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# "Blood India Connect" – App for Connecting Donors and Patient using Twilio Communication API Tools

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**Abstract- India requires 5 crore units of blood each year but barely receives 2.5 units. Every two seconds, someone needs blood. Every day, more than 38,000 blood donations are required. The number of posts on social media platforms like Facebook and Twitter asking for blood donations has steadily increased along with the rapid growth in social Media usage throughout the world. Finding a blood donor is a difficult task in every country. Many individuals throughout the world are interested in donating blood when there is a need, but those donors may not have access to information on blood donation demands in their local area, to overcome this difficulty there are various blood donor finding applications on the market, such as the Red Cross Blood, Neologix and UBlood. However, more dependable applications that satisfy the expectations of consumers are encouraged. All of these applications will notify the specific donor when blood is required, but the major drawback is that these applications will give notification only if we use that particular application. To address this issue in the aforementioned applications, we created an application that will send the blood request message to that specific donor via WhatsApp / text message with the Google Map's location of the hospital where the patient is admitted. Clinics can use this application to make requests whenever a patient is in need.**

**Keywords- social media, Google Map's location, WhatsApp.**

## I. INTRODUCTION

When a patient need blood, he or she must traditionally contact a blood bank or a suitable blood group of a donor in their circle, family, and friends. However, finding a suitable blood donor from a small number of people in a short period of time is challenging. Furthermore, blood banks cannot ensure that they will have matching blood groups on hand. There has also been a constant increase in the number of blood donation requests posted on social Media. While researching this issue, the ease of access, blood needs, and blood donation statistics (1,2) are all taken into account.

There is an ongoing need for blood and blood components (red blood cells, blood plasma, platelets). Every minute of every day, someone needs blood; unfortunately, in Canada (3), only 1 in 60 Canadians donated blood last year, despite the fact that nearly 1 in every 2 Canadians is qualified to give. 52 percentage of Canadians required blood or blood products for themselves or for family member. Blood donation rates per 1,000 persons are 33.1 in high-income countries, 11.7 in middle-income countries and 4.6 in low-income countries (1).

As a result, obtaining a blood donor is getting increasingly difficult in every country. There are

various blood donor finding applications available, such as the Red Cross Blood app, which allows donors to set appointments with blood banks as well as quickly and conveniently locate nearby blood drives and donation sites (4).

However, no direct contact exists between the donor and the clinic in need of a certain blood type. As a consequence, this software is more advantageous for donors but not for clinics in terms of quickly and directly locating desired blood type. The Neologix (5) Blood Donor Finder programme helps people in need of blood discover nearby donors. Although this programme aids in the identification of donors, communication with those donors is slow and labour-intensive, as the requester (patient or clinic) must contact each donor personally. Furthermore, there is no application that provides an appropriate communication route to alert donors about the blood donation criteria. To address this issue, an application called Ublood was launched on June 15, 2022, which will notify the specific donor. The main drawback is that this application will only alert us if we use it.

Our application can address these challenges by quickly linking patients with a huge pool of donors in the same location. When a patient requires blood donations, the clinic (where the patient is being treated) can utilise the application to contact blood donors in the area or adjacent city depending on their location. The registered donors will receive a notification through WhatsApp / text message about the need for blood donation at a certain clinic, along with the Google Map's Location. We also built a calling function if a patient needs blood at night, the ratio of messages being seen would be significantly less as compared to day time, so our application will make a call automatically to that donors so we can receive a response promptly.

The application can also teach users of the value of routine blood donations and provide details on the eligibility requirements, donation procedures, and other pertinent information. Additionally, the programme may notify donors of forthcoming blood drives, urgent blood needs, and other critical changes by sending notifications and reminders.

In particular in locations where access to blood and blood products is restricted, we can boost accessibility and availability of a safe and appropriate blood supply by developing a blood donors application. Additionally, the programme can aid in reducing the time and resources required for manual blood collection and processing, improving both the effectiveness and cost-effectiveness of the procedure. Collaboration between blood banks, hospitals, and community organisations, as well as other factors, will be critical to the application's success for blood donors.

