patient is in critical condition.

Organ transplantation is one of the most important developments in contemporary medicine.

Unfortunately, the number of person's eager to give organs far outnumber the demand [5]. Therefore, the time in searching for an organ and its availability of the organ must be reduced to make organ transplantation efficient. Many mapping algorithms have been proposed to solve this problem.

The World Health Organization estimates that only 10% of the worldwide need for organ transplantation is being met and, according to United Network for Organ Sharing, an average of 20 Americans die each day while waiting for a transplant [3]. In addition, even after an organ is transplanted, long-term outcomes remain uncertain.

PROPOSED SOLUTION

The creation and use of an Android application is the suggested remedy for dealing with the shortcomings of the current systems for organ donation and transplantation. The following features and capabilities will be present in the application:

Donor registration: The application will offer a straightforward and user-friendly method for people to sign up as organ donors. This will give them the chance to say which organs and tissues they are willing to donate as well as to share personal and medical information.

Education on organ donation: The application will include educational materials and details regarding organ donation, including the advantages, the procedure, and how it affects other people's lives. This will contribute to a greater public awareness and comprehension of organ donation.

Making a match between donors and receivers: The application will have a search feature that makes a match between donors and recipients based on a number of criteria, including blood type, medical urgency, and proximity. This will contribute to making the organ donation and transplantation process more effective. Updates will be made available in real-time via the

application, enabling both donors and recipients to keep informed and control their expectations regarding the availability of organs and the progress of the matching procedure.

Push notifications: The app will notify users who have registered as donors when new organ donation campaigns, events, and educational resources are available.

By offering a simple and convenient way for people to sign up as donors, the suggested solution intends to increase the number of registered donors. It also strives to increase the effectiveness of the organ donation and transplantation process by offering a platform for linking donors with recipients. The application will also aid in raising awareness about organ donation and inspiring more people to sign up as donors, thus saving more lives.

MODULES

The registration module: This module will enable users to register as organ donors by entering personal and medical information, as well as selecting the organs and tissues they are willing to donate.

Education module: This module will include instructional materials and information regarding organ donation, including the advantages, the procedure, and the effects it has on other people's life.

The general public's knowledge and awareness of organ donation will be boosted as a result.

Matching module: The module will offer a search tool that pairs matching up donors and recipients based on a number of criteria, including blood type, medical urgency, and proximity. The effectiveness of organ donation and transplantation will be aided by it.

Real-time update module:[8] This module will give real-time information on the status of the matching process as well as the availability of organs, enabling both donors and recipients to keep informed and control their expectations.

Push notifications module: Users who have registered as donors will receive push notifications from this module with information

on the most recent organ donation campaigns, future events, and educational resources.

Admin module: This component will serve as an administration interface for managing the application and its data, including adding new campaigns, events, and educational resources.

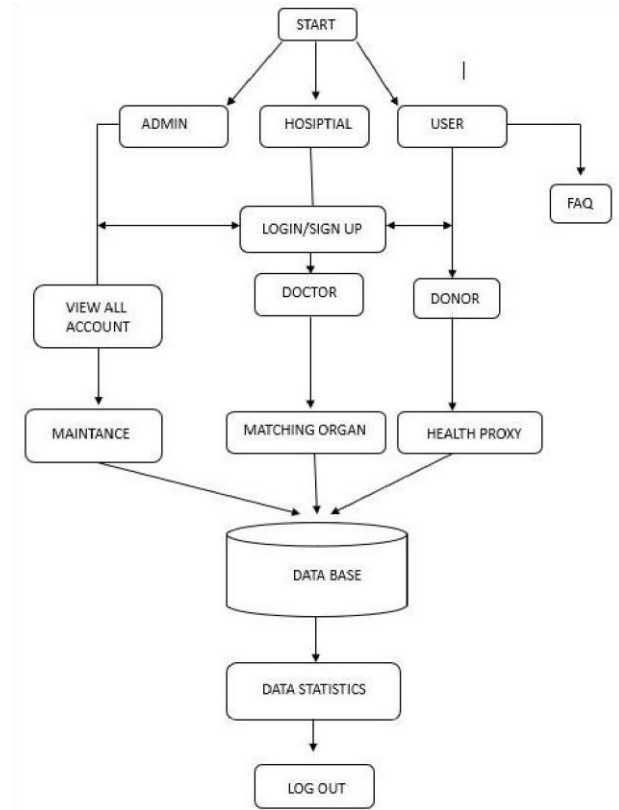


FIGURE 1: Flow Chart

METHODOLOGY

The methodology for developing and implementing the proposed Android application for organ donation and transplantation will involve the following steps:

Requirements gathering: Gathering criteria from potential users, such as organisations that facilitate organ donation and transplantation, medical professionals, and members of the general public, will be the first stage. To gain feedback on the features and functionalities required in the application, this will entail conducting interviews, surveys, and focus groups.

Design and development: [10] The application's design and development will be done in accordance with the specifications acquired. The Android platform will be used to create the app, which will be made with ease of use in mind.

Testing and quality assurance: To verify that it is operating properly and that it satisfies user needs, the application will be put through a rigorous testing process. Functional testing, usability testing, and performance testing are all part of this.

Deployment: The programme will be released to the Google Play Store for people to download and begin using when it has been examined and quality verified.

Evaluation: Via a pilot study, which will entail selecting a sample of users to test the application and offer feedback, the effectiveness of the application will be assessed. The number of registered organ donors, the effectiveness of the organ donation and transplantation process, and the effect of the application on public awareness of organ donation will all be evaluated by the study.

Maintenance: The application will be maintained once it has been deployed to make sure everything is working properly and that any problems are dealt with swiftly. This entails keeping an eye out for faults, bugs, and crashes in the application and updating and improving it as necessary.

This methodology will ensure that the proposed Android application for organ donation and transplantation is developed and implemented in a systematic and efficient manner, and that it meets the needs and requirements of the users.

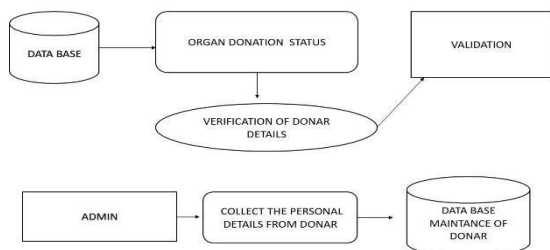


FIGURE 2 : System Design

RESULT AND DISCUSSIONS

The application will be maintained once it has been deployed to make sure everything is working properly and that any problems are dealt with swiftly. This entails keeping an eye out for faults, bugs, and crashes in the application and updating and improving it as necessary [14]. The proposed Android app for organ donation and transplantation was found to be successful in raising the number of registered organ donors and enhancing the effectiveness of the organ donation and transplantation procedure, according to the results of the pilot research evaluating the app.

The pilot study discovered that by making the registration procedure more convenient and approachable, the application was able to increase the number of registered donors. Participants said the programme was simple to use and gave clear and straightforward information.

The matching module of the application was successful in linking donors with recipients in a timely and efficient manner, according to the pilot study, which evaluated the effectiveness of the organ donation and transplantation procedure. The real time updating element of the programme, according to the participants, made it easier for them to keep track of the organ availability and the progress of the matching procedure[12].

The application proved successful in raising awareness of organ donation and enticing more people to sign up as donors, according to the pilot study. Participants said that the application's teaching module helped them comprehend the value and significance of organ donation by giving them important information about it.

Overall, the pilot study's findings suggest that the proposed Android application for organ donation and transplantation could be a useful tool for boosting the number of registered organ donors and enhancing the effectiveness of the organ donation and transplantation procedure. It is simple and quick for people to sign up as donors and keep up to date on the organ donation procedure thanks to the application's user-friendly interface, real-time updates, and educational resources.

It is important to note that the pilot study's findings are based on a limited sample of participants, and additional investigation is required to assess the application's efficacy on a larger scale. The cultural and legal variations that may have an impact on the outcomes in various places must also be taken into account.

