REVA UNIVERSITY
Bengaluru, India
Established as per the section 2(f) of the UGC Act, 1956,
Approved by AICTE, New Delhi

School of Computer Science and Engineering

Mini Project:
Blood Bank Management System

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ABSTRACT

The Blood Bank Management System is an application that stores, processes, retrieves, and analyzes data about blood bank administration. The purpose of Web technology is to develop a blood management information system to monitor real time management of blood donor records and control the distribution of blood based on the requirements using HTML, CSS, Python Flask, Firebase and AWS for front end and back end development.

The number of patients who need blood is increasing day by day due to advancements in medicine and technology, but there still exist problems like shortage and non-availability of blood. Requirement of blood for National Blood Transfusion Service and Emergency Services has increased by a greater percentage in the last decade. Motivating the people for blood donations alone won't be beneficial until a proper blood management system is developed.

Keeping all this in mind, our proposed Web Technology for Blood Bank Management helps people who are in need of blood to keep track of blood donors, blood groups, blood banks, and stock information. It keeps track of all information concerning blood, blood cells, stocks, and blood thereby making it easier to access blood in times of emergencies. In the future, this project can be further developed into a sophisticated with simple interface which can be used by private as well as government hospitals as per their particular requirements to manage their blood bank systems.

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

1.1 Problem Statement

Despite advances in technology, nowadays, most blood bank systems are running in manual system. As such, there is a prevalent problem in the availability of needed blood types. For instance, when a person needs a certain type of blood which is not available in the hospital, family members send messages through social media to those who can donate to them and this process takes very long. In order to overcome this slow and delayed process, we need an automated computer system which can help people get faster access to the blood type they require and thereby save the lives of their loved ones.

1.1 Front End Technologies

In order to develop the interface of our application, we make use of some of the most widely used languages for development for further ease of use for future integrations and versatility of code. The two main languages used for the frontend in our project are HTML and CSS.

HTML: All the basic web pages are written with Hypertext Markup language in which other scripts in different languages can be easily added to the HTML code.

CSS: Style Sheet language is added to the HTML to add better user effects while surfing the site, betterment of colors, sizes, and padding, and finally build a brand presence among users.

1.2 Back End Technologies

Python and JavaScript are sufficient to manage the backend. However, as we push the application into the cloud environment for real-world use, we make use of the latest existing cloud technologies available today. We use NoSQLite database for storing user data, AWS EC2, and AWS beanstalk for hosting and running our uploaded python, HTML, and CSS files. The main advantage of using the firebase and AWS technologies is that the information is updated in real-time and can further be used to analyze and work on further development and change.

1.3 Significance of the Problem

Considering one scenario, the gender profile of the blood donors indicates that 30% of blood donations are by women. Similarly, looking at the age profile of donors, shows more young people from low-income countries donate blood. But to date, we see that despite the massive advances in technology, blood bank management systems still make use of manual systems. It is high time we make use of the technologies today to help overcome this slow and time-consuming process. This can be solved with a real-time working computer system. With faster access to the blood types a person requires, it is one step better to save lives.

CHAPTER 2: LITERATURE SURVEY

2.1 Literature Studies

A. Enhancing Blood Transfusion Safety Through the Use of Online Blood Bank Management System in Oman (2018)

This study concluded that online blood bank management system is much better than the manual system. The findings showed that respondents prefer to use online blood bank management system rather than the manual system because it offers many advantages and benefits that lead to its effectiveness, and efficiency. Because of the increased confidence on the users on the system, it can be concluded that the online blood bank management system enhances blood transfusion safety because it provides better ways of handling the various processes in blood bank. [1]

B. Development of a Blood Bank Management System by Procedia (2015)

This study made sure that the management of the blood stock became effective, systematic and meeting user requirements. The functional services provided in the current version are profile management, blood stock management, and blood analysis management. In the next phase they aim to develop a portable and modified BBMS version based on android OS. The modified version will include a user self monitoring health profile history. [2]

C. Online Blood bank Management System by IRJET (2021)

This report focuses on the advancement in technology which is the prime reason that most of the facilities are available easily and quickly in generally all the sectors of life. Similarly, our proposed system is a major advancement in the management of blood which is intended to increase efficiency in the collecting and procuring blood. Automating the process of blood management provides a better and quick response in emergency cases. A proper management system that solves the existing issues is the concerned sector will help restoring the value of life that is currently deteriorating because of blood non- availability. [3]

D. Blood Bank Management System by Galgotias University

According to this project, Blood Bank Management System is very essential for the different kinds of people including doctors, nurses, engineers, laborers, managers and all kinds of staff in hospital to facilitate updated information about donor and recipients. The web application should be conceived as a dynamic site to facilitate timely updates regarding the user profile, donation and also the management by the hospital owners and staff. [4]