The user-friendly interface of the blood donors application can be created so that blood donors can register their information, such as their blood type, location, and availability to donate. Additionally, the app can send reminders to donors to remind them to make regular donations and assist them in finding blood donation drives and events in their neighbourhood. The programme can offer a search tool to those in need of blood transfusions to assist them in finding donors nearby. In order to help match patients with potential donors, patients and their carers can also register information about themselves, such as their location, blood type, and medical condition.

## II. EXISTING SYSTEM

**1. UBlood:**

UBLOOD A one-of-a-kind socio cultural platform that allows for real-time communication between a requester and a willing blood donor within a certain geographic area. The process is designed to link interested donors in order to save a life in times of need across the country. UBlood is a mobile app and web platform that helps people find blood donors online. The tool allows for geo-searching, real-time connections and notifications, and updates, greatly simplifying the process of identifying donors in times of necessity. We're contacting the community with a simple request: help us sign up donors for UBlood. This will be another modest step in your ongoing efforts to develop a better society

**2. Blood Donor Finder application by Neologix:**

The Neologix (5) Blood Donor Finder programme helps people in need of blood discover nearby donors. Although this programme aids in the identification of donors, communication with those donors is slow and labor-intensive because the requester (patient or clinic) must contact each donor individually. Furthermore, there is no ap plication that provides a sufficient communication route for informing donors about blood donation criteria.

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**3. Friends2Support:**
Friends2support is a group that connects people who need blood and willing blood donors on one platform. Through this website, we look for donors who are ready to donate blood and offer the quickest assistance to people who are in urgent need. We began on November 14th, 2005, in a tiny room with only 100 willing donors, but we have since grown to serve our community, inspire others, and spread the word. Our goal is to meet all of India's blood needs.

## III. SCOPE OF OUR PROJECT

The project's scope is defined by a system boundary. Anyone who wishes to deal with a situation in which a blood donor is needed in an emergency must have the Auto Contact Blood Donor application. When a patient in need of blood uses our application and makes a request, our application will automatically send the message to those donors who are in that particular place through whatapp message, and if necessary, our programme will make a call using the user provided information. As a consequence, we will be able to get respond more quickly.

## IV. LITERATURE SURVEY

Blood transfusion is an essential part of medical treatment. It helps save thousands of lives each year, in both routine and emergency situations. It also significantly improves the life expectancy of patients suffering from a variety of acute and chronic diseases. Blood transfusions help with the voluntary donation of blood. The blood supply will be critical in the next five to ten years to address the stress of an ageing population.

In addition, in the event of a procedure or treatment, medical facility personnel will need to ask the affected person's family to donate blood, or the family will need to know a donor who has the same blood type as the affected person. This emergency scenario exacerbates a number of difficult scenarios in the search for blood donors. New procedures must be developed to meet society's expectations. A blood donor management system that is geographically located [18] Mobile crowd sourcing is used as an alternative technology. This is the practice of assigning or delegating a job to a large group of people. Crowd sourcing methods where a large number of people are brought in to help solve a variety of problems. It brings millions of users together to develop a product that benefits society as a whole. Crowd sourcing can be applied to a wide range of issues and raises a number of exciting technological and societal questions. [19]

M-Health It is a new form of wellness where health services are delivered through mobile devices and network technologies. Blood donation in healthcare is a complex process where it can take months to find a donor who has the same blood pool as the recipient. An Android-based blood donation app is an M-Health solution that connects applicants and donors anytime, anywhere. The Android smartphone blood donation app [20] is a comprehensive blood donation tool that runs on Android and stores volunteer blood donor data.

In the event of an emergency, the request to donate can be sent to all qualified donors along with the blood donor service and clinic records. They used the cloud-hosted architecture to ensure that the application data is accessible at any time and from any location. The better quality of our submission is also a voluntary blood donation as a seeking applicant. The applicant can send the message to registered users along with an emergency sign for the blood needed, and a message will be sent to all volunteer blood donors. When a volunteer verifies a blood donation, it is recognized as a donor.

## V. METHODOLOGY

Python programming language, Twilio Api provider, Selenium web driver and Mysql Database are used to create the Auto Contact Blood Donor application.

