PLASMA DONOR APPLICATION

IBM PROJECT REPORT

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TIRUCHENGODE – 637 215

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BONAFIDE CERTIFICATE

Certified that the project report "**PLASMA DONOR APPLICATION**" is the bonafide work of "KAVYA S (1921151), KEERTHANA S (1921152), GAYATHIRI SHREE I S (1921127), LAKSITA P (1921157)" who carried out the project work under my supervision.

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INTERNAL EXAMINER EXTERNAL EXAMINER

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1. INTRODUCTION

1.1 Project Overview

A plasma is a liquid portion of the blood, over 55% of human blood is plasma. Plasma is used to treat various infectious diseases and it is one of the oldest methods known as plasma therapy. Plasma therapy is a process where blood is donated by recovered patients in order to establish antibodies that fight the infection. In this project plasma donor application is being developed by using AWS services. The services used are AWS Lambda, API gateway, DynamoDB, AWS Elastic Compute Cloud with the help of these AWS services, it eliminates the need of configuring the servers and reduces the infrastructural costs associated with it and helps to achieve serverless computing. For instance, during COVID 19 crisis the requirement for plasma increased drastically as there was no vaccination found in order to treat the infected patients, with plasma therapy the recovery rates were high but the donor count was very low and in such situations it was very important to get the information about the plasma donors. Saving the donor information and notifying about the current donors would be a helping hand as it can save time and help the users to track down the necessary information about the donors.

1.2 Purpose

As we all know, the traditional methods of finding plasma, one has to find out for oneself by looking at hospital records and contacting donors have been recovered, sometimes may not be available at home and move to other places. In this type of scenario, the health of those who are sick becomes disastrous. Therefore, it is not considered a rapid process to find plasma. The main purpose of the proposed system, the donor who wants to donate plasma can simply upload their covid19 traced certificate and can donate the plasma to the blood bank, the blood bank can apply for the donor and once the donor has accepted the request, the blood bank can add the units they need and the hospital can also send the request to the blood bank that urgently needs the plasma for the patient and can take the plasma from the blood bank.

2. LITERATURE SURVEY

2.1 Existing problem

There are many people who are willing to donate plasma to those who need plasma.But there is not any accessible way to help them to find plasma donation centers in real-time. So, the problem is not the lack of donors, but finding the right sponsor at the right time. If someone needs plasma, they seek plasma first from family members, then from hospitals and the nearest plasma bank. If they can't process plasma in these ways, it's very difficult for them to contact another for a short-term plasma draw. This is a problem that I want to solve through this application. Instead of just providing plasma to people in need with an outdated list of regular plasma donors who may or may not be available to help, This application reaches the right people the moment users find Out.

2.2 References

Several experiments have been carried out over the years by different groups of researchers. Here are some of the following groups:

[1] Gokul Dudani (2021). "A Systematic Review & Design of Web-Based Blood Management System". Blood is a fluid that carries oxygen and is a connective tissue that carries other substances because of its volume. Now that we understand the importance of blood, we see that it not only carries oxygen to the tissues but also clears the air between them through the heart and blood vessels. The average volume of blood donation is 470ml per person, which is only 8% of the adult volume. When blood is needed in a hospital, it is usually not available in time, leading to inconsistencies. Both patients and sponsors are unaware that the donor is being hospitalized due to a lack of communication and other services.

[2] ways to keep your plasma healthy, Original Archived November 1, 2013, Accessed November 11, 2011. Plasma donation is one of the most accepted practices for saving lives,While earning a few dollars. The whole process can take some time, but it's well worth it once you experience it a few times. Accepting money in exchange for plasma is welcome. It's a move when you feel like you're not just a hero, but you're adding value to yourself. The term "healthy" does not mean only in the absence of disease. It also means that you are healthy enough.