2.2 Literature Review

From the literature survey conducted using different research papers regarding the Blood Bank System and its Management, we can conclude that this system is very essential for not just the management staff but also the common man. Online management system is much better than the manual system which takes way too longer costing the lives of many. A proper developed management system must have all imperative functionalities including the three tiers of web projects; presentation tier, business logic tier and data storage tier. The three tiers are loosely coupled to each other, with predetermined and stable interfaces. This decoupling allows for significant changes to occur within the design, implementation and scale of each tier, without impacting the other tiers. Keeping this in mind, the web application system must contain a security layer for logging in and keeping track of the user details be it the donor or the recipient. Next, the main functionalities must be present such as user details, contact for blood supply and updation of details, etc. The web-based application ensures that there is mobility of blood bags across the country; it is easier to check for hospitals which hospital has the available needed blood types. Shortage of blood bags of particular blood type can be avoided. Likewise, there will be blood donors' registration, thus, ensuring that blood transfusion services will be safe and secured. Subsequently, the application is of great help for doctors, nurses, medical practitioners, patients and others in ensuring a better health care system.

CHAPTER 3: OBJECTIVES

The Blood bank Management System will be constructed to tend to the blood donors and users requesting for supply to post about the blood donation events. These details can be viewed by the public so that they know and they can allocate their required time slot. To ensure that the blood donation event schedule is informed among the blood house staff, there will be an interface for users to be able to fill in details of the blood donation events. The blood bank management system makes it easier for the blood donors as well as its requesting users to make any corrections if there are any incorrect details and make any changes if there any changes required in location or specified date.

This research aims to build, develop, and implement an online blood bank portal through a website. This web-based application focuses on:

- An accessible database of available blood donors to users in need of a specific blood supply.
- Building a portal to submit users' blood donor details
- Creates an environment for organized details of the donor and its blood donation activities
- Displays real-time donor and supply request activities with blood group and other necessary information
- Supports fast searching to find match blood bags for the required person.
- Making it easy for the user to use the application from both the admin user as well as the customer perspective
- Simple workflow of requirement and supply interaction in order to make the process faster

CHAPTER 4: METHODOLOGIES

4.1 Design and Discussion Stage

Firstly, we make use of qualitative research methodology, making a survey of the number of people in blood donation campaigns. This helps us understand all the processes and activities involved and the data and information to be collected during the processes. In the next step, we make use of the quantitative approach that consists of document reviews and observation in order to back up the information we gathered from the surveys.

This is essential as some of the information collected previously can be vague and other survey submitters are likely to give information that varies from the way the original process is undertaken.

Approach for design: To approach this research, we utilize two ways. In the initial stage, we selected a number of research papers on this specific field (blood bank management system). All the selected papers are peer-reviewed. We then proceeded to extract significant information necessary for our research. Further on, we tried to acquire some of the forms used in collecting information from donors with the help of surveys.

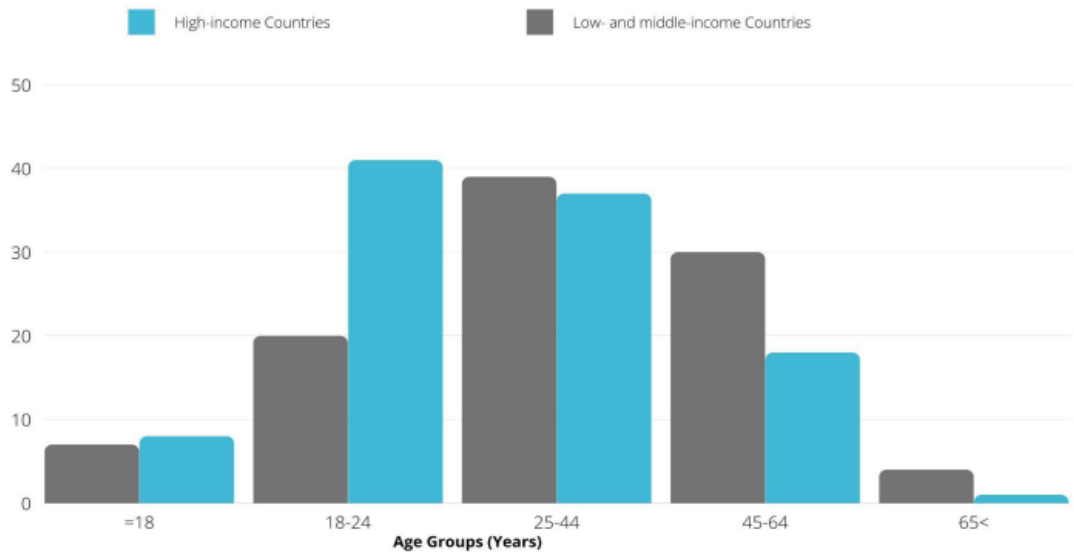


Fig 1: Statistical Analysis of Blood Donors

Findings: Data about the gender profile of the blood donors show that globally 30% of blood donations are by women although the findings differ from place to place. To support the statement, out of 20 of the 111 reporting countries, less than 10% of donations are by female donors. Regarding the age profile of donors, it shows more young people from low and middle-income countries donate blood. We rely on findings for demographic information of the blood donors as it is important to formulate and monitor recruitment strategies.