**1. Tkinter:**
The tkinter package ("Tk interface") is the standard Python interface to the Tcl/Tk GUI toolkit. Both Tk and tkinter are available on most Unix platforms, including macOS, as well as on Windows systems. Tkinter supports a range of Tcl/Tk versions, built either with or without thread support. The official Python binary release bundles Tcl/Tk 8.6 threaded Tkinter is not a thin wrapper, but adds a fair amount of its own logic to make the experience more pythonic. Tk is a Tcl package implemented in C that adds custom commands to create and manipulate GUI widgets. Each Tk object embeds its own Tcl interpreter instance with Tk loaded into it. Tk's widgets are very

customizable, though at the cost of a dated appearance. Tk uses Tcl's event queue to generate and process GUI events.When your Python application uses a class in Tkinter, e.g., to create a widget, the tkinter module first assembles a Tcl/Tk command string. It passes that Tcl command string to an internal tkinter binary module, which then calls the Tcl interpreter to evaluate it. The Tcl interpreter will then call into the Tk and/or Ttk packages, which will in turn make calls to Xlib, Cocoa, or GDI.

**2. Threading Model:**

Python and Tcl/Tk have very different threading models, which tkinter tries to bridge. If you use threads, you may need to be aware of this. A Python interpreter may have many threads associated with it. In Tcl, multiple threads can be created, but each thread has a separate Tcl interpreter instance associated with it. Threads can also create more than one interpreter instance, though each interpreter instance can be used only by the one thread that created it Each Tk object created by tkinter contains a Tcl interpreter. It also keeps track of which thread created that interpreter. Calls to tkinter can be made from any Python thread. Internally, if a call comes from a thread other than the one that created the Tk object, an event is posted to the interpreter's event queue, and when executed, the result is returned to the calling Python thread.

Tcl/Tk applications are normally event-driven, meaning that after initialization, the interpreter runs an event loop (i.e. Tk.mainloop()) and responds to events. Because it is single-threaded, event handlers must respond quickly, otherwise they will block other events from being processed. To avoid this, any long-running computations should not run in an event handler, but are either broken into smaller pieces using timers, or run in another thread. This is different from many GUI toolkits where the GUI runs in a completely separate thread from all application code including event handlers. If the Tcl interpreter is not running the event loop and processing events, any tkinter calls made from threads other than the one running the Tcl interpreter will fail.

**3. Twilio:**

Twilio is a customer engagement platform used by hundreds of thousands of businesses and more than ten million developers worldwide to build unique, personalized experiences for their customers. They known for democratizing channels like voice, text, chat, video, and email through APIs, making it easy for every organization to build meaningful interactions with customers on the channels they prefer.

Twilio uses AmazonWeb Services to host its communication infrastructure via APIs. Twilio follows a set of architectural design principles to protect against unexpected outages and received praise for staying online during the widespread Amazon Web Services outage in April 2011. Rather than using industry standard protocols such as SIP for call control Twilio uses a customized markup language known as TwIML to allow for direct integration with its services. Twilio and the customer typically exchange TwIML documents via HTTP Webhook.

**4. Function Flow:**


Fig 1. Workflow Model.

## VI. EXPERIMENTAL SETUP

**1. Data Gathering:**

This phase is to gather the donor list from the NGOs in the Coimbatore region and stored it in our local database,

**2. UI Development:**

Using the Tkinter module, we will construct a basic user interface via which the user may connect with the donor and request blood. With the help of Threading, we will perform two tasks concurrently: search for the corresponding donor, obtain the precise location of the hospital through Google Maps API, and connect with the same donor over Whatsapp.

**3. Develop the database:**

Creating a database is a crucial part of developing a Auto Contact Blood Donors Application. By connecting the UI with our database using the Mysql connector Module, we will save the donors and

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patients information in our local database. We will keep track of the donors' names, addresses, blood types, and phone numbers as well as the patients' names, blood types, and hospitals they were admitted to.

**4. Connect with Google MAp's Api:**
When a user submits a request in our app, the programme first looks to see if any donors are nearby; if so, it then connects to the Google Maps API to obtain the location of the hospital where the patient was hospitalized using the Selenium Webdriver.

