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Android-Based Organ Donation Platform

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Abstract: *The Android-Based Organ Donation Platform is a mobile application developed to make the organ donation process easier and more organized. It brings together donors, patients, and doctors on a single digital system. The app is built using Android Studio and supported by a secure database to keep information safe. Users can register as donors, request organs, and check updates about donation status at any time. The system includes an automatic matching feature that helps connect suitable donors and recipients quickly. This platform is designed to reduce waiting time and improve safety by providing clear and updated information. Doctors can review and approve matches to ensure that medical decisions are accurate and reliable. Hospitals can easily access donor details when needed, helping them respond faster in emergency situations. The application also includes important features such as managing donor records, tracking organ availability, handling patient requests, and verifying matches through doctors. Administrators control user ac- counts and maintain all system data to ensure smooth operation. Overall, the platform supports better healthcare services by offering a simple, secure, and technology-based solution for organ donation management.*

Keywords: *Organ Donation*

I. INTRODUCTION

Organ failure is a life-threatening condition, and for many patients, a transplant is the only effective solution. Even though many individuals are willing to donate organs, finding a suitable match promptly is often difficult. This is largely due to the lack of an integrated system connecting donors, recipients, and hospitals. Many healthcare centres still rely on paper records, phone calls, and manual communication, which can slow decision- making and delay urgent care. A digital platform can centralize information and simplify these processes, enhancing coordination and efficiency. The widespread use of smartphones makes it possible to manage organ donation more effectively through mobile applications. An Android-based app can streamline donor registration, allow patients to submit requests easily, and keep donor information up to date. The system sends real-time updates to both users and medical professionals, reducing waiting times and improving responses in emergency situations. Data security is a top priority for the platform. Donor and recipient information is stored safely in a centralized database, and healthcare professionals verify all records before confirming matches. Hospitals can access accurate, current information whenever necessary, especially during critical cases. The app also enhances communication among all participants. Users can track request status, receive notifications, and stay informed at every step. Doctors review each case to ensure accuracy and safety. By combining secure digital records with seamless collaboration, the platform makes the organ donation process faster, safer, and more reliable.

II. RELATED WORK

The National Organ and Tissue Transplant Organization (NOTTO) manages organ donation and transplantation in India. It keeps cen- tralized donor records and conducts awareness programs to encour- age organ donation. NOTTO

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also provides digital registration and coordinates efforts among hospitals and transplant centers. Howev- er, the current system does not have a fully integrated Android- based real-time matching platform that donors, patients, and doctors can access directly through a mobile application. Several studies have suggested web-based organ donation management systems built with technologies like PHP, ASP.NET, and MySQL. These systems typically include features for donor registration, patient reg- istration, administrative approval, and database management. Web- based platforms help with centralized data storage and allow admin- istrators to monitor records effectively. However, they have some drawbacks, such as lack of portability, limited real-time notifica- tions, reliance on desktop access, and slower communication be- tween stakeholders. These issues can reduce system efficiency, es- pecially in emergencies where quick action is essential. As smartphone use increases, mobile healthcare applications are gain- ing popularity. Android apps developed with Android Studio and Java offer user-friendly interfaces, secure logins, real-time commu- nication, and cloud database integration. Many healthcare apps fo- cus on booking appointments, emergency services, and managing patient records. Yet, few mobile applications specifically target or- gan donation management, featuring automated matching between donors and recipients along with real-time updates for everyone in- volved.

III. LITERATURE REVIEW V. PROPOSED SYSTEM OVERVIEW

1. Life Saver – The Organ Donation App
Authors: S. Manwatkar, R. K. Choudhary, P. Walokar,
S. Iyer,A.Karadbhajne,H.Nimavat
Explanation:
An Android app for registering donors and recipients effi- ciently. Emergency alerts notify potential donors during ur- gent cases, reducing delays. Uses secure cloud storage for quick access.
Additional Issues: Needs improved real-time alerts and advanced emergency response features.

