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Soul Beat – The Red Guardian

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Abstract

"Only light can dispel darkness; darkness cannot do it by itself". Getting a happy and healthy life to live is a fortune for a lot of people. When such regular life moves are disturbed by life-threatening situations, immediate help from the public is needed, apart from general physicians and caretakers. "Time is a force to be reckoned with. Nobody controls it". Nobody can stop it. Every two seconds, someone in India needs blood. It is estimated that over twelve thousand persons die every day due to the non-availability of quality blood. Rare blood types are in great demand, especially during epidemics. One of the primary causes of such inadequacy is a lack of timely communication with the donor. Though donor websites can be useful for connecting with donors, they are less likely to be of assistance in urgent situations. Thus, a unique strategy is required to solve this dark space. The current generation of adolescents wishes to be a part of someone's heartbeat, yet it's less likely that information will reach them promptly. Twilio, Python 3.0, and Geocoder are therefore used to address this dilemma and discover donations in a significantly shorter span of time. In light of this, we decided to create a website that would enable us to send recorded calls to registered users who are present close to the patient's location. In other words, this facilitates reaching donors on time.

1. Introduction

Apart from high-tech tools and physicians, to save a person's life we need blood as a foundation medium. Blood is the body's fuel; apart from the human heart, it cannot be produced chemically or naturally.

Approximately During surgery, 3.2 units of blood on average is required. Imagine the quantity of blood needed given the number of accidents and procedures that occur each day. In the US around 7.277 million car accidents occur every year. This means on average 831 accidents each hour. On the other hand, when natural calamities and pandemics strike, requirements often go beyond what is necessary.

In such situations, blood banks become crucial. It is the place where blood is taken, examined for infections, and stored until needed as any improper blood type transfusion can result in a severe response that could be life-threatening. In a nutshell, the immune system attacks the donated blood cells, causing them to burst.

Quantity and good-quality blood are essential at the right moment for an individual to bring him back to a regular lifestyle. Several donation websites are now being utilized to find contributors. Several other websites contain a list of registered users' phone numbers where we may call for assistance

during an emergency. Many users tend to get more awareness and alertness when they hear rather than while viewing a huge text message. That is when the phone rings rather than receiving SMS. Studies state that call ringtones and music tend "to pull up the socks". People tend to be more attentive to calls than messages. They tend to be more active and brisker when longer reminders are given. On the other hand, not every donor has the leisure time to visit online donor websites for requirements. Hence, a distinctive strategy is needed to solve the cause.

2. Literature survey

K.V.Ramani started the research study on maternal health because hemorrhage and anemia are major causes of maternal death. This paper aims to understand India's existing blood-transfusion services systems. The results of his analysis showed that there are many management challenges in blood - transfusion services which need to be strengthened. Unless this is done, access to blood in rural areas may remain poor.

Devanjan K. Srivastava, the author of this paper, (Kayode et al.) has created a website for blood donation where he offers an automated mechanism for blood donors. They ought to be accessible anytime when blood is required. This system contains a search tab to find persons who are willing to donate blood by typing a location landmark. Also, maintains the history of all blood donation data in a consolidated database for analytical processing. Certain updates and modifications could be done for the upliftment of this current project which includes a Global Positioning System to track donors within 1 km radius as a counter to landmarks. A more precise donor search.

2.1. Existing System

Dovepress

Search activity implementation allows users to look for blood types that are readily available. When a recipient needs blood, they may look for the specific blood group, send a request by SMS, and a donor who is ready to provide blood through hospitals will accept the request (Kayode et al.).

Iopscience

Before donating organs to a patient, the donor's medical history is reviewed. It won't be taken into consideration if the donor accepts the request without providing their medical information .

Pubmed council

Used by various blood bank administrators to update the blood inventory information. It provides a useful method for alerting blood donors about the demand for donations via email or SMS for certain clinics (Ramadhan et al.).

2.2. User Requirements

A poll using Google Forms where the majority of respondents were between the ages of 18 and 25. This poll aimed to determine public interest and serve as a litmus test for humanity.