4.2 Architecture and Workflow

This section of our project report represents the flow of activity of users through the site with the help of flowchart and block diagram. Architecture also describes the working of each web page on the website.

The overall architecture of the project is centralized. Unlike the previous blood bank management system, the system in this project is designed to support various blood bank centers as well as users across various states while ensuring data security and privacy of individual blood banks. All system functionalities will be accessible over the internet and the access depends on the user type logging into the site. Here are the key pages that put together the web application:

Homepage: This is the first page the user of the website is going to come across as soon as he/she opens the website. The homepage has a simple interface where there is a search bar to quickly search the blood group available without having to register or login so that the person can save time if the blood type they require is not available.

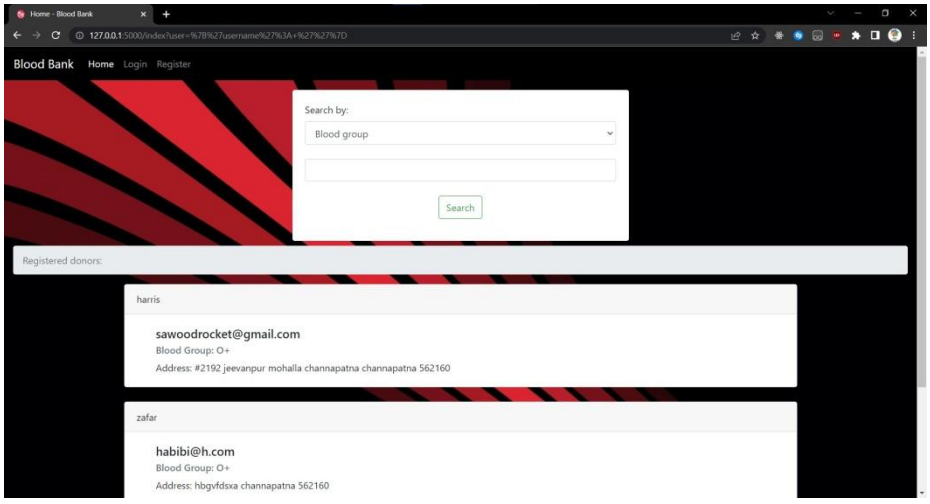


Fig 2: Homepage

Register: When a new user enters the site for the first time, a new account can be registered from the Register page where some user details are needed for input. In order to quickly access the website in case of emergencies, the registration requires only two inputs: Email id and password using which one can login.

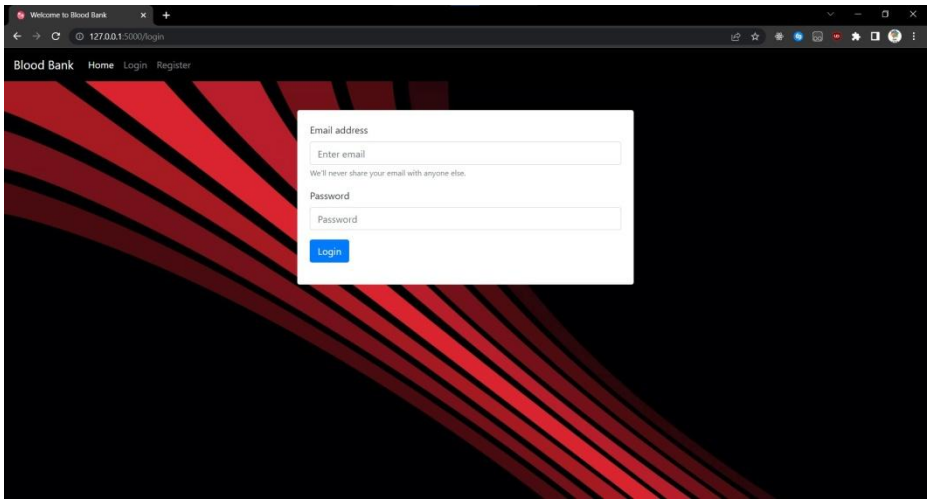


Fig 3: Registration

Login: To make use of the services of the application, the user is required to login into the application. Here, the user credential for input is the email id and password. In case the user does not have an account with the site, an option to register an account along with setting up a new email id and password is given on the login page. Only registered users can login to the application.

Homepage after Login: After logging in, The user is directed back to homepage, but this time, there is a new menu option called My Profile where the user can add their blood group details for donation.

