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The Development and Impact of a Blood Unity Application

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Abstract:- This research focuses on the development and impact of a Blood Unity Application. Blood shortage is still a major problem in the medical sector. Emergencies come as last minute requirements and are very crucial. Inadequate blood and compatability problems make it difficult to manage the blood supply effectively. Sometimes, a lack of awareness and communication causes those who might be eager to donate to be unaware of the efforts that are running. To avoid these challenges we have designed an app which acts as a bridge between the donors and the people in need. In this paper, we present an overview of a website and a mobile application designed for blood donation. It is a user-friendly application where we collaborate the donors and hospitals to the people in need. By creating this application, we can assure a safe and secure blood transfusion. Anyone in need of blood at any time can download this app right away and use it to locate nearby donors who have the necessary blood type. We make the donors contact information available through the app to all registered users, enabling them to get in touch with them directly in case of emergency. We have also made a website similar to the app to use through PCs or Laptops from anywhere and at anytime. The website was developed through HTML, CSS, Bootstrap at frontend and PHP, MYSQL at backend and Angular Java Script at control end. The app was developed using Apache Cordova.

Keywords:- *Blood Unity Application, Blood Transfusion, Emergency Blood Supply, Donor-Recipient Communication, PHP, MYSQL, Angular Java Script, Cordova.*

I. INTRODUCTION

Blood is an essential element that every hospital needs to provide to its patients, and we cannot predict when we will need it. Blood is not needed in advance; rather, it is required at the exact moment and is critical for that specific patient. People constantly require blood during surgeries, and blood shortages frequently arise, which puts patients in dangerous situations with unanticipated outcomes. In some cases deaths occur only as a result of insufficient blood or blood that is not accessible to the patient at the appropriate moment.

Additionally, a lot of people wish to donate blood but due to lack of awareness, a lot of donors are unable to give blood. We therefore provide a bridge through an online platform where the beneficiaries may locate blood donors and all potential donors can register here in order to prevent this communication gap between the donors and recipients. Not all donors may be aware of blood donation programs, but registering on an online platform could make it easier for recipients to get in touch with owners when they are in need.

Blood drives are a great way to donate blood, but they take a long time. The blood bank keeps the blood and delivers it to hospitals as needed. However, because emergency needs cannot always be predicted in advance, blood banks may not always have enough blood on hand. For this reason, we have registered various donors from various locations on our online application, which allows the recipient to locate the donor at the closest location and have a live, safe blood transfer.

To assist donors and receivers connect, we have developed an online platform called Blood Unity: Connecting Donors to Those in Need. Anyone in need of blood at any time can use this app to quickly find the closest potential site that has the necessary donors with a specific blood group. This is an intuitive, user-friendly program that anyone of any age can use and understand with ease.

As per 2021 statistics of Times of India, for every two seconds someone in India needs blood and also it was estimated that 12000 people die in India only due to shortage of blood. These statistics allow us to see how important it is for patients to receive blood at the right moment and also for donors to know when they should donate blood. Blood is a vital necessity for any surgery, and since India has so many hospitals, there must be a large number of willing donors eager to give their blood in order to save lives. Raising awareness among the public also requires teaching them about the importance of blood donation and how it can save lives.

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We offer a user login in our Blood Unity application so that all registered users can log in and complete the required information if they would like to donate. Not only can donors use the app, but anyone who has registered may also view the list of donors after logging in, and depending on the blood type necessary, they can get in touch with them right away. By using this app, recipients in need of blood can find donors in their area and receive assistance that could potentially save their lives.

There are few applications already existing related to blood donation but there are quite many reasons for us upon choosing this project. First thing is by increasing no. of applications on a particular aspect, awareness increases among people. Second, we don't offer any premium access or subscriptions like other apps to the users to access the app, it is completely a free and easily understandable application. Also we provide the contact of all the registered donors so the recipients can access the app and contact them if needed which may help them in getting the blood at the critical moment.