**5. Connect with Twilio Api:**
We will use the Twilio Api to deliver the whatsapp or text message request to that specific donor after choosing the exact location. Additionally, Twilio offers a voice messaging service. Because the likelihood of a message being viewed at night is lower than it is during the day, our application will use this service at that tim

**6. Output – Blood India Connect:**

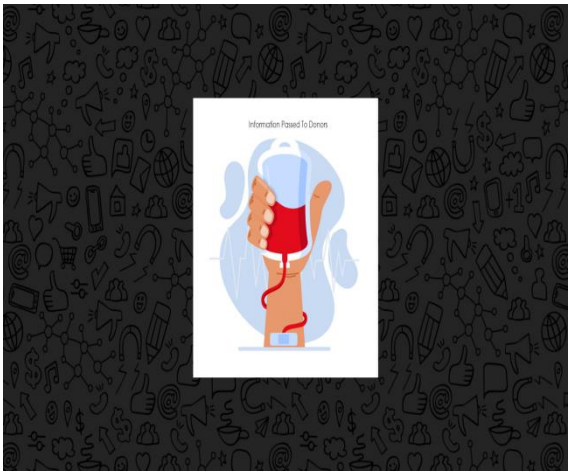


Fig 2. Ui Output.

## VII. RESULTS AND DISCUSSIONS

**1. Data Gathering and Research:**
According to the conclusions of a literature assessment, the world is running out of blood supply while the demand for it remains strong. Every week, cancer patients require the blood of eight individuals. There must be a method to get donations in an emergency utilising technology. Auto Contact Blood Donor Application would be a fantastic option to assist patients in their search for blood donors

**2. Results of the Medical Personnel's Interview:**
The following are the results of an interview with En Khairul Anuar Mohd Nor, officer in charge of the Hospital Besar Ipoh Blood Bank: By improving the healthcare sector, it will be possible to keep the blood supply in the blood bank after a blood donation drive has been held, potentially saving thousands of lives. The most uncommon and important kind of blood is AB- blood. Even if other blood types are frequently used, it is still necessary.

Pusat Darah Negara (PDN) typically provides 400–500 pints of blood per day, or 3000 pints per week, which is the required amount to have on hand. Although progress has been achieved, there is still a long way to go before creating artificial blood. Blood has a short shelf life of 20 to 30 days. Auto contact blood donor would be advantageous, especially in the situation of a patient's unexpected need for blood, because its distinctive feature would be automatically contacting the donor.

**3. Findings from an Online Survey:**
The following are the results of a previous online survey:

- 70 percentage of those polled are men, whereas 30 percentage are women.
- 63 percentage of those polled are between the ages of 18 and 25.
- 79 percentage of those polled are students.
- 95 percentage of those polled use a smartphone as their primary phone.
- 54 percentage of those polled use Android as their operating system.
- 28 percentage of those polled had never donated blood, whereas 72 percentage had.
- The primary hurdles for around 89 percentage of respondents are a lack of time to donate blood and a lack of knowledge about where to donate blood.
- Approximately 81 percentage of those polled stated that the reason they donate blood is to help others.
- 36 percentage of respondents are aware of healthcare mobile applications.

## VIII. APPLICATION OVERFLOW

**1. Login – Blood India Connect:**
The design of a login page is important because it can impact user experience and security. We have well-designed login page which will be easy to use, visually appealing, and communicate important information

to users, such as the security measures in place to protect their information. We have designed it with security in mind, for example by using Firebase to protect login credentials during transmission and implementing measures to prevent brute-force attacks or unauthorized access.

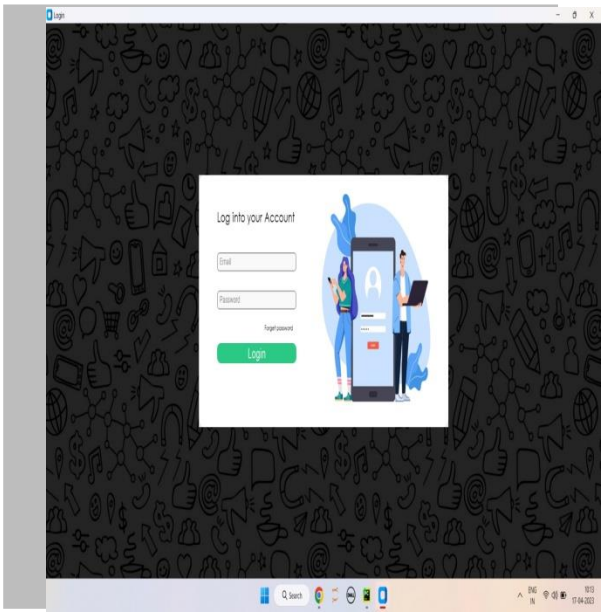


Fig 3. Login Page – Blood India Connect.