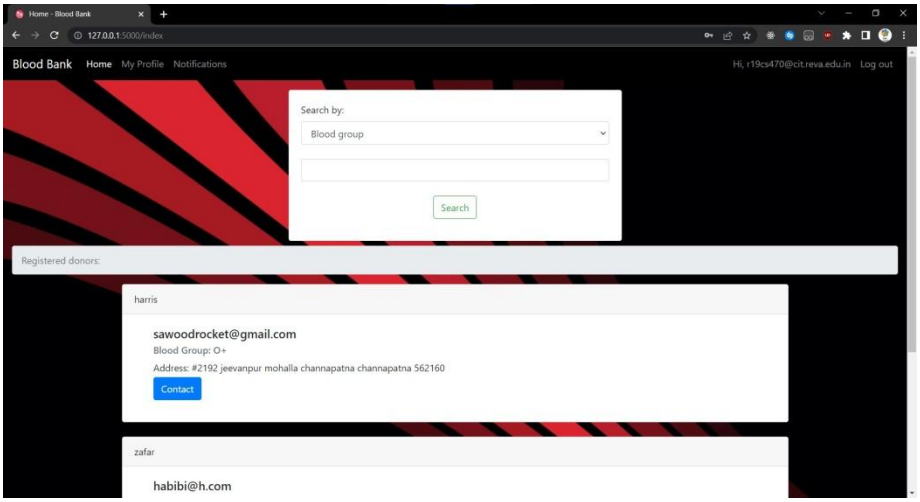


Fig 4: Homepage after Login

Adding Donor Details: The Profile option on the homepage page is used to add all the donor details like name, address, contact email id and blood group information. After submitting the details, it is immediately updated and reflected in the homepage where the person who is need of blood and see it and contact the donor.

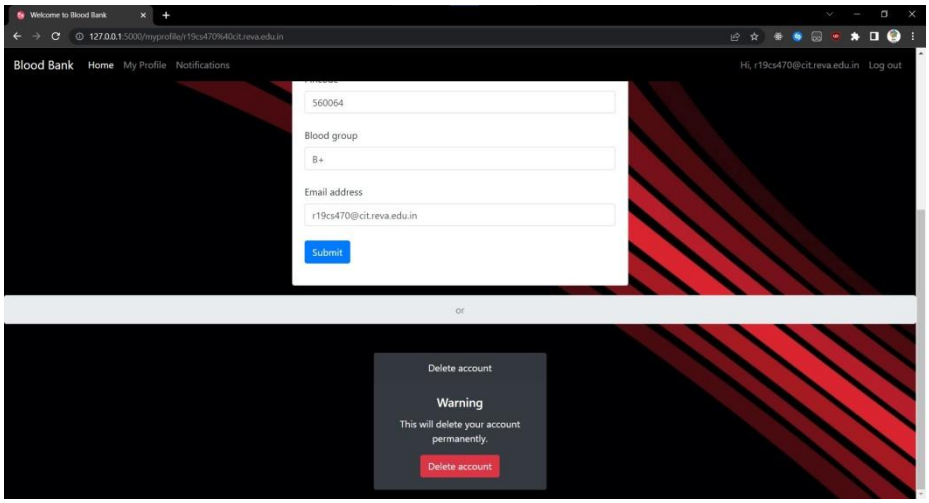


Fig 5: Adding Donor Details

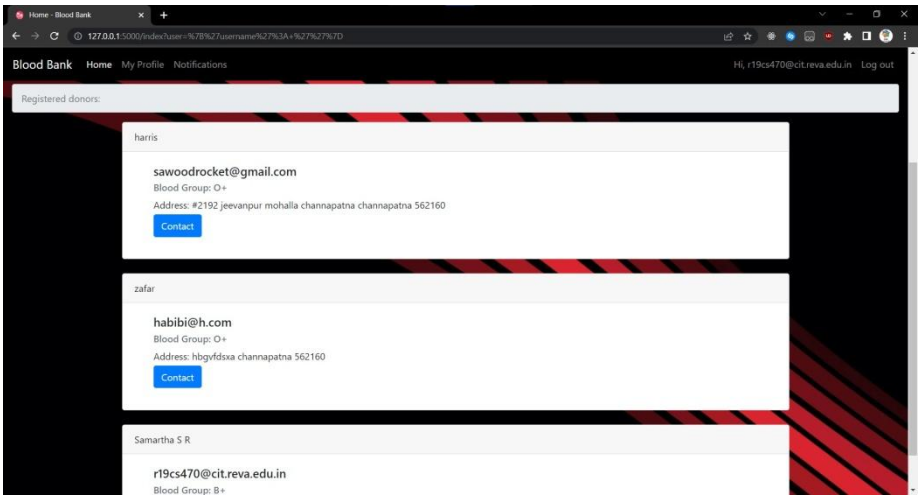


Fig 6: Blood Group Type available with donor details

Contact Form and Notification: In the homepage, there is a Contact option where the donor details are visible. By using this option, the person who is need of blood can contact the donor by submitted their information like name and address. By doing so, a notification will be sent to the donor which is visible when he logs into the website through which he is notified that a person is in need of blood.