According to 2022 figures, 20,000 persons were unable to be saved owing to a blood shortage. If they had received the blood at the proper time, they would have survived. There are donors who are willing to contribute but are unaware of the emergency, or the beneficiaries do not know the donors and were unable to connect, resulting in the recipients' deaths. So, in our application, contributors and receivers are connected simply by registering. This enables recipients to connect with contributors as needed.

In our application, in the registered donors, there is no need to search for every donor instead, we may search for a specific blood group and retrieve all the donors in that blood group. Donors can also easily register by filling out their details. We have also added the functionality that the donors' contacts are clickable, and when we tap on them, it directly reflects in the dialler, allowing us to call the appropriate donor if necessary.

We used HTML, CSS, and Bootstrap for the website's frontend development, and PHP for server-side programming to connect the site to the server. MYSQL is used to store logged-in user data as well as application-related data. Also, angular js is used for the webpage's framework. Cordova is the framework used to construct the mobile application. It was previously known as PhoneGap. Apache Cordova develops the UI using HTML and CSS, and the logic is written in AngularJS.

The primary goal of the project is to develop a blood management system in which recipients do not perish due to lack of blood and can find donors at the appropriate time. Physical blood drives may not be available at all locations or at the proper time, therefore donors who are available at all times and locations can transfer blood in real time. So we created a program that connects donors and recipients in all possible places and assures a safe blood transfusion. We have developed a new feature that greatly benefits the recipients. Instead of calling all the specific blood group donors, they can send a notification to that specific blood group donors that they require blood, and then donors willing to donate at that time can call them and find out where they are and get there to donate.

II. LITERATURE REVIEW

Initially, during the early 1900s, when there was no awareness about blood transfusion and how blood might be passed from one person to another, many people died as a result of blood shortage. In 1914, a Belgian doctor completed the first non-direct blood transfusion. Then, during World War 1, when people were injured while fighting, blood transfusions became more popular. As a result, they have suffered significant blood loss and must be rehabilitated by receiving blood transfusions. Then, many people who did not participate in the battles would come forward to donate blood, allowing them to help those who had lost blood and save their lives.

While the first blood transfusions were performed directly from the donor to the recipient before coagulation, it was discovered that by adding anticoagulant and refrigerating the blood, it could be stored for several days, and this process gave rise to the concept of blood banks, which has since grown in popularity.

Because blood can be preserved for many days by adding anticoagulants, hospitals began collecting and storing it to avoid the last-minute rush of blood. This concept has assisted numerous patients in saving their lives during unexpected emergency situations. As a result, some volunteers have stepped forward to establish blood banks, which collect, store, and provide blood to hospitals as needed. In this way, the concept of blood banks emerged, and it has grown to great heights in the blood transfusion system.

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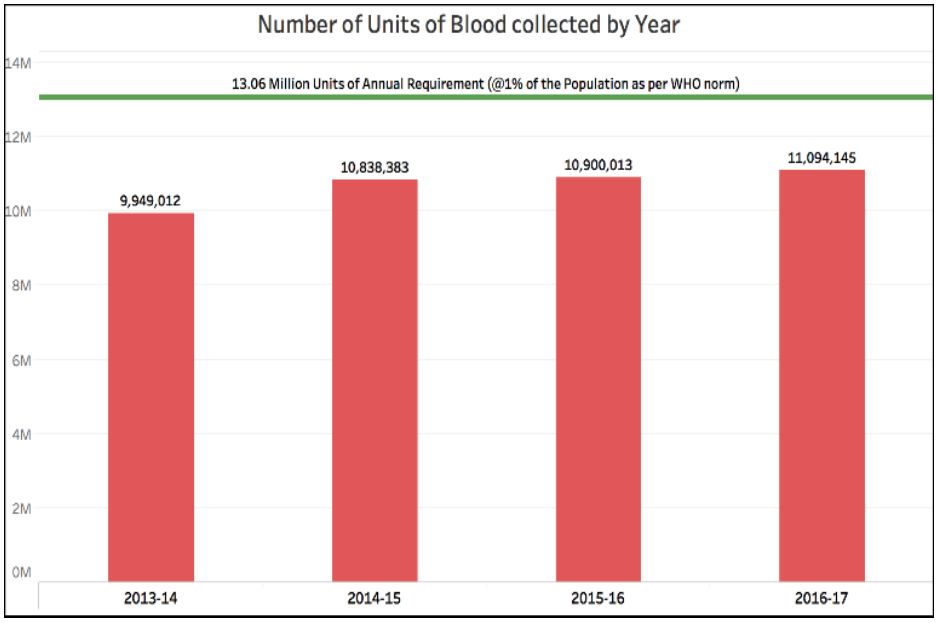

