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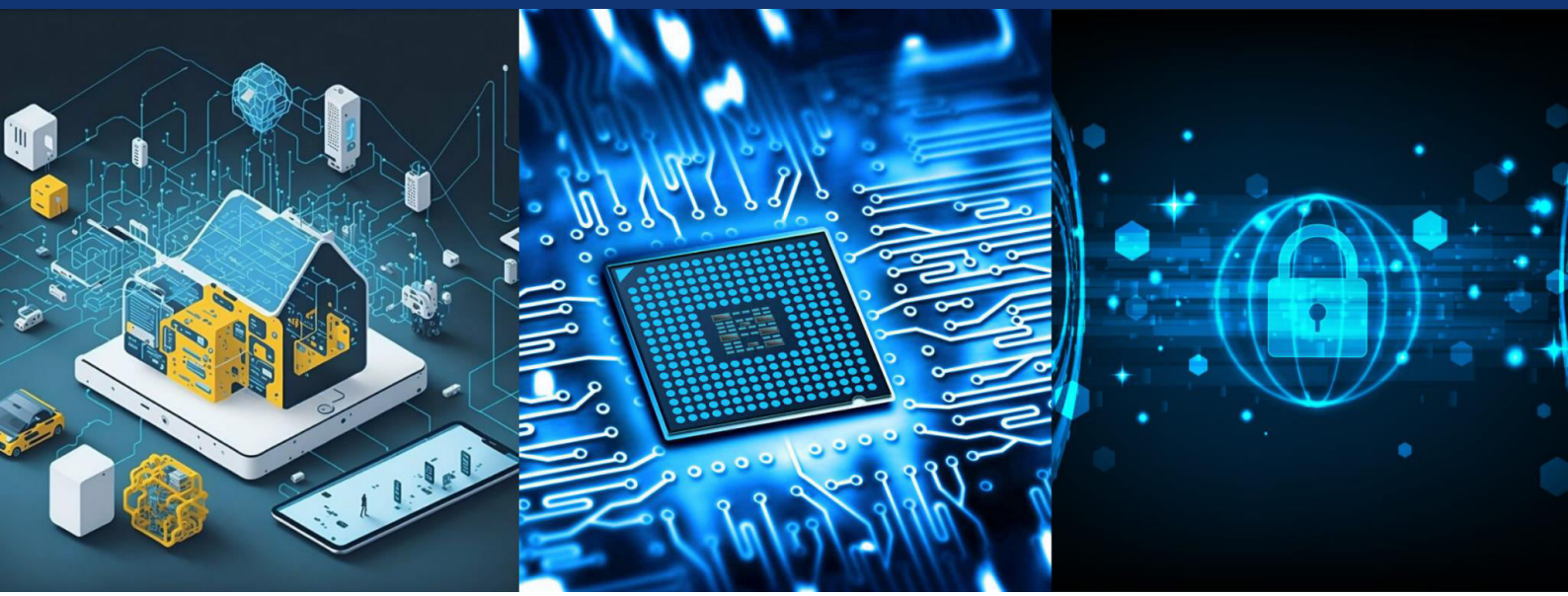