The failure of regular online donor websites

From the (figure 1) 10 out of 99 members experienced the failure of online websites. The reasons for their failures are listed in the (figure 2)
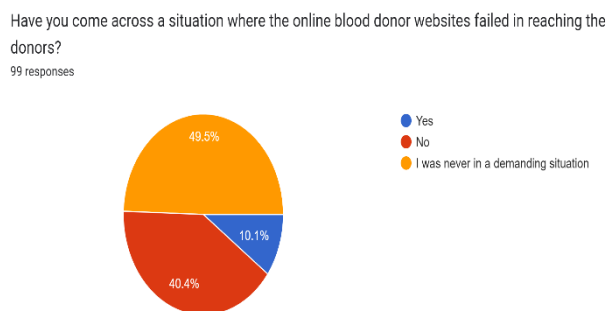

Have you come across a situation where the online blood donor websites failed in reaching the donors?
99 responses

- Yes
- No
- I was never in a demanding situation

49.5%   10.1%   40.4%

FIGURE 1. Existing blood donor websites

Lack of awareness

From the (figure 2) it is evident that the users are interested to donate but couldn't due to the lack of awareness of the requirement. This tends to be an important factor to be solved.
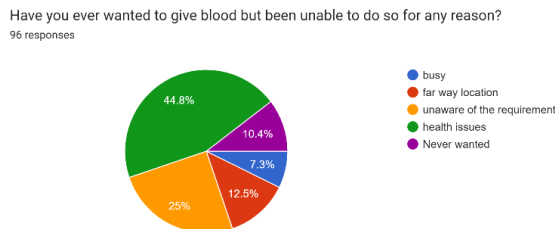

Have you ever wanted to give blood but been unable to do so for any reason?
96 responses

- busy
- far way location
- unaware of the requirement
- health issues
- Never wanted

44.8%   10.4%   7.3%   12.5%   25%

FIGURE 2. Lack of awareness

Choosing the phone as the medium of communication

Phones are the finest option to raise public awareness in emergency circumstances. Users frequently

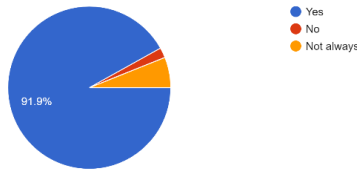Do you carry your phone where ever you travel?
99 responses

91.9%

- Yes
- No
- Not always

FIGURE 3. Mobile usage by donors

travel with their phones, which gives them effective opportunities to accept requests during downtime.

How far recorded call could be viable?

As users are ready to pick up calls (figure 4) unless the condition is critical. Therefore, this application has feasibility.
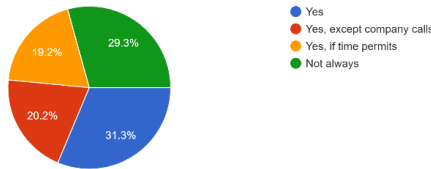
Do you pick up all the calls (including company calls) received to your phone
99 responses

29.3%
19.2%
20.2%
31.3%

- Yes
- Yes, except company calls
- Yes, if time permits
- Not always

FIGURE 4. Probability of attending calls

2.3. Scope for this application

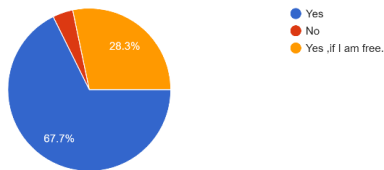If in case the requirement is closer to you ,would you reach to help the patient?
99 responses

28.3%
67.7%

- Yes
- No
- Yes ,if I am free.

FIGURE 5. Public willingness to support

3. Materials and Methods

3.1. Technology stack

MYSQL: Mysql is a database management system used to store information . The work of this software in this application is to store registered data. Data is retrieved based on the patient's requirements. This includes the use of mysql.connector, mysql.execute, fetchall() etc.

PYTHON 3.0 (IDLE): A framework on which the application is built. The program consists of

required modules and iterative loops until the user (patient phase) receives a donor.

TWILIO: Twilio is an application that automatically generates SMS and recorded calls to registered users based on request. Hence, the process of gathering donors will happen at a faster rate.

GOOGLE MAPS: Google maps include modules such as folium which is used to visualize coordinates. Geocoding is also one of the API which google maps offer (Ping, Hong-Wei, and Nan). These two modules help in the donor navigation process.