Fig 1: Literature Survey of Blood Units

Later, in 1939-40, blood group system was created, which limited the number of blood groups from which blood could be drawn and administered. Then, in 1950, plastic bags were gathered to store blood instead of breakable glass bottles. Advancements were achieved in this area for blood storage. Then the components in blood red blood cells and white blood cells were found. Blood research has yielded numerous discoveries. There were also some specific temperatures at which the blood needed to be preserved for future use. Many precautions must be followed, such as storing it in a cool spot at a specific temperature, to ensure that it does not cause difficulties when used again.

During the early stages of blood transfusion, people in the United States and Europe would donate blood in exchange for money. So this used to be an issue for the recipients because they had to buy the blood for money. However, times have changed, and people now actively donate blood for others, even if they have no relationship to them. The number of blood volunteers has significantly increased, and people are eager to donate blood, which is a good sign.

Blood donation is referred to as such since it occurs only when people freely donate blood for the benefit of others. Also, some criteria state that blood can only be donated once every 7-8 weeks. No donor can provide blood in less than two months, and there are some guidelines that how much blood can be donated at once, as well as the number of blood cells and whether the donor is healthy enough to contribute. A person suffering from any sickness is not eligible to donate blood. The volume of blood collected from donors and the procedure used may vary. Blood can be collected manually or using automated technology, but only in a secure manner.

III. PROBLEM STATEMENT

Emergency requirements arise unexpectedly and are extremely necessary. In India, there is an emergency need for blood every 0.2 seconds, hence blood donation has become critical to save lives. Blood banks perform an excellent job of collecting and storing blood, but the demand for blood by recipients is unpredictable, and there is sometimes insufficient blood in the blood banks. This unanticipated need for blood must be met in order to prevent deaths or the onset of serious illnesses. When there is little blood in the blood banks, it is difficult for the receiver to obtain blood. As a result, there must be an alternative route for recipients to obtain blood; also, because blood is an emergency demand, there should be an easy mechanism for identifying donors.

IV. TECHNOLOGIES USED

Cordova is an open-source framework for developing mobile applications that supports cross-platform development using web technologies such as HTML, CSS, and JavaScript. It is simple to study and understand technology.

HTML is used to structure web pages and their content. It is used to develop the frontend of a website. **CSS** is used to style webpages, such as their design, layout, and display variations.

PHP is an open-source server-side scripting computer language that is commonly used for backend web development and can be simply incorporated into HTML.

MySQL is a relational database management system that keeps all of the information from linked searches and logged-in data for future access.

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Angular JS is a structural framework for dynamic web applications that improves the functionality of the user interface on the frontend of the web page and can be easily integrated with other platforms.

V. METHODOLOGY

This Blood Unity program features a number of simple steps to complete, beginning with user signup and continuing with donor registration, which includes filling out all of the necessary information to donate blood so that anyone may access it if necessary. In the user registration, anyone can register so that if somebody needs blood, they can identify the registered donor's information and contact them. In the user login, we can find registered donor information as well as data from donors who donated, and users can edit or delete their data at any moment if changes are required. If a person wants to see if there are any donors of a specific blood group, they don't have to verify everyone; instead, they may search in the search box for that blood group, and all of the donors will be listed.