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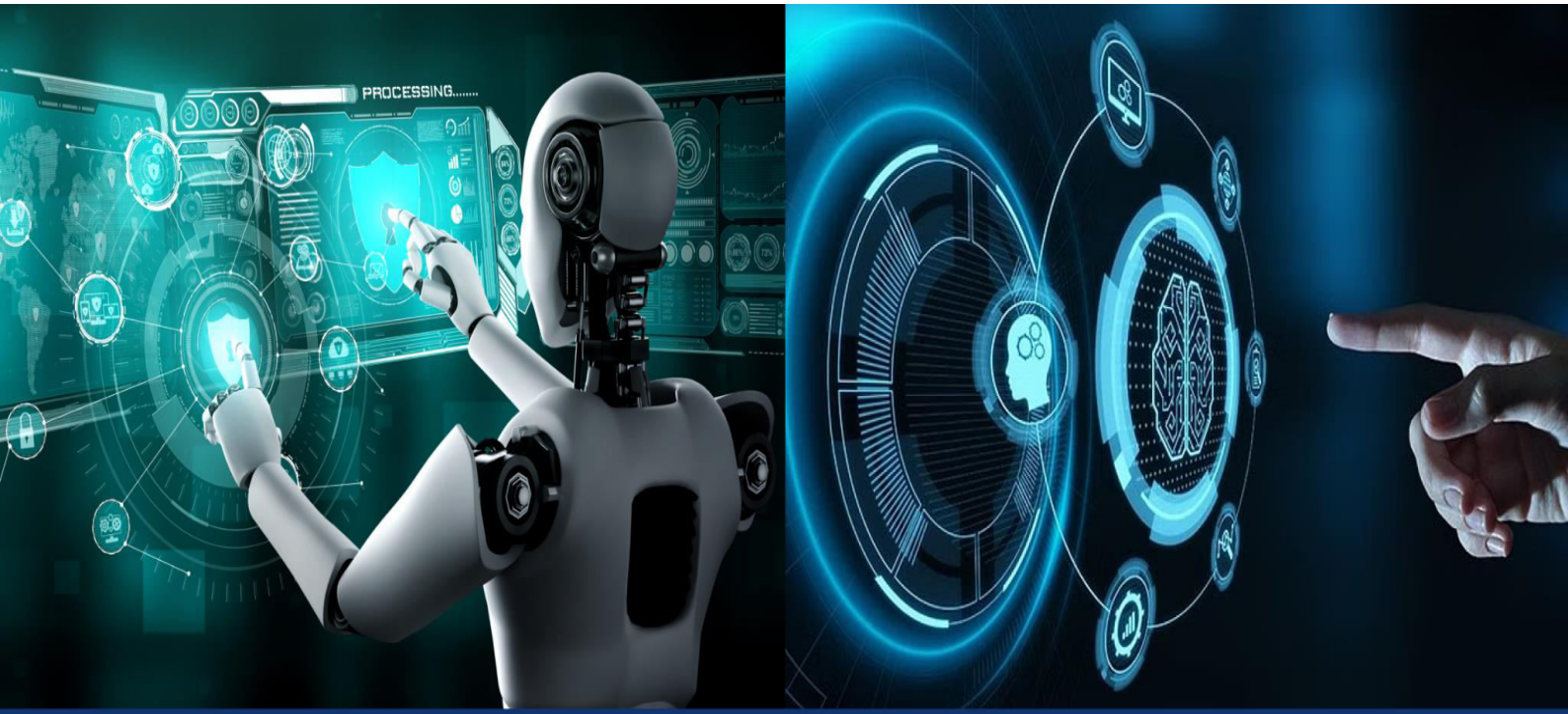

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A Mobile Solution for Streamlining Blood Donation

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ABSTRACT : A Flutter-based Blood Donation System In a world where blood transfusions are critical for saving lives, a constant shortage of blood exists. This project tackles this challenge by proposing a Flutter-based Blood Donation System. This mobile application bridges the gap between blood banks, donors, and institutions needing blood. The system caters to four distinct user groups: Registered Users: These users create an account using their government ID and profile photo. They can manage their profile information, view insightful dashboards with news, statistics, and personal donation history. Importantly, the system guides them through pre-donation screening tests, locates nearby donation opportunities, and allows them to respond to blood requests from institutions. Registered users receive helpful notifications about upcoming camps, urgent blood needs, and reminders for their next eligible donation. Unregistered Users: Even without registering, users can leverage the app's functionality. They can find nearby NGOs and blood donation camps on a map and utilize search filters to identify specific donation opportunities. Additionally, they have access to informative dashboards with news and statistics, and can opt-in to receive push notifications. Institution Admins: Hospitals and other institutions needing blood can register admins using a unique ID. These admins can manage their profiles, view a comprehensive list of donors, and directly contact them through calls, messages, or notifications.

KEYWORDS: Blood Donation, Android Application, Gps, Blood Types, Flutter, Firebase.

I. INTRODUCTION

According to the survey conducted by World Health Organization (WHO) for the Year 2019, India wants eight crore units of Blood, however solely ten lakhs units are available on the market, that shows the intense shortage of blood. Blood and its parts are vital for human life as there's no substitute for human blood. No major operation will be performed while not the utilization of blood in any hospital or clinic. Since India has a huge population, the requirement of blood is rising on a daily basis. Statistics specifically show an alarming level. The quantitative relationship between the number of blood banks available and the number of blood banks required is not optimal.