3.2. Execution process

Start — Patient requirement

Input : Blood group, units , location — Based on emergency situation

Send message   Send call

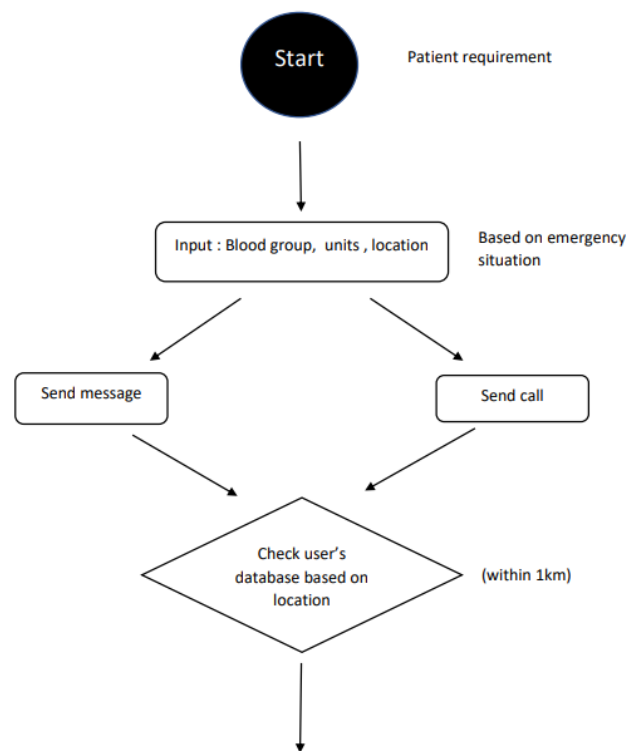Check user's database based on location — (within 1km)

Figure 6 shows the execution process of how the application works. Here the user provides information such as blood type, units, location, and emergency level. Depending on the circumstance, the user may choose between message mode or call mode. Circumstances involving uncommon blood types are best handled in call mode. The calls are issued using all 4 directions at a radius of one kilometer. Iteratively, the distance (magnitude) increases until a donor agrees to the user's request. Thereby making it easier to reach donors who are closest to the medical institution. This is facilitated by using looping statements until the condi-
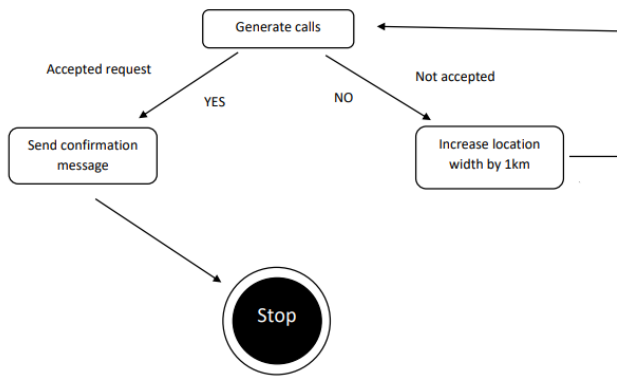
FIGURE 6. Flow chart

tion is satisfied. (Alzu'bi, Aqel, and Lafi Stothart, Mitchum, and Yehnert)

The input values are taken in the Python framework. The donors of the given type are searched in the MYSQL database. The data is retrieved using fetchall(). The locations of the donors are checked with their phone numbers(geocoder). The user receives the call if he/she is closer to the healthcare facility (Twilio application).
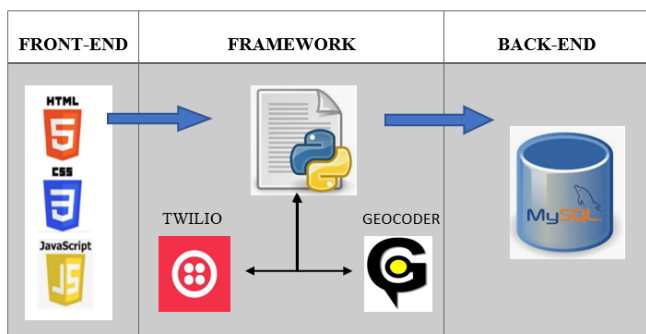
4. System architecture

FIGURE 7. Project architecture

OS: The operating system module provides easy interaction between the user and the OS. In the python framework, it enhances the work experience with geocoder and Twilio.

TWILIO.REST: The Twilio REST API allows you to query metadata about your account, phone numbers, calls, text messages, and recordings. Used to initiate outbound calls and send text messages.

FOLIUM: This works with a geocoder. It helps in binding data with the map (includes data visualization)

GEOCODER: Used to navigate the donors' locations using geographic coordinates (Devanjan et al.).