[3] Ripathis S, Kumar V, Prabhakar A, Joshi S, Agarwal A (2015). "Microscale Passive Plasma Separation: A Review of Design Principles and Microdevices," J. Micromech Micro 25 (8): 083001; Plasma separation is of great importance in the fields of diagnosis and healthcare. Due to the lagging transition to microscale, these recent trends are a rapid shift towards shrinking complex macro processes.

[4]In this paper, the author has carried out analysis based on the opportunities presented by serverless computing. They emphasize that serverless services are a more affordable approach for many network services and it is more user friendly as a serverless approach will relieve the customers from the intricacies of deployment. These services will help to improve the new business opportunities.

[5]Author conducted a survey of existing serverless platforms in this paper from source projects, industry, academia, use cases, and key characteristics and has described the challenges and the open problems associated with it. The Author's work presented a hands on experience of serverless technologies using different services from different cloud provides such as Amazon, Google, IBM, Microsoft Azure.

[6]In this paper three demonstrators for IBM Bluemix OpenWhisk were presented. They exhibit event-based programming triggered by weather forecast data, speech utterances and Apple WatchOS2 application data. And also demonstrated a chatbot using IBM Bluemix OpenWhisk that calls on the IBM Watson services which include dates, weather, alarm services, news and music tutor.

[7]In this paper serverlessOS was designed. It comprises components such as
1. desegregation model that leverages desegregation for abstraction but it will enable resources to move fluidly between servers for the performance.
2. The second key component is cloud orchestration layer which helps to manage fine-grained resource placement and allocation throughout the application lifetime with the help of global and local decision making 3. And the third component is an isolation capability which enforces data and resource isolation.

[8]In this paper an efficient resource management system for serverless computing framework was proposed which aims to enhance resource with a focus on memory

allocation among the containers and the design which was added on top of an open-source serverless platform, openLambda and it is based memory needs events are triggered