The project titled "A Mobile Solution for Streamlining Blood Donation" aims to develop an innovative mobile application using the Flutter framework. The app seeks to bridge the gap between blood donors, recipients, and blood banks by offering real-time matching, location-based services, and seamless communication. It provides a platform where donors can easily register, view donation requests, and receive notifications when their blood type is needed, while recipients or blood banks can quickly locate and connect with available donors.

The mobile solution incorporates features such as push notifications for urgent donations, reminders for upcoming donation schedules, and detailed safety guidelines for donors. By utilizing real-time location tracking and a centralized database, the app ensures that blood donations are facilitated promptly, especially in critical situations. This project not only promotes regular blood donation but also enhances the overall experience by reducing manual processes and logistical delays

The rest of this paper is organized as follows. Section 2 briefly discusses the methods to be carried out. Section 3 Result analysis. Section 4 is the Conclusion; Section 5 discusses future enhancements.

II. LITERATURE SURVEY

Blood transfusion is a critical element of health care. It contributes to saving ratings of lives yearly in each ordinary and emergency thing. Furthermore, it dramatically improves the anticipation and excellent lifestyles of patients with a number of acute and continual conditions. Blood transfusion helps voluntary blood donation. During the ensuing five-10 years, the

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delivery of blood is important to meet the stress of older populations. In addition, in the case of operation or treatment, medical institution employees ask
the affected individual's cherished ones for blood donation or family need to be forced to be conscious of some donor who has the compatibility of the blood type with the affected person. This emergency scenario increases numerous demanding situations are trying to find out the donors. New techniques have to meet the demands of society.

A Geo-localised Blood Donor Management System [3] As an alternative technology, it employs Mobile Crowdsourcing. This is the practice of requesting or distributing a task to a wide number of individuals. Crowdsourcing systems that enlist a vast number of individuals to help solve a diverse range of problems. It gathers millions of users to create an item that would benefit the whole society. Crowdsourcing can be linked to a wide range of topics, and it poses a number of intriguing technological and social problems.

M-Health [4] It is a new wellness horizon that provides healthcare facilities through mobile devices and networking technology. Blood donation in health care is a complicated procedure that takes months to select a donor that has the same blood pool as the recipient. Android-based blood donation application is an M-Health solution to connect the requester and donor at any time and from any place.

The Android Smartphone Blood donation application [5] is an android-based total blood donation utility that keeps the information of blood donor volunteers. In instances of an emergency, the request can transmit the message to all eligible donors for donation, together with records from the blood institution and clinic. They used the cloud hosting infrastructure to keep application data anywhere and at all times. It is also a voluntary blood donation as a requesting applicant that is the superior attribute of our submission. The requester can transmit the message to the registered users along with an emergency sign for the blood needed, and a message will be transmitted to all voluntary donors of blood. When a volunteer confirms the donation of blood, it is recognised as a donor. Our software supports the collection of blood donations and ensures careful handling of the emergency situation.

III. ANDROID BLOOD DONATION APP

A. Existing System

The people who donate blood to patients are not checked for properly. Will the donor have any possible medical problem and donate blood to the recipient, the danger may arise. One should always be verified donor medical records. Medical histories would be like:

- No blood should be donated by an individual with anaemia.
- Donors who have blood-borne illnesses should not apply for blood donation.
- People unweighted by height do not donate blood from their heights
- After a few years of pregnancy and during pregnancy, women do not donate blood. In the existing model, the above medical records are not employed. This could lead to impairment. Blood does not necessarily match the donor and patient's body state the two things below are not taken into account the location of the donor as well as the distance between both the recipient and donor..

B. Proposed System

This section outlines the **Analysis**, **Framework**, and **Algorithm** involved in the **Android Blood Donation App**. The system aims to provide real-time identification of blood donors and streamline communication between donors, hospitals, and blood banks to address emergency blood requests. It ensures efficient and secure data handling, promotes voluntary blood donation, and facilitates donor-recipient matching for timely medical support..