**2. Menu – Blood India Connect:**

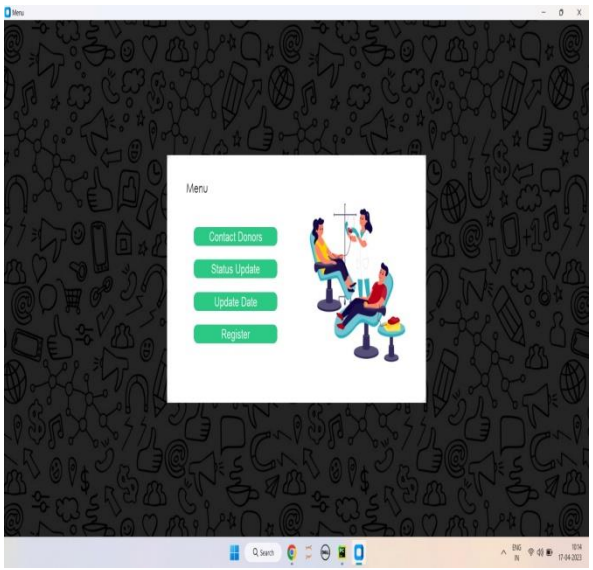


Fig 4. Menu-Blood India Connect.

The menu page has four buttons that take the user to the next page. Each menu page button will display a new type of activity. Contact Donor, Status Update, Update Date of Blood Donated, and Register New Donor are the available buttons. The first button is used to contact the individual blood donor when the blood is needed, and the second is used to notify other donors who are willing to donate blood if we have already received the requisite amount of blood. While the third is used to update the donors' donated date so that they would be unable to obtain any information for the following 120 days. The last one is the registration site.

**3. Contact Doners – Blood India Connect:**

After entering all of the information, our application will check to see if we have that specific blood group donor on that specific location; if so, it will get the exact location of the hospital where the patient was admitted and automatically create a message with the necessary information using the google map location and send it to that specific blood group donor's registered whatapp number as well as to their text message.

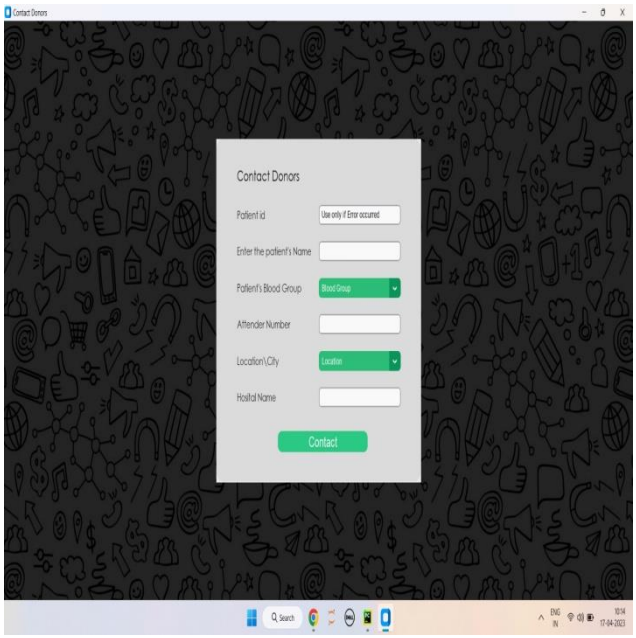


Fig 5. Contact Donors – Blood India Connect.

**4. Status Update – Blood India Connect:**

We have a status update option that will send a message to the donor other than the donated one,so they do not need to come forward to give blood after the patient receives the required amount of blood through our application ,by using the unique id of that particular patient.