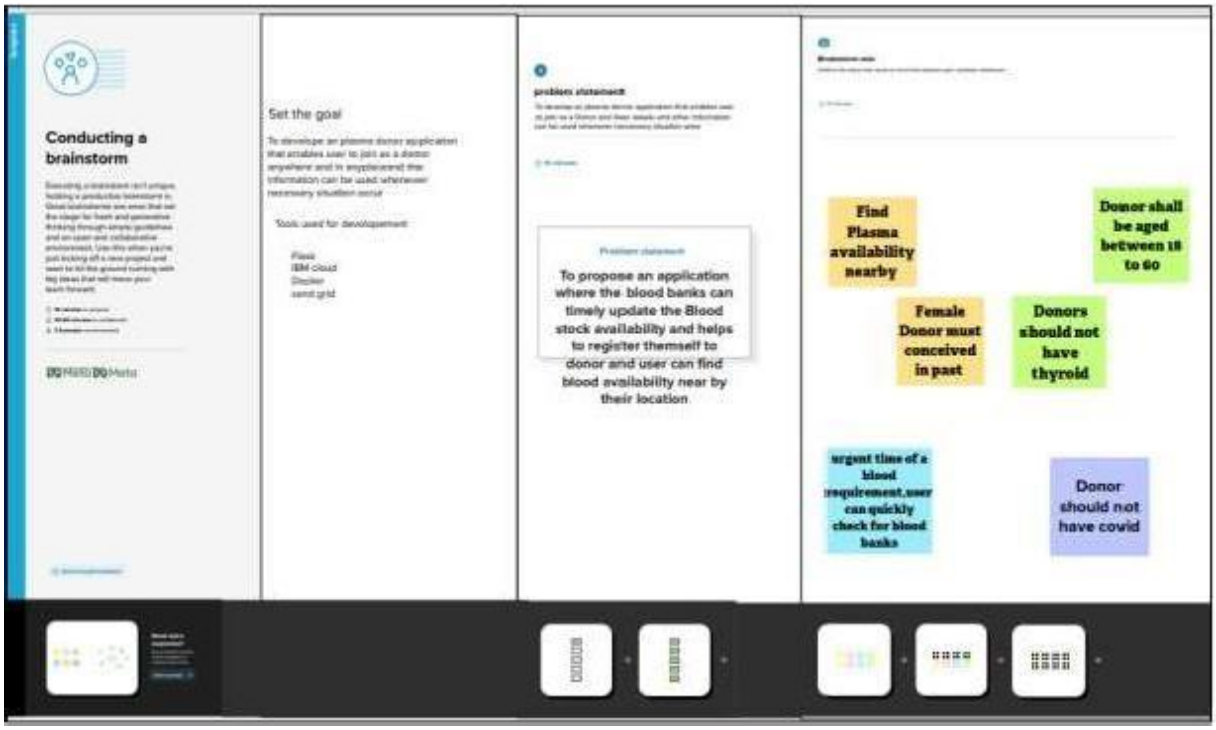
2.3 Problem Statement Definition

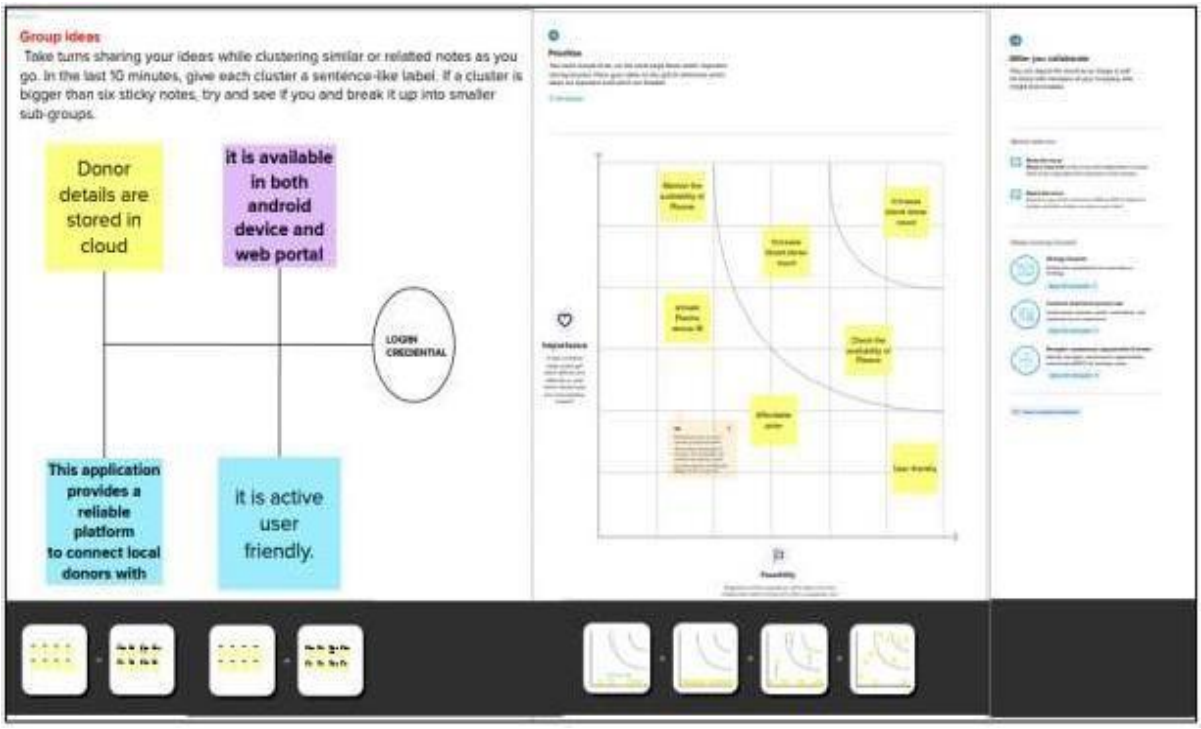
This system aims at connecting the donors & the patients by an online application. By using this application, the users can either raise a request for plasma donation or requirement. Similar to blood donors there also exist plasma donors where there exists problems like in case of emergency needs the most important life saver necessity is plasma , Plasma Banks are the main providers of plasma who receives blood from various donors, monitors the plasma groups database of emergencies and makes them available to the hospital whenever needed. The major problem faced by the main plasma providers and the need is the availability of donors at the right time. We hereby took a step forward to build a system to create a network of people who can help each other in need. We propose an application where the plasma banks can timely update the plasma Stock availability and donor and register themselves to the donor and the user can find plasma availability nearby him/her. The urgent time of a plasma requirement, users can quickly check for plasma banks, hospitals or donors as per requirement matching a particular or related and reach out to them through the App.