C. Problem Statement

According to the survey conducted by World Health Organization (WHO) for the Year 2019, India wants eight crore units of Blood, but solely ten lakh unit available on the market, which shows the intense shortage of blood. Blood and its parts are vital for human life as there's no substitute for human blood. No major operation will be performed while not the utilization of blood in any hospital or clinic. Blood transfusion is a critical element of health care. It contributes to saving ratings of lives yearly in each ordinary and emergency thing. Furthermore, it dramatically improves the anticipation and excellent lifestyles of patients with a number of acute and continual conditions. Our Flutter-Based Blood Donation System offers functionalities for quick access to donor records collected from various parts of the country. It enables monitoring of the results and performance of the blood donation activity such that relevant and measurable objectives of the organization can be checked. They are providing an efficient search for who needs the blood in their own cityas fast as possible. The donor can also easily keep track of the donation they made.

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D. Core Modules:

1. **User Registration & Authentication**:
   - Implements user login and sign-up using Firebase Authentication. Users can register as donors or recipients.
   - Verification of user details to ensure valid donor profiles.
2. **Blood Donation Request**:
   - Allows users to search for available blood types and donors within their vicinity using Google Maps API.
   - Provides real-time updates on the status of donation requests and responses.
3. **Donor & Recipient Matching**:
   - Matches blood donors with recipients based on proximity, blood type, and urgency.
   - Sends notifications to nearby users via Firebase Cloud Messaging when there's a need for donation.
4. **Donation Scheduling & Tracking**:
   - Allows donors to schedule appointments for blood donation at nearby hospitals or blood banks.
   - Tracks past donations and the number of successful blood donations for both donors and recipients.
5. **User Interaction**:
   - Includes voice commands for hands-free control, and haptic feedback to guide users through the app.
   - Push notifications for donation opportunities, reminders, and updates on donation status.

This framework ensures a seamless and user-friendly experience for both blood donors and recipients, offering real-time communication and matching features.

E. Technology Used for Blood Donation App

1. Hardware Requirements:

- **Processor**: Intel i5
- **RAM**: 8 GB
- **Storage**: 1 TB Hard Disk
- **Operating System**: Windows 11

2. Software Stack:

- **Front End**: JavaScript, Dart (Flutter for cross-platform development)
- **Back End**: Node.js, Express.js, MongoDB

3. Development Tools:

- **IDE**: Android Studio (for Flutter development)
- **Code Editor**: Visual Studio Code
- **Cloud Services**: Firebase (for authentication, real-time database, and cloud messaging)

This configuration ensures a smooth development environment for building and maintaining the Blood Donation app.

IV. RESULT AND DISCUSSION

1. Registered User Module:

Registered users can log in, search for blood donors, request blood donations, and track donation requests.

Registered User Module:

1. **Registration**:
   - Users register using a government ID and profile photo.
2. **Password Management**:
   - Users can reset their password using two-factor authentication (2FA) if forgotten.
   - They can manage and change their passwords.
3. **Login**:
   - Users log in with their credentials.
4. **Dashboard**:
   - View feeds, news, and statistics.
   - Track goals, achievements, leaderboard, and last blood donation date.
5. **Blood Donation**:
   - To become a blood donation volunteer, users must complete a pre-screen test.

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- After passing the test, they can become a donor.

6. **Find Nearby Locations**:
   - View nearby NGOs and blood donation camps on a map.
   - Search by applying filters.
7. **Blood Requests**:
   - View blood requests from institutions with options to accept or reject.
8. **Donation History**:
   - Users can view their past blood donations.
9. **Notifications**:
   - Receive notifications about camps, emergency blood requests, and more.
   - Toggle push notification alerts on or off.
   - Receive reminder notifications when 3 months have passed since the last donation.