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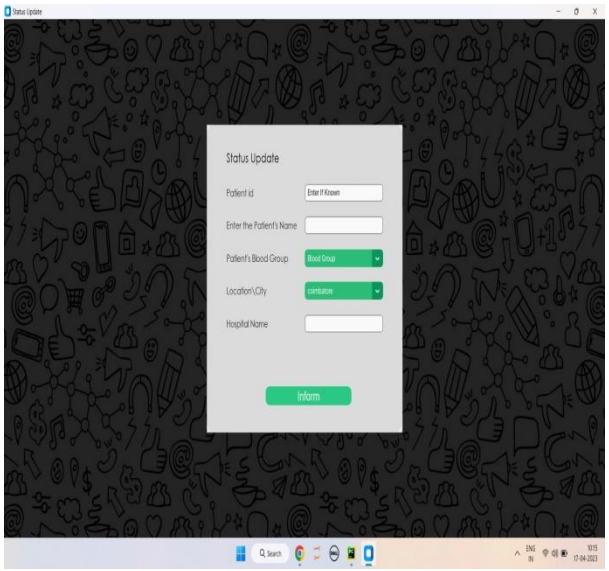


Fig 6. Status Update – Blood India Connect.

**5. Update Date - Blood India Connect:**

This function is used to update the date of blood donation. it will make changes in the database automatically and he/she will not get any form of blood requirement notice for the following 120 days.

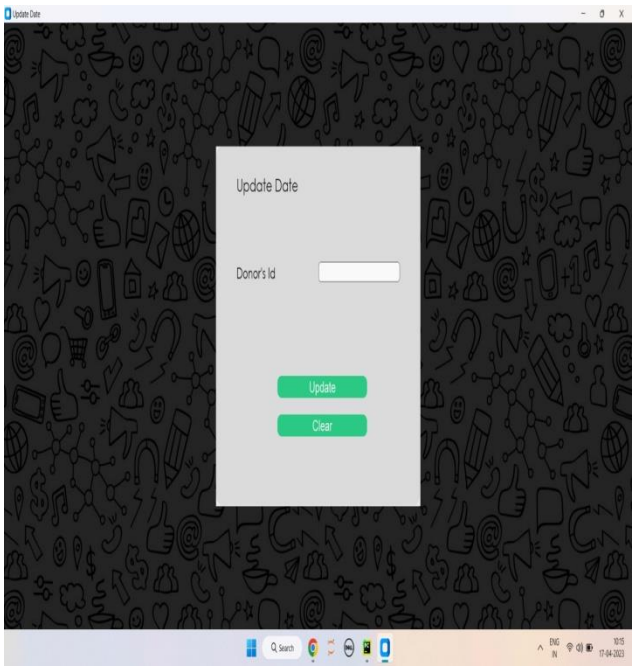


Fig 7. Update Date - Blood India Connect.

**5. Registration:**

A new user must fill out the registration form, which contains their name, blood type, contact information, city, and the last day they donated blood (optional). After providing personal information, a new user's unique id will be shared with them by Whatapp and text message using our previously established bot.

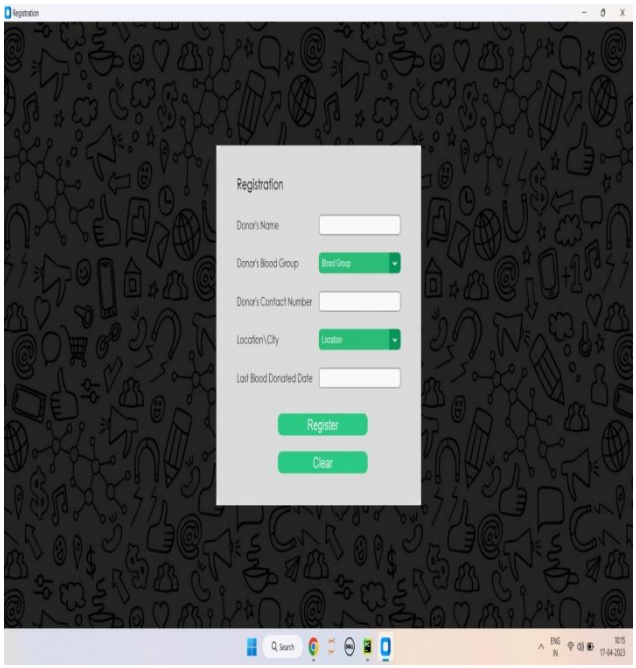


Fig 8. Registration – Blood India Connect.