2. Organ Donation – An Android Application
Authors: P. Kadam, P. Damkondwar, V. Gadekar, S. Khod- we,A.Sahane
Explanation:
App increases awareness and participation in organ donation. Users can register, upload medical reports, and get real- time updates. Secure centralized storage ensures faster organ allo- cation.
Additional Issues: Automated verification and awareness modules need integration to boost participation.

3. Online Organ Donation Management System
Authors: P. P. Pangarkar, D. Shinde, V. Nirgude, L. Pra- japati,S.A.Bhad
Explanation:
Digital platform connecting donors, doctors, and hospitals nationwide. Simplifies registration, promotes deceased organ donation, and ensures timely access to donor information.
Additional Issues: Requires expansion to national databases and automated decision support for faster matching.

4. A Donor – Mobile Application for Saving Human Life Authors: S. Sindhuja, V. Priyadharshini, S. Gothainayagi, M.Devika,E.A.Baraniga
Explanation:
Mobile app connects blood and organ donors with recipients using real-time communication. Provides fast access to donor details and medical camp info.
Additional Issues: Map- based donor location feature needs implementation for easier access in emergencies.

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IV. PROBLEM STATEMENT

Organ donation is a life-saving process, but the lack of a cen- tralized and accessible platform creates delays in connecting donors with recipients. Many willing donors are unaware of how to register, while patients and hospitals struggle to find compatible organs quickly. Manual registration systems and scattered databases lead to inefficiency, miscommunication, and extended waiting times for critical patients. The proposed An- droid-Based Organ Donation Platform addresses these chal- lenges by providing a user-friendly mobile application where donors can register, recipients can request organs, and hospitals can manage and verify donation data efficiently. The platform

V. PROPOSED SYSTEM OVERVIEW

Ensures real-time updates, secure communication, and simplified processes to improve organ donation awareness and reduce the time required to match donors with recipients.

The proposed Android-Based Organ Donation Platform connects donors, recipients, doctors, and hospitals on a single mobile plat- form. It aims to reduce waiting times, improve donor– recipient matching, and enhance the safety and efficiency of organ trans- plantation. The system includes an Android application, a Fire- base cloud backend. Users can register as donors or recipients, submit organ requests, and receive real-time notifications. Donor and recipient data are securely stored in Firebase, and matches are verified by doctors before confirmation. Administrators manage user accounts and monitor records. The workflow is simple: donors register, recipients request organs, the system per- forms automatic matching, doctors verify the match, and notifica- tions are sent to both parties. Key features include real-time matching, secure cloud storage, instant notifications, and role- based access control. This platform provides a reliable, mobile- based solution for organ donation management.

VI. SYSTEM ARCHITECTURE

The Organ Donation and Transplant Management System is a web-based platform that connects donors, recipients, hospitals, and government authorities within a single integrated system. Its main objective is to streamline the organ donation process, ensure transparency, and securely manage data using cloud services.

1. Modules

1.1 Donor Module

In this module, a donor can register and securely log into the system. After logging in, the donor completes a donation form that includes personal details, medical history, blood group, and organ donation preferences. The donor can also track the status of their application within the system.

1.2 Recipient Module

Recipients create an account and complete an organ request form describing their medical needs and important details such as blood group and urgency level. The system identifies suitable organ matches using stored donor information. Recipients can view matched organ details and monitor the progress of their requests.

1.3 Hospital Module

Hospitals verify medical information and upload necessary documents in PDF format. They can log into the system, submit supporting documents, and check the approval status of applications. All uploaded files are securely stored in cloud storage.

1.4 Government Module

Government authorities log in to review uploaded doc- uments and verify the authenticity of applications. After verification, they either approve or reject the re- quest. The system records the decision and automatically generates notifications.

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2. Backend Architecture (Firebase Integration)
The system uses Firebase services to manage authenti- cation, data storage, and file handling:
• Firebase Authentication: Ensures secure log- in and identity verification for all users.
• Firebase Database: Stores structured data related to donors, recipients, hospitals, and approval status.
• Firebase Storage: Stores uploaded documents such as medical reports and verification files in a secure cloud environment.