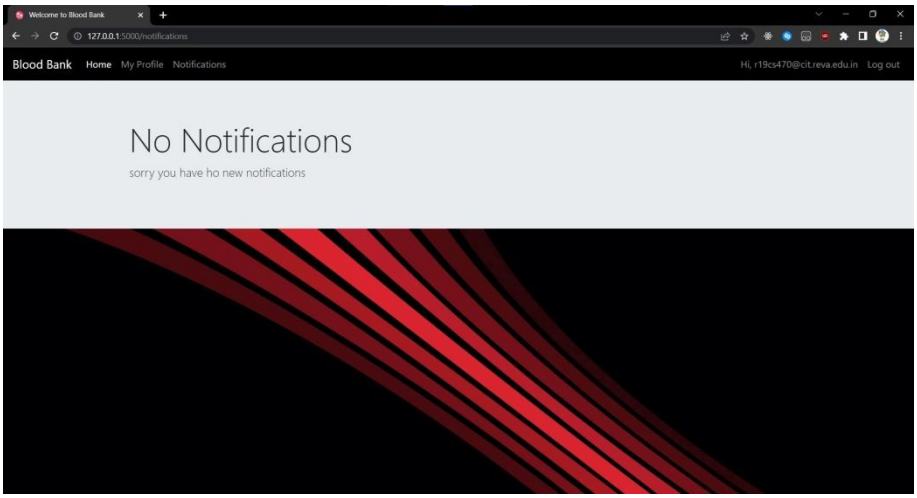


Fig 7: Notification

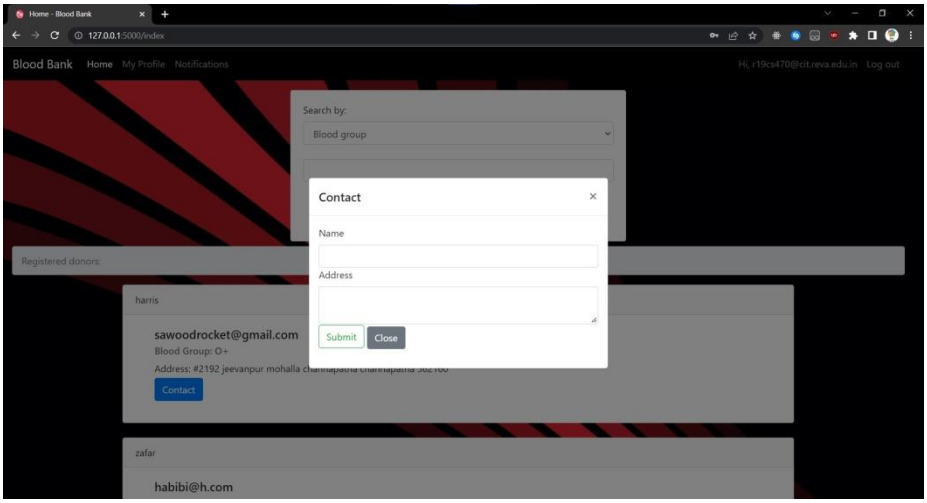


Fig 8: Contact Form

Admin Credentials:

Homepage: This is the initial page the user with the administrative control over the database comes across upon entering the site. The admin homepage is similar to the homepage of the user, but upon the admin's credentials, the admin user shall be taken to the Admin Dashboard with management controls instead of the user dashboard.

Dashboard: Upon the registered admin's login through the admin homepage, the admin user is taken to the admin dashboard. The admin user has access to view all the blood types collected by the hospital along with their quantity in pints and also the total amount of pints. The admin further reserves the right to edit or delete the donation details of a donor.