3. IDEATION & PROPOSED SOLUTION

3.1 Empathy Map Canvas

3.2 Ideation & Brainstorming





3.3 Proposed Solution

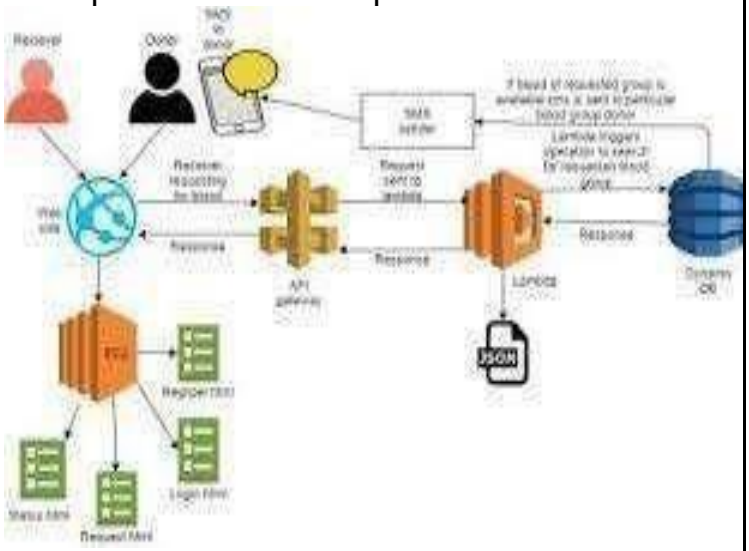
1.CUSTOMER SEGMENT(S) **Who is your customer?** People who wish to donate plasma and Hospitals & Blood banks which needs plasma donors	**5.AVAILABLE SOLUTIONS** **Which solutions are available to the customers when they face the problem?** Available solutions notify about the donors, patients and the availability of plasma & need for the plasma. The notification regarding the need for plasma was not send to the donors	**8.CHANNEL OF BEHAVIOUR** **8.1 ONLINE What kindof actions do customers take online?** Registering for plasma donation and requesting for plasma will be carried out through online **8.2 OFFLINE What kind of actions do customers take offline?** Arrangements for plasma donation Awareness for more plasma donation.
2. JOBS-TO-BE-DONE / PROBLEMS J&P **Which jobs-to-be-done (or problems) do you address for** your customers? Data collection should be monitored properly with the donor's data security. Unawareness about the need for plasma donation. Demand for donors.	**6.CUSTOMER CONSTRAINTS** **What constraints prevent your customers from taking action or limit their** choices of **solutions?** Network Bandwidth Donor Health condition Lack of knowledge about app Unavailability of plasma	**9.PROBLEM ROOT CAUSE** **What is the real reason that** **Does this problem exist? What is the backstory behind the need to do this job?** Lack of unawareness about the importance of plasma donation. Inability to find the donors at the time of emergency. Decrease in donors count

3. TRIGGERS TR **What triggers customers to act?** Volunteering interest and social responsibility towards society triggers the people to use this application	7. BEHAVIOUR **What does your customer do to address the problem and get the job done**? An unique ID will be provided for the donor's, in order to maintain their personal privacy. At the same time, an unique ID will be issued to the patient and the records will be monitored. Both donor and patient can access the application at ease.	10. YOUR SOLUTION SL Donors will be searched with blood groups in our database, if needed. The volunteers can donate the blood with their interest and become donors by registering themselves. Stock monitoring will be done and updates happen at the same time. An application which will act as the intermediate between the hospital and donors and bridge the gap between them.
4.EMOTIONS: BEFORE / AFTER **How do customers feel when they face a problem or a job and afterwards?** Before: Hard to find the donors for plasma donation at the right time. After: Satisfactory feel and relaxed feel after getting the right donor		