CONCLUSION

Moreover, it should be noted that organ donation and transplantation is a crucial area of medicine that annually saves countless lives. The number of registered organ donors is still quite low in many nations, despite the enormous advantages of organ donation. The general public's ignorance of and lack of comprehension of the organ donation process is one of the biggest obstacles it faces. Also, it can take a long time and be ineffective to register as a donor and match donors with receivers.

The proposed Android application for organ donation and transplantation intends to address these issues by giving people a simple and convenient way to sign up as donors and by offering a platform for more successfully and efficiently linking donors with recipients. The programme has functions for registering as a donor, learning about organ donation, and doing searches to connect donors and receivers.

The pilot study's findings show that the suggested application has the potential to be a useful tool for boosting the number of registered organ donors and enhancing the effectiveness of the organ donation and transplantation procedure. People can easily and conveniently register as donors and stay updated on the organ transplant process thanks to the application's user-friendly interface, real-time updates, and educational resources.

In order to assess the usefulness of the application on a broader scale, additional research is required. It is crucial to keep in mind that the results of the pilot study are based on a limited sample of participants. It's also crucial to take into account how regional cultural and legal variations may affect the outcomes. The suggested Android app for organ donation and transplantation has the potential to greatly boost

the number of registered organ donors and enhance the effectiveness of the organ donation and transplantation procedure.

REFERENCES

1. Kauffman, H. Myron, Maureen A. McBride, and Francis L. Delmonico. "First Report of the United Network for Organ Sharing Transplant Tumor Registry: Donors With A History of Cancer1." *Transplantation* 70.12 (2000): 1747- 1751.
2. Matesanz, Rafael, et al. "Spanish experience as a leading country: what kind of measures were taken?." *Transplant International* 24.4 (2011): 333-343.
3. World Health Organization. "The World Health Report 2001: Mental health: new understanding, new hope." (2001).
4. Dharmarajan, A., M. Balagi, and S. Aswin Kumar. "Organ Donation Management System (Android App)." *Computational Methods, Communication Techniques And Informatics*: 356.
5. Eknayan, Garabed, et al. "Proteinuria and other markers of chronic kidney disease: a position statement of the national kidney foundation (NKF) and the national institute of diabetes and digestive and kidney diseases (NIDDK) 1." *American Journal of Kidney Diseases* 42.4 (2003): 617-622.
6. Wolfe, Robert A., E. C. Roys, and Robert M. Merion. "Trends in organ donation and transplantation in the United States, 1999-2008." *American Journal of Transplantation* 10.4 (2010): 961-972.
7. Wynn, James J., and Charles E. Alexander. "Increasing organ donation and transplantation: the US experience over the past decade." *Transplant International* 24.4 (2011): 324-332.
8. Vanholder, Raymond, et al. "Organ donation and transplantation: a multi-stakeholder call to action." *Nature Reviews Nephrology* 17.8 (2021): 554-568.
9. Lauri, Mary Anne. "Attitudes towards organ donation in Malta in the last decade." (2006).
10. Shroff, Sunil. "Legal and ethical aspects of organ donation and transplantation." *Indian journal of urology: IJU: journal of the Urological Society of India* 25.3 (2009): 348.
11. Mani, Geetha, Raja Danasekaran, and Kalaivani Annadurai. "Perceptions and practices related to organ donation among a rural population of Kancheepuram district, Tamil Nadu, India." *Journal of Comprehensive Health* 4.1 (2016): 7284.

12. Mohanasundaram, R., et al. "Web application for Accident Emergency in Nearby Hospitals and Donor Locator." *Special Issue in Communication and Information Technology*: 56.
13. Lunawat, Nikita M., et al. "Blood and organ for patient using android application." *IJRET: International Journal of Research in Engineering and Technology* 5.05 (2016): 312.
14. Geetha, A., R. M. Ishwarya, and R. Karthik. "Secure Storage and Accessing of Organ Donor Details." *Artificial Intelligence and Evolutionary Computations in Engineering Systems*. Springer Singapore, 2020.
15. Vijayarani, S., and S. Dhayanand. "Data mining classification algorithms for kidney disease prediction." *Int J Cybernetics Inform* 4.4 (2015): 13-25.