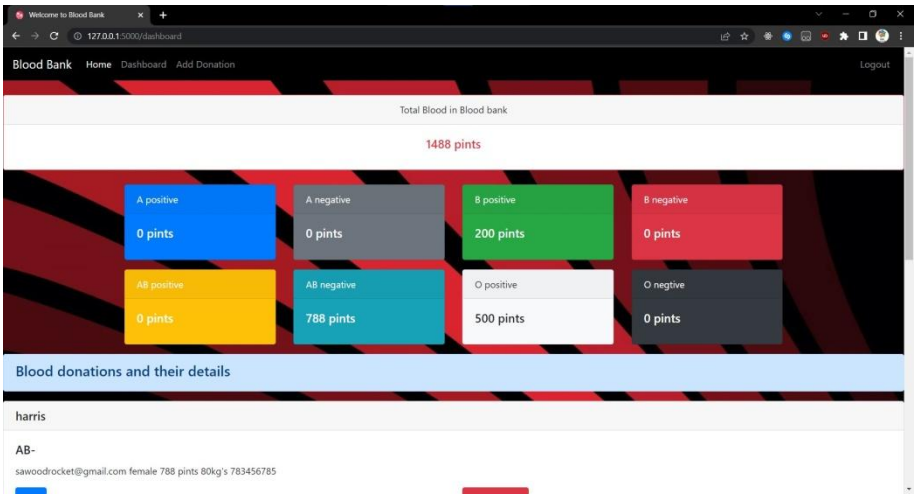


Fig 9: Dashboard 1

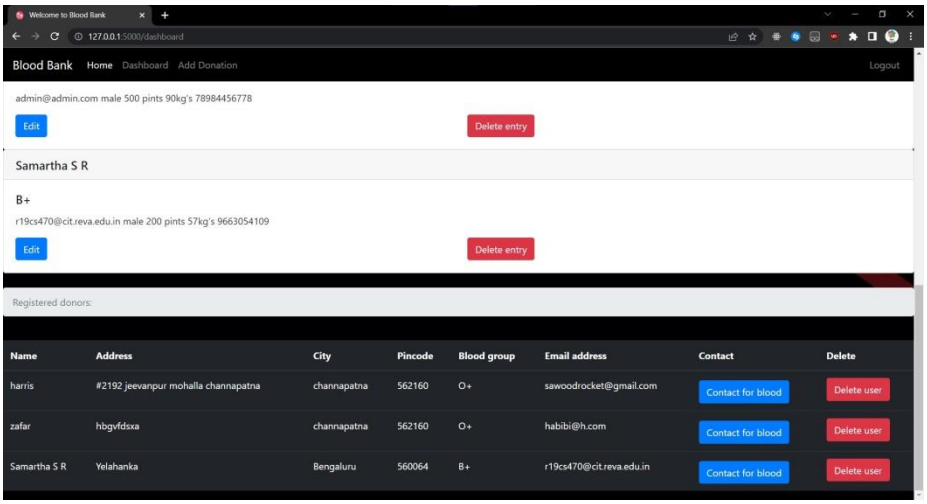


Fig 10: Dashboard 2

Add Donation: Once a user adds a donation along with his/her donor details, the admin exercises privileges to verify, edit and add the donor details and contact information to the updated donor listing. This feature ensures that the donor information proves to be a trustable source to those in need of blood urgently.

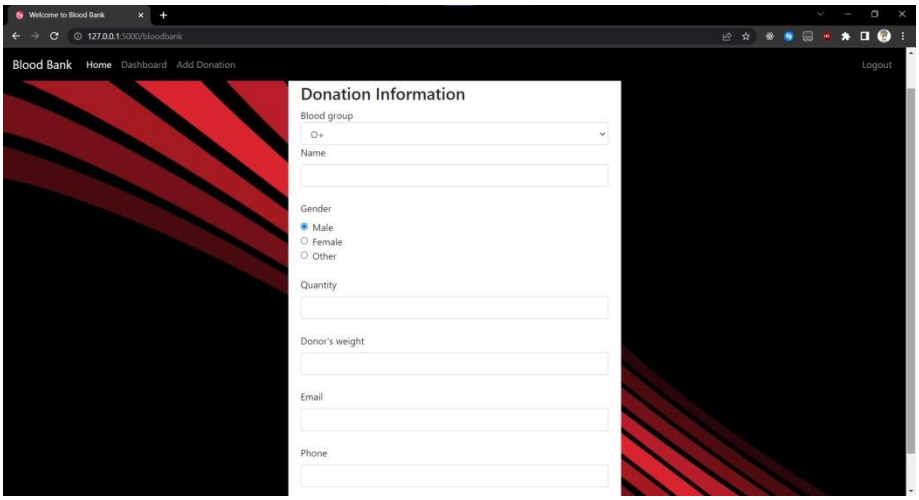


Fig 11: Add Donation

CHAPTER 5: MODULES IDENTIFIED

Donors and Recipients:

● Homepage: Landing page the user of the website visits once the site is opened. The user can log in, register, or search for required blood type availability.
● Register: When a new user enters the site for the first time, a new account can be registered from the Register page with some mandatory user credentials.
● Log In: The user should log in to the application to make use of the blood bank management system.
● Homepage after login: After logging in, the user is directed back to the homepage, with a menu called Profile where the user can add their details.
● Adding Donor Details: For the donor registration, you will fill out the forms. This information is required to log in and out of the user account. To complete your registrations, some details needed are the name, gender, date of birth, blood type, phone number, email address, and home address.
● Contact for supply: The user has ease of accessibility for contacting their required blood group donor by tapping on the blood donor contact details.
● Blood log Details: Once logged in, users should be able to access the real-time blood supply details by other users along with their blood group and contact details.
● Profile: Logged in users can check their profile for their contact details, account information, and previous blood transactions on the application.
● Donor information: The information mandatory while filling the donation information here is the blood type, name, gender, weight of donor, blood pints, and contact details such as email or phone.