3.4 Problem Solution fit

S.NO	**Parameter**	**Description**
1.	Problem Statement (Problem to be solved)	The main aim of this project is to help the people who need blood in an emergency and to associate some donors who are willing to donate their blood to needy people and save their lives.

2.	Idea / Solution description	The user will be able to Search donors of suitable blood groups and contact them if needed. Donate blood by registering themselves with our system and can also become donors. Will be able to see the stock of various blood groups. Send requests for blood via “contact us”. Get information about all the blood campaigns..
3.	Novelty / Uniqueness	All of them have different ideas and different queries. Based on the user request and experience we will update our project based on user convenience.
4.	Social Impact / Customer Satisfaction	With the right implementation of the software you can benefit in many ways and also it makes the management very easy and error free. The software helps in tracking donors, getting Prompt and Correct Reports when required, and Centralized data storage with security. And last but not the least; the software will help in Customer Satisfaction.

5.	Business Model (Revenue Model)	Hospitals, NGOs, and private groups will profit from this donation application. Anyone with a basic understanding can use this software. This can be utilized at anytime, anywhere. Working with the assistance of the government, we can create a program to assist persons in need of plasma. 
6.	Scalability of the Solution	Instead of scouring the entire world for plasma donors, this program enables users to find donors while sitting at home. Once there is an emergency, send a plasma request to all people. The donor is prepared to be informed of the donation. Receiver may get in touch with the donor. Due to this Donors can check their eligibility on an app as well as making it simpler to find a suitable donor

4. REQUIREMENT ANALYSIS

4.1 Functional requirement

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	**Access Website**	Software operator should be capable to access web- application through either an application browser or similar on the pc.
FR-2	**Software operator Registration**	The software operator should be able to register through the web-application. The donor software operator must provide user name, gender, blood/plasma group, location, contact.
FR-3	**Login/logout/update details**	The login information will be stored on the database for future use.
FR-4	**Search for donor**	Search results can be viewed in a list. Each element in the list represents a specific donor with the donor details.
FR-5	**User plasma request**	Users can request to donate plasma by filling out the request form on the page. Once the request is submitted, they will get an email.
FR-6	**View distribution details**	The plasma bank should be able to view the status of the distribution details.

4.2 Non-Functional requirements

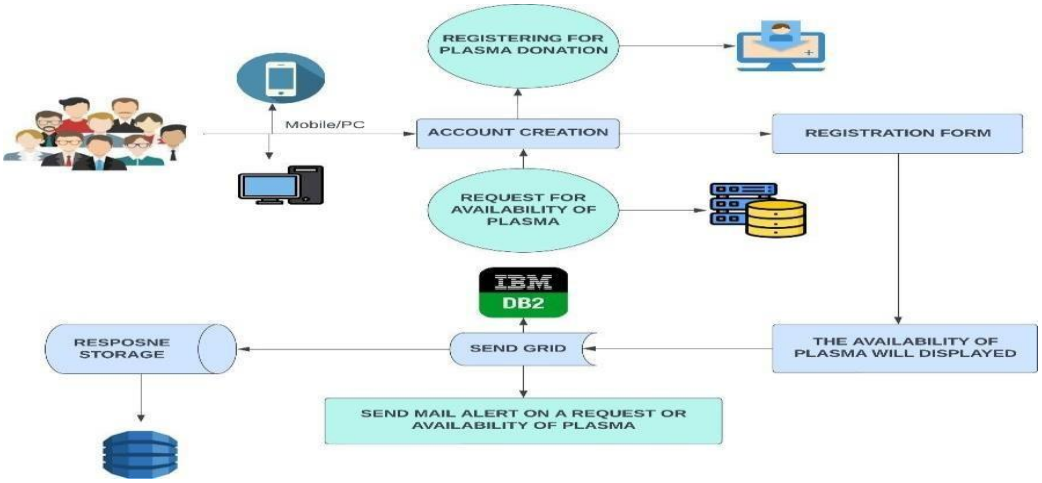
Following are the non-functional requirements of the proposed solution.