3. Approval and Notification Workflow
• The hospital uploads the required documents.
• The government authority reviews the submitted files.
• If the application meets all criteria, it is approved, and an approval notification is sent.
• If the application does not meet the requirements, it is rejected, and a rejection notification is generated.
• The system updates the status in the database and displays it to the relevant users.

VII. IMPLEMENTATION DETAILS

The implementation of the proposed Android-Based Organ Donation Platform consists of four main steps: User Input and Registration, Donor–Recipient Matching, Doctor Verification, and Notifications and Updates.

User Input and Registration
Users, including donors, recipients, and doctors, log into the application securely. Donors provide personal details and specify the organs they are willing to donate. Recipients enter their organ requirements along with relevant medical information. Doctors register to verify donor–recipient matches. All input data is sanitized and stored securely in the centralized Firebase database to ensure data integrity and privacy.

Donor–Recipient Matching
When a recipient submits a request, the system searches the donor database for compatible donors. Matching is performed based on organ type, blood group, and medical compatibility Each match is initially marked as pending and updated to ap- proved or rejected after doctor verification. A categorized re- port of potential donors is presented to both the recipient and the doctor for review.

Doctor Verification
Doctors review donor details and recipient requests to ensure medical safety and compatibility. They approve or reject matches accordingly. Once approved, the system triggers notifications to both donors and recipients. Rejected requests pro- vide feedback to recipients, enabling them to take appropriate next steps.

Notifications and Updates
The system sends instant notifications to users regarding do- nor availability, match approvals, and updates. Recipients can track the status of their requests in real time, while donors receive alerts when a match request is assigned. Doctors are notified of pending verifications, ensuring timely review and action.
This stepwise implementation ensures a secure, efficient, and real-time organ donation process, improving coordination between donors, recipients, and healthcare professionals while reducing delays in critical situations.

History and Reusability
The system stores all past donor–recipient matches for future reference. Doctors and recipients can track previous requests and approvals, which helps in planning and decision-making. This feature ensures continuity in organ donation processes and allows faster response during emergency cases by provid- ing access to prior records efficiently.