Fig 1: Register Page

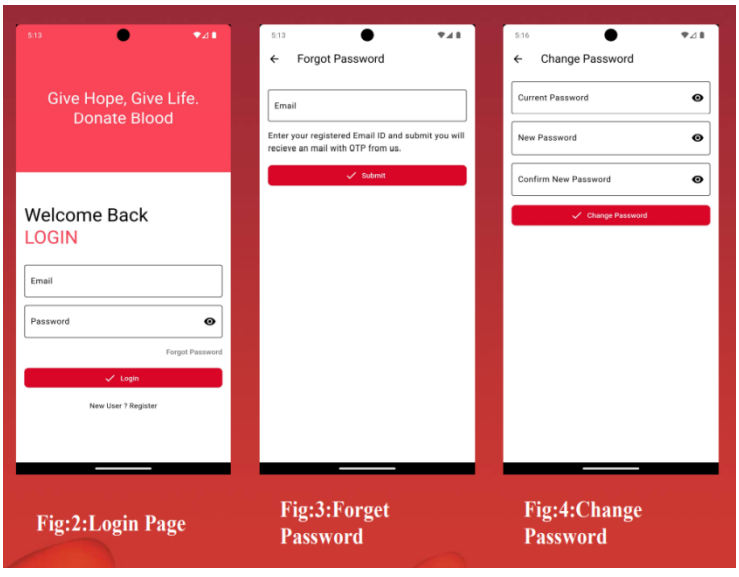

Fig 2:Login Page Fig 3:Forget Password Fig 4:Change Password

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2. Unregistered User Module:

- Unregistered users can view general information, search for nearby blood banks or events, and register themselves for donations.

Unregistered User Module:

1. **View Nearby Locations**:
   - Can view nearby NGOs and blood donation camps on a map.
   - Can search for locations using different filters.
2. **Dashboard**:
   - Can view feeds, news, and statistics.
3. **Notifications**:
   - Can receive push notification alerts.

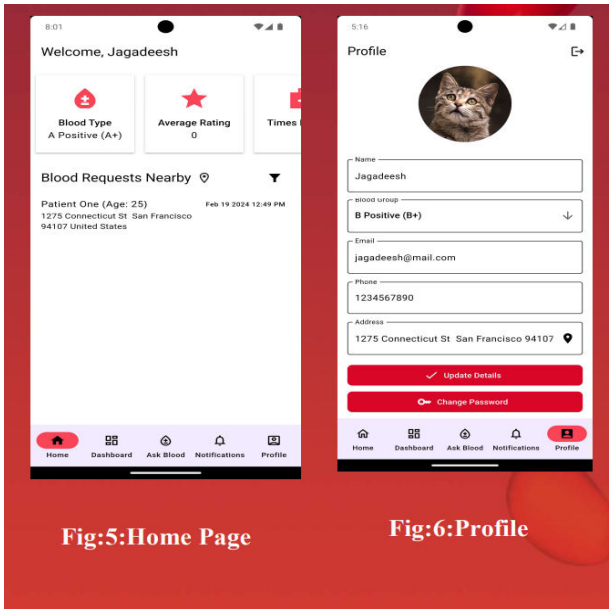

Fig 5:Home Pag Fig 6:Profile

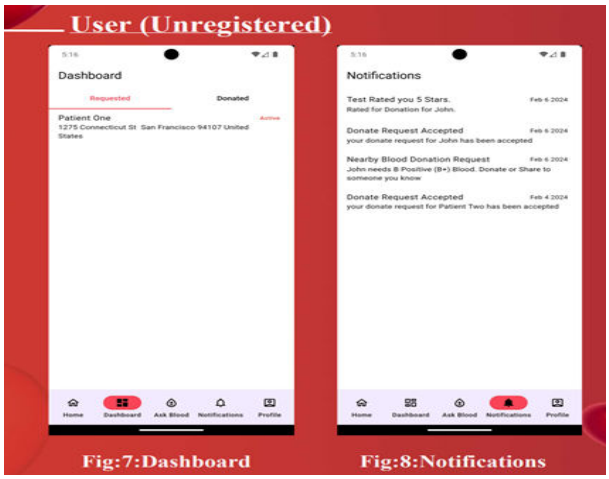

Fig 7:Dashboard Fig 8:Notifications

3. Institution Module:

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- Institutions (e.g., hospitals, blood banks) can register and manage blood donation events, request blood donors, and view blood donation records.

Institution Admin Module:

1. **Registration and Login**:
   - Register using a unique ID sent via email.
   - Log in using credentials and manage the profile.
   - Option to change the password.
2. **Donor Management**:
   - View the list of all registered donors.
   - Contact donors via call, message, or notifications.
   - View donors with similar blood types.
   - Access limited donor details, ensuring donor privacy (details are shown only if the donor accepts the request).
3. **Appointment Management**:
   - View and update the status of all appointments.
4. **Blood Requests Management**:
   - Manage blood requests sent by institutions.
5. **Blood Banks**:
   - View details of all available blood banks.
6. **Notifications and Alerts**:
   - Create notifications and alerts to advertise blood donation camps, blood shortages, and other relevant events.