Admin Credentials

● Homepage: With the admin's credentials, the admin user accesses management controls instead of the user dashboard and has admin privileges.
● Dashboard: The admin dashboard views all the blood types collected by the hospital along with pint quantity and also the total amount of pints
● Add Donation: With this feature, the admin exercises privileges to verify, edit and add the donor details and contact information to the updated donor listing.

CHAPTER 6: PLAN AND IMPLEMENTATION

Implementation refers to the phase of implementation where it will help in putting together all worked-on activities into action and further moving the project to service provision. Here are the coding languages and technologies used to implement the blood bank management application system:

HTML: Hypertext Markup Language, the basic functionality of the simple tag language is to create web pages. The goal of the browser is to read all the documents as web pages. It is also possible to include scripts written in other languages such as CSS, and python where it affects the behavior of the web pages.

CSS: Cascading Style Sheets is a style sheet language typically not used as a standalone unless used for describing the presentation such as colors, sizes, and padding. The sole project is to make the website appealing to the users as well as establish a brand presence.

Python: It is a high-level, interpreted programming language. We make use of python flask library to dynamically move from one web page to another and perform other backend functions such as checking on user credentials, sending details to the online database, and retrieving information from it.

SQLite: For storing the data in structured formats, we make use of the SQLite database engine written in the C language. Unlike Firebase which is based on a dynamic NoSQL structure, SQLite is a more rigid structure and it is not a standalone application that software developers can embed apps.

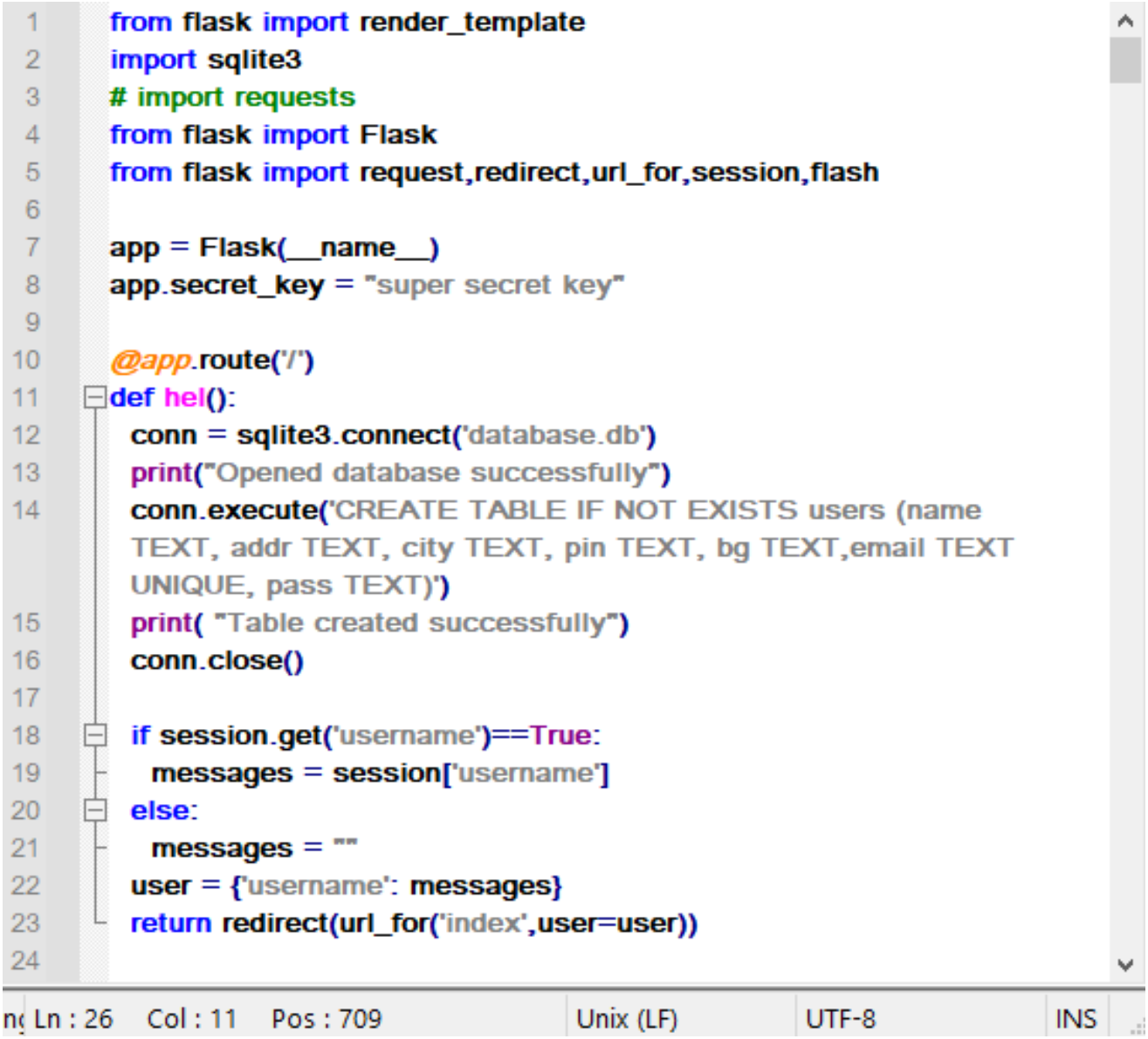
JavaScript: It is used along with the structures of HTML and CSS code on the client end to check on web page behavior and integrate third-party libraries as well. This is used to send data to the Firebase database in real-time.