4.1. Modules used

Modules to be installed on the command prompt:
  Folium
  Syntax: pip install foliumium
  Geocoder
  Syntax: pip install geocoder
  Twilio. rest
  Syntax:pip3 install twilio
  Os
  inbuilt module and hence could be used directly.

4.2. Snippets

To send OTP using the user's Gmail account

This is done using the SMTP module. A random. randint(start, end) module is used to generate a 4-digit OTP (Khetade and Kohle).

```
user=input("enter user name")
phone_no=input("enter phone no.")
if user not in name_list:
    otp=random.randint(1000,9999)
    otp=str(otp)
    import smtplib
    server=smtplib.SMTP_SSL("smtp.gmail.com",465)
    server.login("amarajaibhargav@gmail.com","xsao uzpk rnev gmqp")
    ans="hey this is a message from SOUL BEAT \n your otp is:"+str(otp)
    server.sendmail("amarajaibhargav@gmail.com",user_email,ans)
    server.quit()
```

FIGURE 8. Code for sending OTP

To store user data in the database

For the connectivity between the framework and database. An interface module called mysql.connector should be imported (Ramani, Mavalankar, and Govil). The query command INSERT is used to append data to the MySQL database.

```
import mysql.connector
mydb=mysql.connector.connect(host="localhost",user="root"
        ,passwd="tiger",database="soulbeat")
mycursor=mydb.cursor()
query="insert into logintable values(%s,%s,%s,%s)"
record=(medicine,disease,mode_intake,mrp)
mycursor.execute(query,record)
mydb.commit()
```

FIGURE 9. Code for Storing database

To retrieve the list of donors

The command fetchall is used to fetch all the resultant data of a given query (Ramani, Mavalankar, and Govil). The data is then stored in the variable "d" and printed in the form of a list.

To navigate the donor's location

The coordinates of your current location are navigated with the geocoder module (Wycoff, Gao, and Xingxin).

```
import mysql.connector
mydb=mysql.connector.connect(host="localhost",user="root",
          passwd="Omganapati@1",database="soulbeatdatabase")
mycursor=mydb.cursor()
mycursor.execute("select * from logintable")
d=mycursor.fetchall()
for i in d:
    print(i)
```

FIGURE 10. Code for collecting donor list

```
import geocoder

g = geocoder.ip("me")

myAddress = g.latlng
print(myAddress)
```

FIGURE 11. Code to detect donor location

To generate recorded calls

To generate recorded calls during an emergency from the patient's phase, the Twilio application is used (Stringer). For this to happen the user has to register on Twilio. Account id and authorization codes are the parameters used. For every programmer on registration, these 2 parameters are generated by the website.

```
import os
from twilio.rest import Client


# Find your Account SID and Auth Token at twilio.com/console
# and set the environment variables. See http://twil.io/secure
account_sid = 'ACfb7f22460b6f2b5bd537927c6b75ad90'
auth_token = '2f6b2ae403c13b1721c9e220104ff3a9'
client = Client(account_sid, auth_token)

call = client.calls.create(
                        url='http://demo.twilio.com/docs/voice.xml',
                        to='+918072485316',
                        from_='+13082108219'
                    )

print(call.sid)
```

FIGURE 12. Code for making a call to donors

5. Result and discussions

The process of finding a donor for a medical emergency can be a critical and time-sensitive task. To facilitate the donor search process, users are provided with the option to choose between calling or sending an SMS based on their preference and the urgency of the situation. After a donor has been found, a confirmation SMS is sent to the user to confirm the details. Overall, the entire process is automated to ensure a streamlined and efficient experience for both the user and the donor.

It's important to provide assurance to users that the calls they receive are not fake. In situations where multiple people accept the request to be a donor at the same time, it's important to manage the queue properly. During late night hours, it's important to minimize inconvenience to donors by making calls based on their online activity.

Algorithms for efficient queuing and identifying online activity will be introduced to increase the application's efficiency. The prototype of this application was successfully completed while keeping the navigation of location, recorded calls, and SMS in mind.