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SYSTEM AECHITECTURE

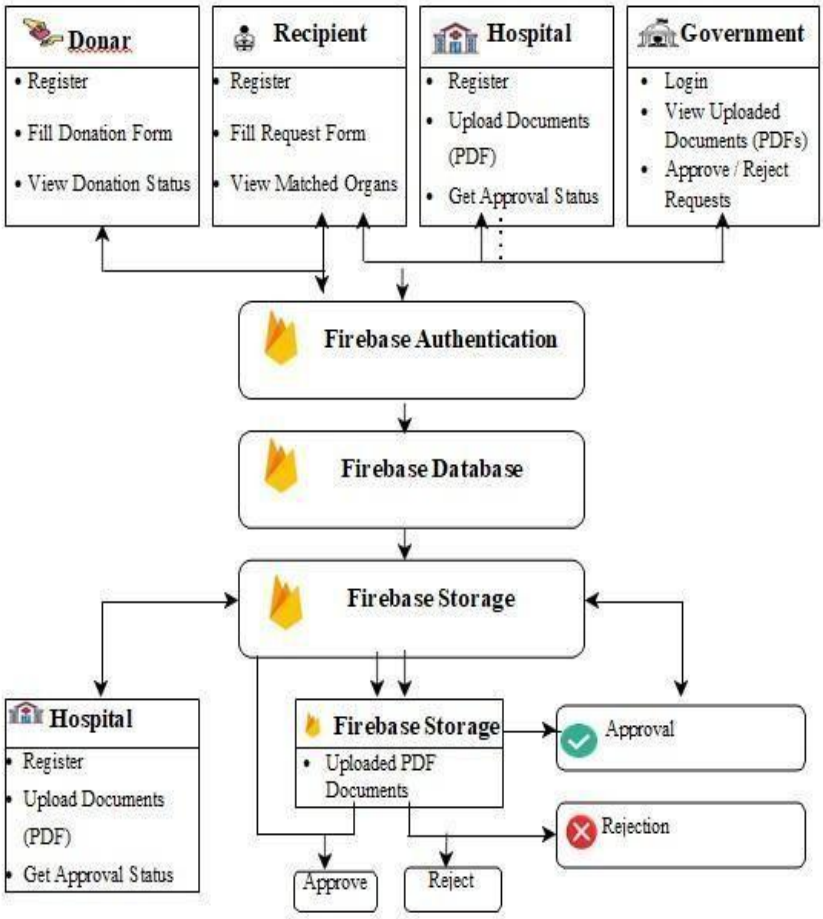

Figure 1: System architecture

VIII. PROPOSED SYSTEM

System Architecture :
System Architecture is shown in Figure1.
Our proposed system will function in following steps:
Step 1: User Registration
Donors and recipients register in the Android application with their details.
Step 2: Login & Authentication
The system verifies users through secure authentication using Firebase.
Step 3: Organ Request Submission
Recipients submit requests for required organs through the app.
Step 4: Automatic Matching
The system automatically searches for suitable donors based on blood group, organ type, and age.

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Step 5: Doctor Verification
Doctors review and approve the matched donor and recipient.
Step 6: Notification System
Both donor and recipient receive real-time notifications about the match status.

IX. ANALYSIS OF PROPOSED SYSTEM

1. Enhanced Efficiency and Real-Time Communication:
The proposed Android-Based Organ Donation Platform improves the efficiency, accessibility, and reliability of organ do- nation management. By integrating mobile technology with a cloud-based backend (Firebase), the system provides real-time updates and instant notifications to donors, recipients, and doctors, reducing delays in critical situations.

2. Intelligent Matching With Medical Verification:
The automatic matching engine analyzes donor and recipient details such as blood group, organ type, and age, ensuring faster and more accurate matches. Doctor verification adds a layer of medical safety, minimizing errors and ensuring that only compatible and medically approved matches are processed.

3. Secure Role-Based Access :
The platform's role-based access control allows different users (donors, recipients, doctors) to interact with the system accord- ing to their responsibilities, maintaining data security and privacy.

4. Improved Coordination and System Reliability:
Compared to traditional manual or web-based systems, the proposed platform reduces communication delays, centralizes all data, and improves coordination among hospitals and healthcare providers. Overall, the system enhances organ donation efficiency, reduces waiting times for patients, and provides a secure, scalable, and user-friendly solution.

5. MODULES
The proposed Android-Based Organ Donation Platform is di- vided into five main modules: Donor, Recipient, Doctor, Ad- min, and Notification. Each module is designed to handle spe- cific functionalities and ensure smooth operation of the system.

1. Donor Module
This module stores information about registered donors and keeps track of available organs and their status. Donors can up- date their personal details and organ availability at any time. The module also sends notifications to donors when a recipient request matches their profile.

2. Recipient Module
The Recipient Module allows patients to request organs and view available donors. Recipients can track the status of their requests and receive notifications regarding donor matches and approvals. The module also maintains a history of all requests made by each recipient for future reference.

3. Doctor Module
Doctors use this module to verify donor details and recipient requests. They can approve or reject matches based on medical safety and compatibility. The module maintains relevant medi- cal records and provides feedback to both donors and recipients regarding the status of matches.

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4. Admin Module

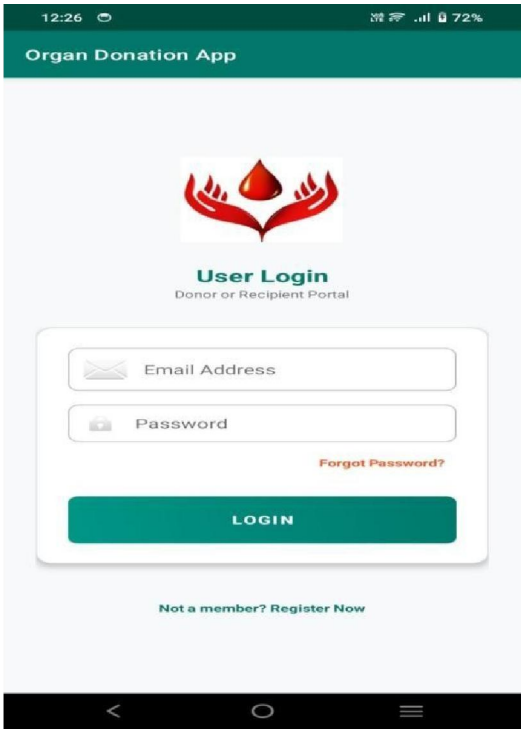
The Admin Module manages the entire system, including all users (donors, recipients, and doctors). It controls the database, ensures data security, handles registration approvals, and main- tains system records. Additionally, it can generate reports for monitoring and analysis purposes.