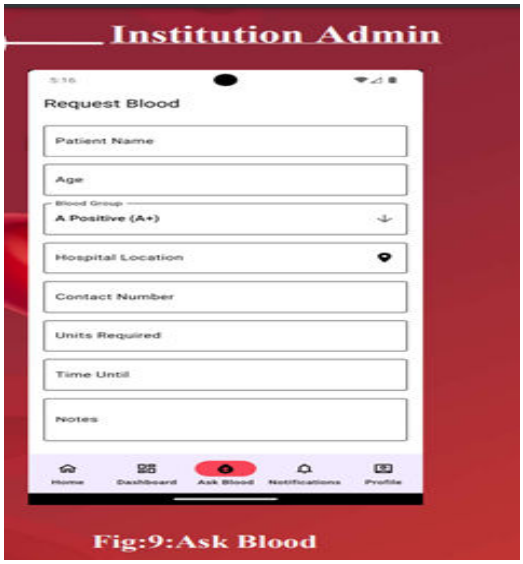

Fig 9: Ask Blood

4. Admin Module:

- Admins can oversee user activities, manage institutions, verify blood donations, and ensure compliance with regulations.

Admin Module:

1. **Login and Access**:
   - Log in using credentials.
   - View the total number of blood donors, blood requests, blood banks, and cities.
2. **Authorization**:
   - Authorize institution admins.
3. **Notifications Management**:
   - Send new push notifications.

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- Add and manage notifications for display to users.

4. **Content Management**:
   - Manage feeds, news, goals, and statistics displayed to users.
5. **Leaderboard**:
   - View the number of users at the top of the leaderboard.
6. **Pre-Screen Test Management**:
   - Manage pre-screen test questions and scoring system.
   - View the number of pre-screen tests attempted by users.

Fig 10: Feeds/Reviews

V. CONCLUSION AND FUTURE SCOPE

The development and deployment of the **Flutter-Based Blood Donation App** marks a significant contribution to the healthcare ecosystem by addressing the critical challenge of blood shortages in emergencies. This app is designed with the aim of simplifying the process of connecting donors, recipients, hospitals, and blood banks, ensuring timely and efficient responses to urgent blood donation needs. It leverages modern technologies like **Flutter for cross-platform functionality**, **Firebase for real-time data handling and authentication**, and **Google Maps API for geolocation**, ensuring that the system provides accurate and real-time data.

The app goes beyond just matching donors and recipients by incorporating essential features such as **donor verification**, **scheduling of donations**, and **tracking past donation history**. Its user-centered design ensures accessibility for all, including built-in features like voice commands and haptic feedback for ease of use. The combination of **real-time communication** between users and the app's secure data management framework not only enhances efficiency but also safeguards sensitive user information, maintaining high standards of **data privacy** and **security**.

Moreover, the app's ability to keep users engaged through notifications, updates on blood drives, and reminders to donate again ensures a higher level of donor retention. By tracking user achievements and participation, it promotes a sense of community involvement, encouraging a culture of regular blood donation.

The comprehensive testing approach, focusing on usability, performance, and security, guarantees that the app delivers a smooth and reliable experience. The scalable architecture ensures that the system can be continuously expanded with new features and functionalities, such as **advanced language support**, **cloud storage**, and integration with more healthcare institutions.

In conclusion, the **Flutter-Based Blood Donation App** addresses the pressing issue of blood shortages in an innovative and impactful way. It empowers users to contribute to life-saving efforts by making blood donation more accessible, efficient, and secure. By fostering collaboration between healthcare institutions and the public, the app not only bridges the gap between donors and recipients but also helps build a stronger, more resilient healthcare system. Continuous updates and user feedback integration will ensure that the app evolves to meet future needs, further enhancing its role as a crucial tool in

public health. This project demonstrates how modern technology can be harnessed to solve real-world challenges, ultimately improving healthcare outcomes and saving lives.