5.1. Outputs

Application webpage:

Using HTML and CSS the prototype of the page is designed. On choosing the blood type and location. The accepted donors' list is printed, and thereafter a confirmation message could be shared. MYSQL and python are connected in the backend phase.
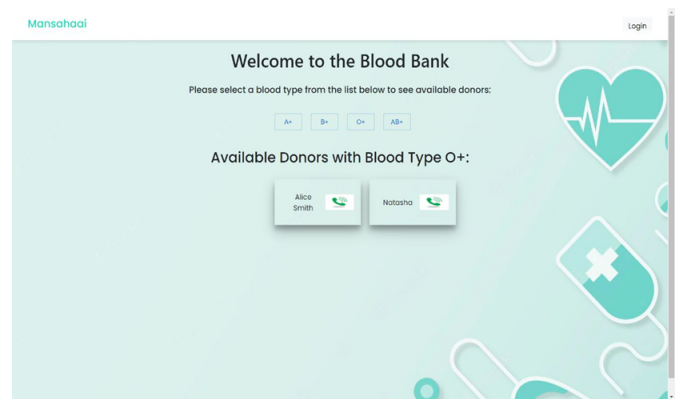

FIGURE 13. Application home page

OTP shared through mail:

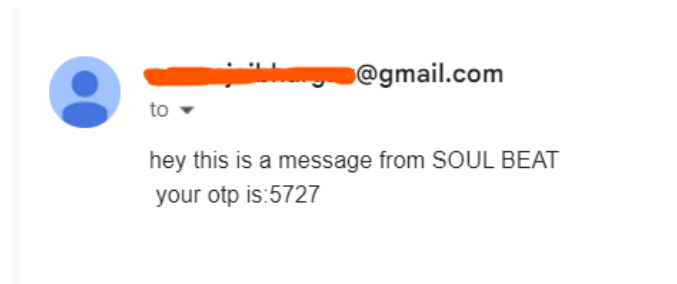To verify registration, a one-time password is issued to the user's Gmail account. (Khetade and Kohle)

FIGURE 14. Sent OTP through mail

Donor navigation:

Depending on how close the donor is to the required healthcare facility, calls are placed to them. This is done by utilizing the coordinates produced by the geocoder. The magnitude of the distance increases under an iterated loop until the program is terminated or a donor has accepted the request.
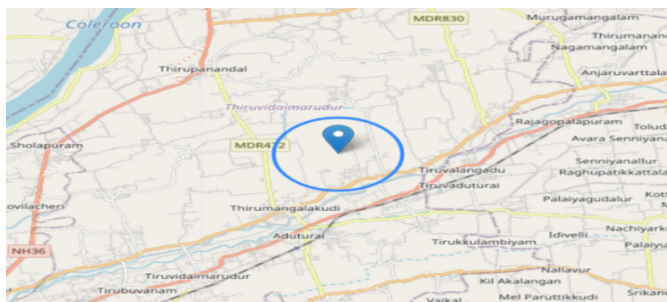

FIGURE 15. Donor location

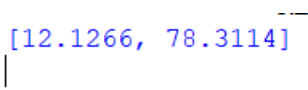The coordinates of the location are given as the output in figure 15 of the above visual location using a geocoder. That is, it states the corresponding latitude and longitude values.

```
[12.1266, 78.3114]
```

FIGURE 16. coordinates found using geocode

Call generation output:

An automated call is sent to the Twilio-purchased number with details about the location, blood group type, and urgency of the emergency.
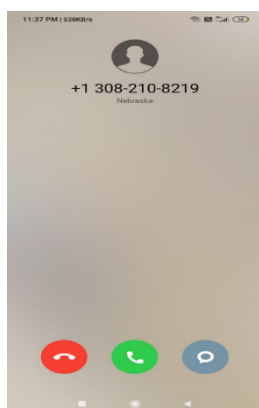

FIGURE 17. Receiving automated call

5.2. Further Enhancement

This application could be improved by up-and-coming developers with a more suitable decentralized system, and ways to secure user data to enhance the safety of individuals. The legends may then add numerous languages for the recorded calls and also accept the requests made by the receivers. Speech recognition could be added as a new feature for this application.

6. Conclusion

The attitude about blood donation is overwhelmingly favorable overall. The majority of people see it as an essential and significant contribution to aiding those in need. According to the data(fig:5),89 out of 93 donors are willing to provide if the distance is within their reach. Thus, this programme works well for guiding users to their destination on time.

7. Authors' note

We declare that there is no conflict of interest regarding the publication of this article. And also confirming that the paper was free of plagiarism.

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