Physical blood drives may not be held in all locations and may not be known to everyone, and even if blood is donated, during emergency situations, sufficient blood may not be available, so we have come up through software and designed a website and an application where anyone can register and contact the donors, as well as a special feature is added in which if tapped on a particular donor's contact to dial them, their contact shows on the dial pad, making it easy for the recipients to contact.

To make things easier for donors, we've developed a new function that notifies all registered donors of a specific blood group when blood is needed. As a result, when any donor of that blood group receives information that they are able to donate, they will donate blood right away. Instead of receivers searching for all donors and contacting them, which takes some time, if a notice is sent to all donors in response to the requirement, the donor who can donate and is in the closest available location can contact the recipient and donate.

There is also a hospital login where all hospitals can register and see if they have every blood type available. So, in this way, all hospitals register and display the blood, and whenever a hospital requires blood for their patients, if they do not have the specific blood type, they can search for other hospitals, and if they do, they can obtain the blood from that hospital by contacting them, saving the patients' lives.

To make the process easier for both donors and receivers, we designed a website and an application that connects contributors with those in need. We designed the Website to be accessible from any computer or laptop, as well as a mobile application for mobile devices. Design is the initial phase in any creation or progress. We began by creating a rudimentary notion for how our application should work or look, using a flow chart or stages.

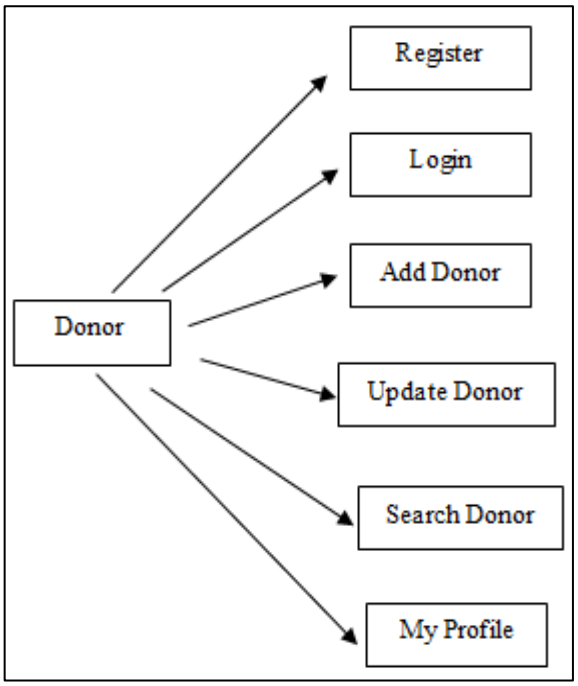

Fig 2 : Donor Registration Stages

In this approach, we designed our initial sequence of stages for our application, as if this were the order or actions that the user would take when registering. Dividing our work into fewer phases and designing them as flow charts or sequences of actions provided us with clarity about each section of the program while also making the work easier.

Next, we have hospital login, which has been developed in the same way, with the steps for how the hospital login should be displayed first, followed by the subsequent activities that must be accomplished. The hospital login process consists of four steps: registering, filling out the relevant information such as location, and then determining whether or not they have different types of blood by answering yes or no for each blood group.

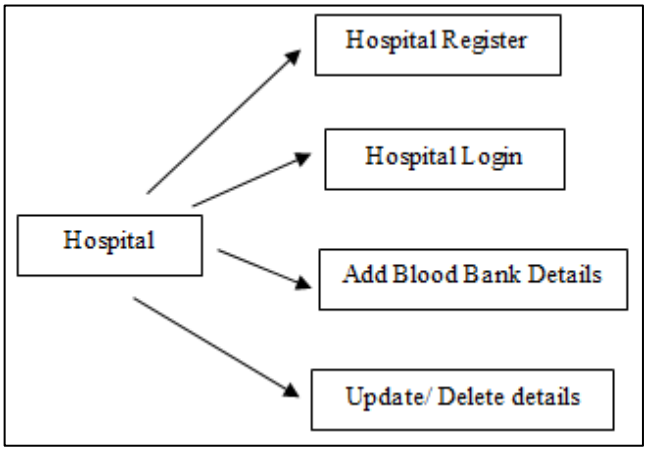

Fig 3 : Hospital Registration Stages

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This is the systematic approach to hospital login, and the steps are as above. So, by designing the user login and hospital login, we have achieved our application's major goal. The administrator can then log in and view all of the data entered by users and hospitals. All of the data that has been stored can be viewed using admin login. The data is kept in a database for future reference.