FR No.	Non-Functional Requirement	Description
NFR-1	**Usability**	The plasma donor application must have a good looking user friendly interface.
NFR-2	**Security**	The plasma donor application must be secured with proper username and passwords.
NFR-3	**Reliability**	The plasma donor application should work properly, even when faults occur.
NFR-4	**Performance**	The plasma donor application must perform well in different scenarios.

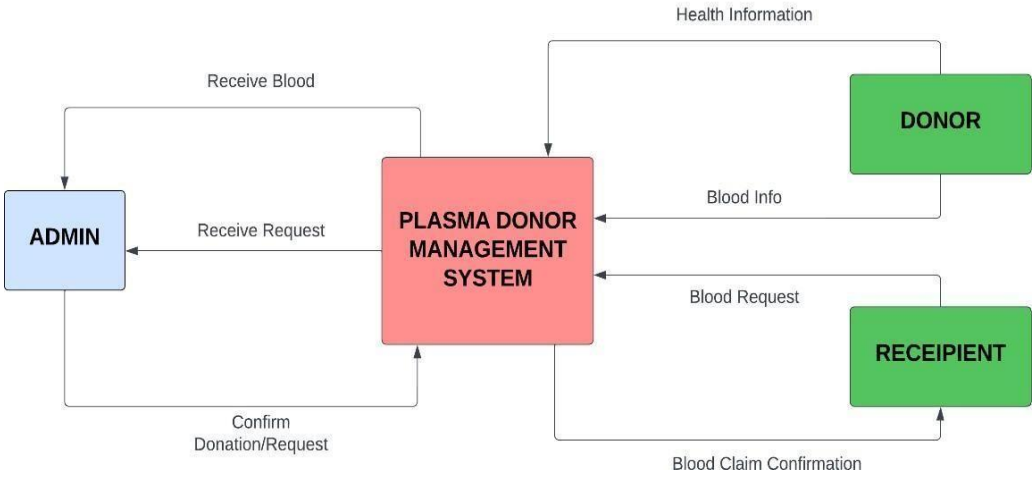
NFR-5	**Availability**	The plasma donor application must be available 24 hours a day with no bandwidth issues.
NFR-6	**Scalability**	The plasma donor application should able to increase or decrease in performance and cost in response to changes in application and system processing demands.