AWS EC2: Amazon Elastic Compute Cloud is a part of Amazon's cloud computing platform which provides secure, resizable compute capacity in the cloud. It is designed to make web-scale cloud computing easier for developers. We rent out the virtual computer EC2 to run all our hosted python, HTML, and CSS files.

AWS Beanstalk: AWS Elastic Beanstalk is a hosting service that assists in deploying applications and orchestrates various services. We simply upload our code and Elastic Beanstalk automatically handles the deployment, capacity provisioning, load balancing, auto-scaling to application health monitoring. We retain full control over the AWS resources powering your application and can access the underlying resources at any time.

CHAPTER 7: SAMPLE CODE

The following sample code gives an idea of how we integrate our HTML and CSS files using python. We import flask libraries to develop an application and use functions to achieve particular tasks



```
1  from flask import render_template
2  import sqlite3
3  # import requests
4  from flask import Flask
5  from flask import request,redirect,url_for,session,flash
6
7  app = Flask(__name__)
8  app.secret_key = "super secret key"
9
10 @app.route('/')
11 def hel():
12   conn = sqlite3.connect('database.db')
13   print("Opened database successfully")
14   conn.execute('CREATE TABLE IF NOT EXISTS users (name
     TEXT, addr TEXT, city TEXT, pin TEXT, bg TEXT,email TEXT
     UNIQUE, pass TEXT)')
15   print( "Table created successfully")
16   conn.close()
17
18   if session.get('username')==True:
19     messages = session['username']
20   else:
21     messages = ""
22   user = {'username': messages}
23   return redirect(url_for('index',user=user))
24
```

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Fig 12: Code 1

change.log server.py

```
396
397   @app.route('/notifications',methods=('GET','POST'))
398 def notifications():
399   if request.method == 'GET':
400     conn = sqlite3.connect('database.db')
401     print("Opened database successfully")
402     conn.row_factory = sqlite3.Row
403
404     cur = conn.cursor()
405     cor = conn.cursor()
406     cur.execute('select * from request where toemail=?',(session[
      'username'],))
407     cor.execute('select * from request where toemail=?',(session[
      'username'],))
408     row = cor.fetchone();
409     rows = cur.fetchall();
410     if row==None:
411       return render_template('notifications.html')
412     else:
413       return render_template('notifications.html',rows=rows)
414
415   @app.route('/deleteuser/<useremail>',methods=('GET', 'POST'))
416 def deleteuser(useremail):
417   if request.method == 'GET':
418     conn = sqlite3.connect('database.db')
419     cur = conn.cursor()
420     cur.execute('delete from users Where email=?',(useremail,))
421     flash('deleted user:'+useremail)
422     conn.commit()
423     conn.close()
424     return redirect(url_for('dashboard'))
425
```

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Fig 13: Code 2

CHAPTER 8: CONCLUSION

The Blood Bank Management System addresses the needs of every issue that is associated with blood. The issues could include difficulty in tracing their donors, managing blood bank accounts, and addressing the efficiency of doing transactions in Hospitals. The proposed Blood Bank website helps the people who are in need of blood by giving them all details of blood group availability or regarding the donors with the same blood group. They don't need to go anywhere to search the blood when they need it. They just need to use this software then all the results will appear in just a second. The medical environment is so busy that we don't have time to spend going here and there. Thus, we can use technical ways to search the blood by using the Blood Bank software we can find thousands of people who are donating their blood and also get the details of the donor and the city he belongs to, and what is their Blood group. These is how the software could be used efficiently and help people who are in need.

The blood bank management system, a 24/7 system that is essential for different kinds of people like blood donation system personnel such as the doctors, donors, recipients, and other general users, once implemented right with the hospital administrative aware of the management of their user base and blood pint details and the users are clearly instructed on the usage of the web application, the system facilitates quick services like direct access to the site to get donor's information in case of emergency with ease. The main advantage of this system is that any person who has undergone a blood test can be registered on the blood bank system as a donor. Apart from the ease of communication between blood supply and demand, it brings along an environment of interactive blood donors, blood requesters, and blood bank clinics. This web application system is to be conceived in its current state - a dynamic site requiring constant updates from blood donors as well as the blood requesters and is to enable blood requesters to publish their requests. This primarily refers to the volunteers and patients using the site.

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