All of the user login data, donor blood donation data, registration details, hospital login data, registration data, and blood availability details will be saved in the database using MySQL. So, by establishing this application, we have built a bridge between donors and recipients for donating blood anytime in need while also ensuring a safe and secure blood transfusion.

Below are a few screenshots of the application we created for our Blood Unity application.

Fig 4 : Initial page

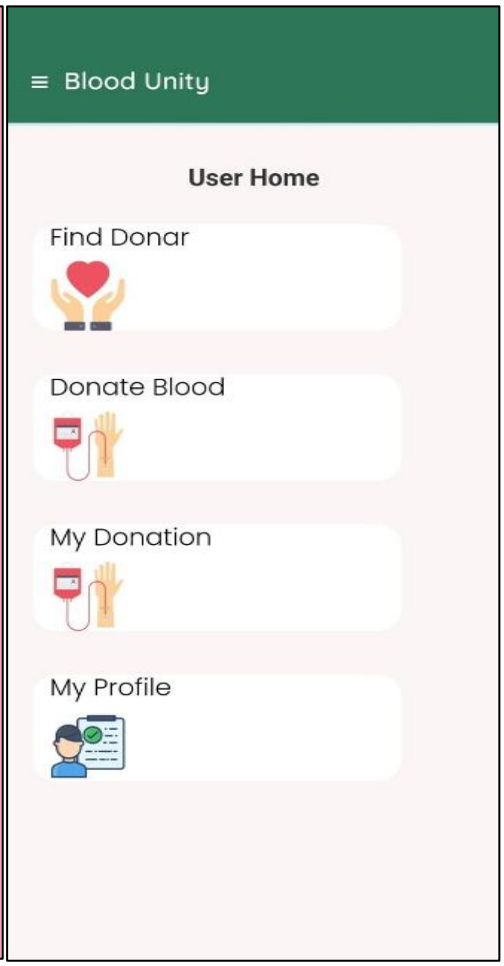

Fig 5 : User login page

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Fig 6 : Donor Registration

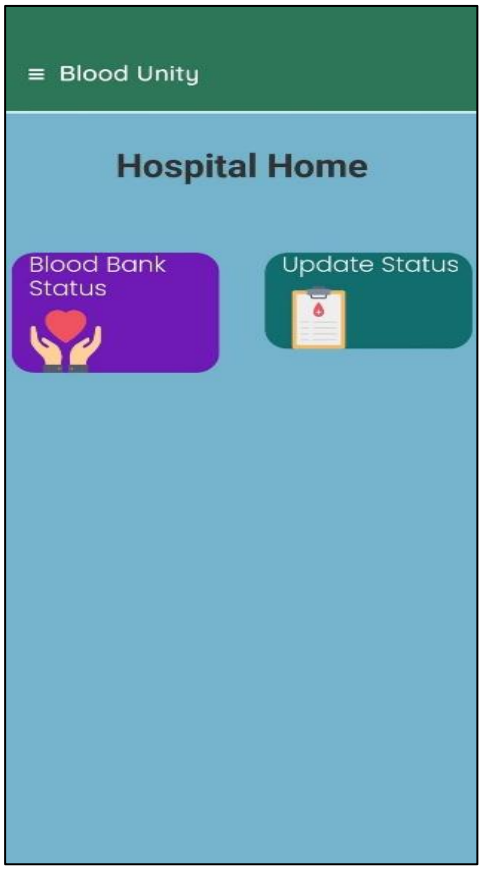

Fig 7 : Hospital Login

Fig 8 : Hospital Registration

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Fig 8 depicts how hospitals should fill out the details when logging in so that other hospitals can assist them when needed.