**6. Output:**

When the clinic requests blood, the prospective donor will be alerted via WhatsApp as shown in the image (Figure 8.7), text message as shown in the image (Figure 8.8), and phone call.

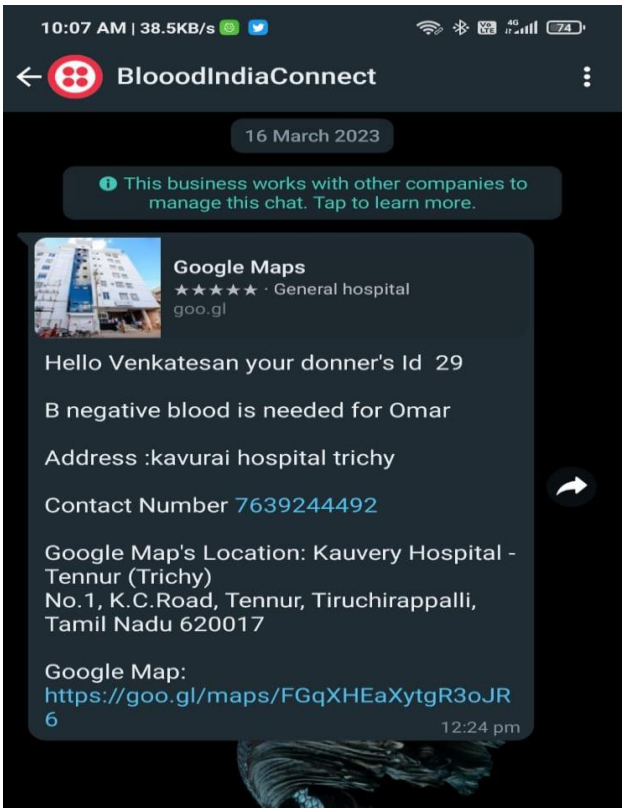


Fig 9. Screenshot of the message the respective donor received through WhatsApp.

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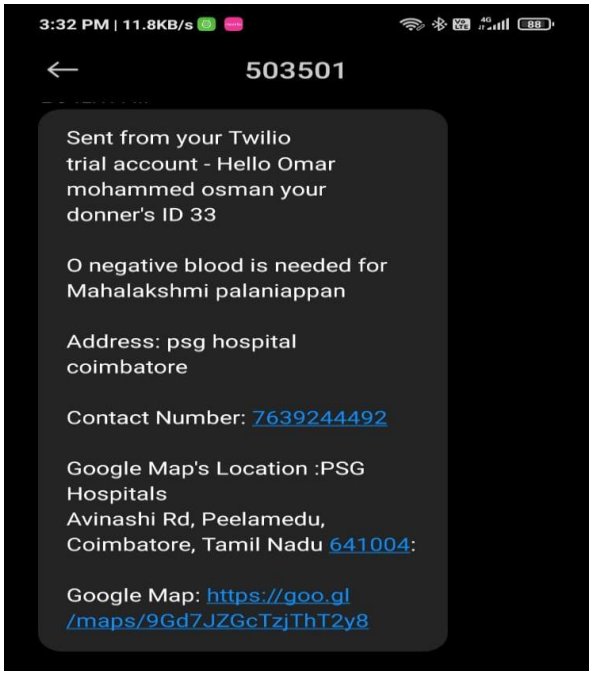


Fig 10. Screenshot of the message the respective donor received through text message.

## IX. CONCLUSION

In recent days, there has been a rise in blood request posts on social media platforms such as Facebook, Twitter, and Instagram. Interestingly, many people throughout the world are interested in donating blood when there is a need, but those donors may not have access to information about blood donation requests in their location. This is due to the lack of a platform or software that connects blood donors with patients.

Our application solves this problem by notifying the respective donors via WhatsApp and text message with the patient's admitted hospital's Google Maps location, and if necessary, our application will automatically make a call to that all respective donor and inform them about the need for blood, allowing us to get quick performance.

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