5. Notification Module

The Notification Module is responsible for sending instant alerts and updates to all users. Donors are notified of recipient requests, doctors are alerted about pending verifications, and recipients receive updates on donor availability and matching progress. This module ensures smooth real-time communication among all participants in the system.

RESULTS

LOGIN PORTAL & USER LOGINS



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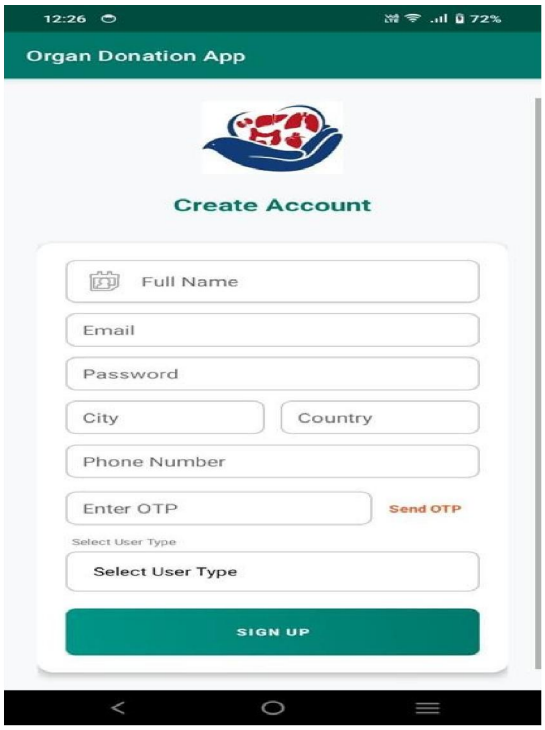
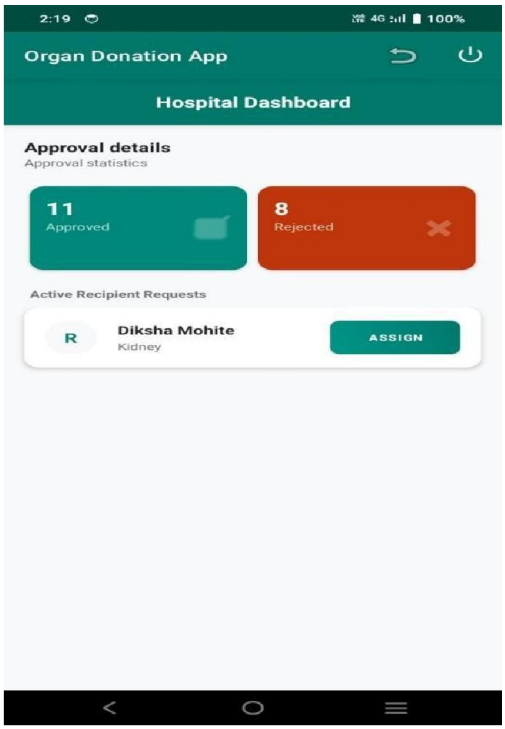
REGISTRATION PAGE & HOSPITAL DASHBOARD





X. CONCLUSION

The Android-Based Organ Donation Platform provides a reliable and efficient way to connect donors, recipients, and doctors. By maintaining accurate donor and recipient information, the system reduces delays in organ matching and ensures medical safety. Real-time notifications and secure data management improve communication and transparency among all users. Overall, this platform en- hances the organ donation process, supports hospitals in managing transplants, and increases the chances of saving lives through faster and safer organ matches

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