VI. RESULTS

We built this project with the primary goal of ensuring a safe and secure blood transfusion in an emergency for any recipient in any geographic area. In addition, it is a simple program that everyone may use.

First, we have user registration, followed by login, and anyone who wants to donate can fill out the data in donate blood and submit them, so the information is preserved and can be viewed in find donor. In addition, users can filter donors by blood group from the search box, and once they have found the donors, they can contact them directly by clicking on the call now button at the bottom of the donor details, which takes them to a dial pad and makes it easy for the recipients to contact them.

Fig 9 : User sign up

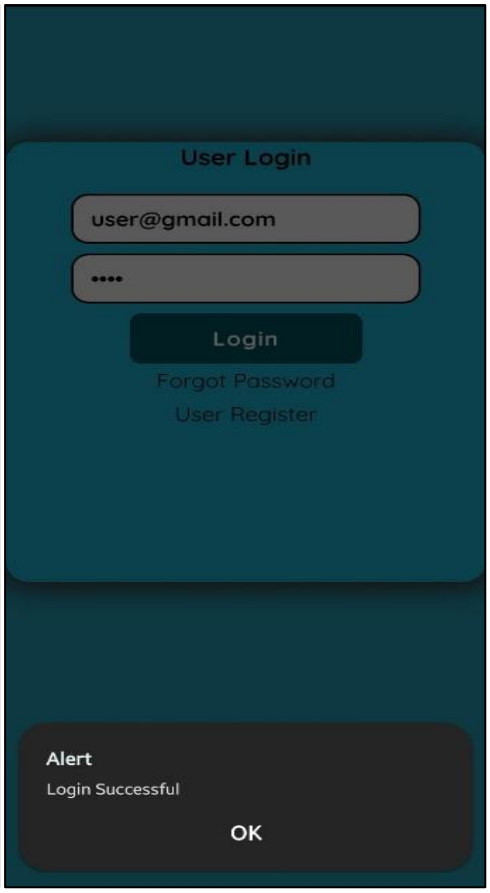

Fig 10 : Alert for sign up

Fig 9 depicts the user registration or login page, and after a successful login, it appears as in picture Fig 10.

Now, following the user login, we have the find donor and could observe all the donors, as well as the call now button at each donor's data via which we can contact them.

Then we have hospital login, where registered hospitals can login and fill up all of the essential details about the availability of blood in their blood banks, so that other hospitals can locate the blood availability when they are needed in an emergency.

In this approach, we included all of the functions and made the app more user-friendly and useful to the recipients. Spreading knowledge about this app increases its popularity and helps to reduce the number of deaths caused by a lack of blood.

Now in picture Fig 11 we can observe the call now button used by recipients to call the donors at time needed during any emergency.

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Fig 11 : Registered donors

These are a few pictures of the online application we created for recipients by connecting them to the donors.

VII. CONCLUSION

Blood Unity is one of the greatest applications for connecting donors and receivers. It ensures a safe blood transfusion because the transfusion takes place live, with the donor coming in and providing blood. Also, the software assures the protection of all users and hospitals by keeping their data secret. Promoting this app raises awareness and encourages more people to download and utilize it during emergencies, which has a significant impact. This app has many simple features that make it easier for users to use the application. It also has some extra features, such as a search based on blood group and a call now button for donors, as well as a hospital login for hospitals to check on other hospitals' blood availability, which set it apart from other apps that existed. Finally, the admin login, which contains all of the stored data from user logins and hospital logins, can be seen; any changes made to the data will be immediately reflected in the data stored in the admin login.

FUTURE SCOPE

We attempted to design a service that would allow consumers to easily locate and contact blood donors in emergency scenarios. This project offers a few extra features that set it apart from other similar projects. It is a very safe and dependable tool that allows users to view and contact all registered donors. Our project does not require a paid subscription to access. In the future, our application can serve as a valuable resource for all users seeking blood in emergency situations.

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