In future, our algorithm more congenial with more features such as

- The analysis such as Frequently requested zone or hospital for Blood, Number of donors, mostly asked Blood Group, Age group of Patients need for blood etc. can be added as additional features.
- The BDOOR can be implemented using Artificial Intelligence and Deep Learning Algorithms.
- NGOs and NCC Units information's can be made available in the application.
- Donors last donated details can be automatically updated in the App.
- Notification to Donors about the nearest Blood Donation Camp.

REFERENCES

[1] Sinha, N., Maurya, S., Bodade, V., & Patil, R.To Make an application to Improve Blood Donation Process UsingData Mining Technique. (2017). International Journal of Recent Trends in Engineering and Research, 3(4), 112–119.

[2] Akar, I. F., Mohammad, T. A., & Ismail Z, M. (2015). CBBR Centralized Blood Bank Repository. InternationalJournal of Information Systems and Engineering, 3(1), 85–97.

[3] Pandit, T., Niloor, S., & A.S.Shinde, A. (2015). A Survey Paper on E-Blood Bank and an Idea to use onSmartphones. InternationalJournalofComputerApplications,113(6),48–50

[4] M. Danish and P. Parwekar, "Push Notify: Push server application," 2013 3rd IEEE international AdvanceComputing Conference(IACC),2013,pp.377-382.

[5] S. R. Okuboyejo, N. A. Ikhu-Omoregbe, "A Framework for the Design of a Mobile-Based Alert System forOutpatient Adherence in Nigeria", African Journal of Computing & ICT, vol. 5, no. 5, Sept. 2012.

[6]BloodDonation,http://en.wikipedia.org/wiki/Blood_donation Saleem, H., & Okumuş, B. T. (2017). Mobile Blood and Organ Donation Management System. KahramanmaraşSütçü İmam Üniversitesi Mühendislik Bilimleri Dergisi, 20(2), 45–53.

[7] Brislin M.R.A et al. (2017), 'Blood Donation and Life Saver App', 2nd Int. Conf. on Communication and Electronics Systems (ICCES), DOI:10.1109/CESYS.2017.8321318, pp 446-451.

[8] Clementeena A, Sankar K and Kannan S, (2014), 'A Study on Blood Bank Management System', Middle East Journal of Scientific Research, Vol. 19, No. 8, pp 1123-1126.

[9] Das H.D, Ahmed R, Smrity N and Islam L, (2020) 'Bdonor: A Geo-Localised Blood Donor Management System Using Mobile Crowdsourcing', IEEE 9th Int. Conf. on Communication Systems and Network 10.1109/CSNT48778.2020.9115776, pp 313-317.

[10] Fahim M, Cebe H.I, Rasheed J and Kiani F, (2016), 'Mhealth: Blood Donation Application Using Android Smartphone', 6st Int. Conf. on Digital Information and Communication Technology and its Applications (DICTAP), Konya, Turkey, 2016, Doi: 10.1109/DICTAP.2016.7543997 pp 35-38.

[11] Hamlin M.R.A and Mayan J.A, (2016), 'Blood Donation and Life Saver-Blood Donation App', Int. Conf. on Control, Instrumentation, Communication and Computational Technologies (ICCICCT), Kumara coil, India, 2016, Doi: 10.1109/ICCICCT.2016.798802, pp 625-628.

[12] Muniraju Hullurappa, Sudheer Panyaram, "Quantum Computing for Equitable Green Innovation Unlocking Sustainable Solutions," in Advancing Social Equity Through Accessible Green Innovation, IGI Global, USA, pp. 387-402, 2025.

[13] Meiappane A, et al. (2019) 'DWORLD: Blood Donation App Using Android', IEEE Int. Conf. on System, Computation, Automation and Networking (ICSCAN), Pondicherry, India, 2019, DOI: 10.1109/ICSCAN.2019.8878830, pp 1-5.

[14] Pohandulkar S.S and Khandelwal C.S (2018), 'Blood Bank App Using Raspberry Pi' Int. Conf. on Computational Techniques, Electronics and Mechanical Systems (CTEMS), Belgium, India, Doi: 10.1109/CTEMS.2018.8769143, pp. 355-358

[15] Priya P, et al. (2014), 'The Optimization of Blood Donor Information and Management System by Technopedia', Int. Journal of Innovative Research in Science, Engineering and Technology, Vol. 3, pp 1-5.

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