5. PROJECT DESIGN

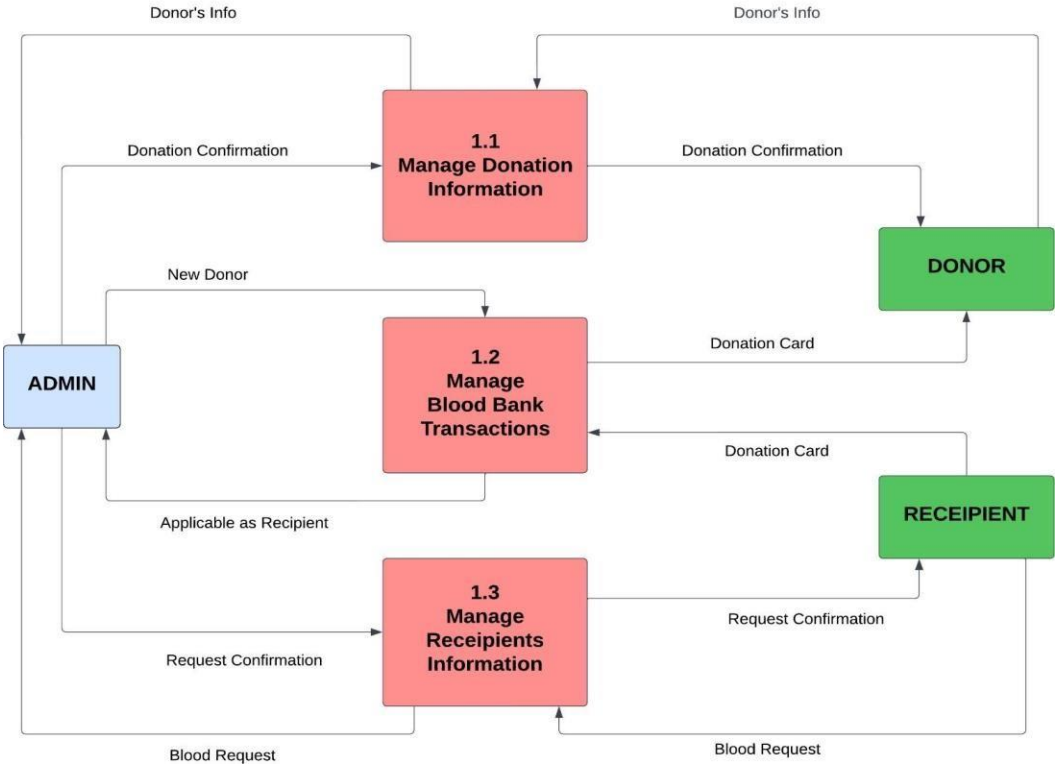
5.1 Data Flow Diagrams

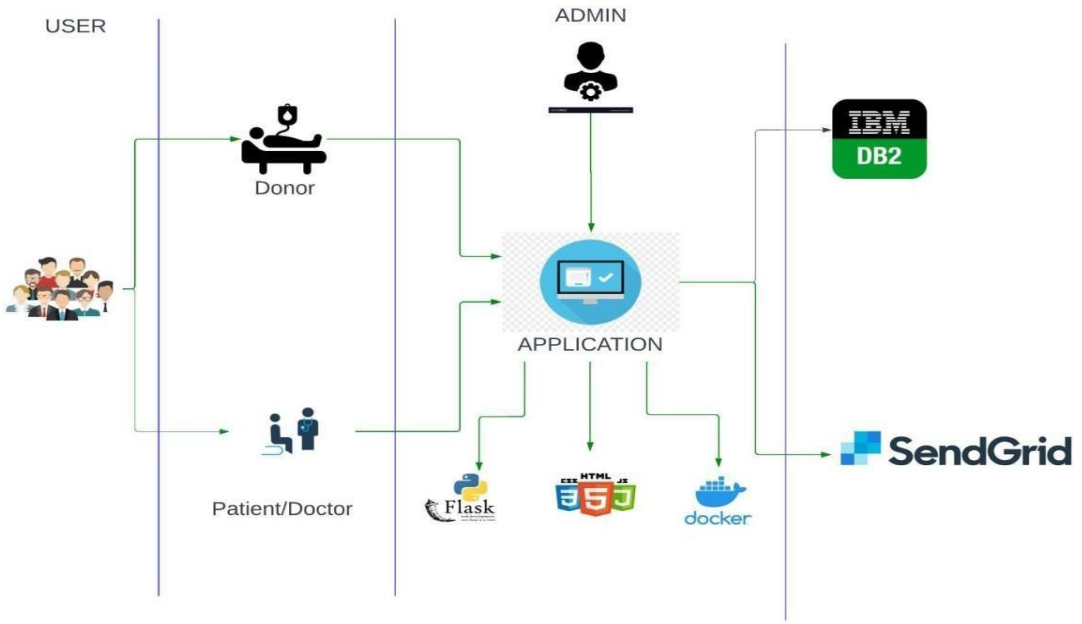


DATA FLOW DIAGRAM LEVEL 0



DATA FLOW DIAGRAM LEVEL 1





5.2 Solution & Technical Architecture

Table-1: Components & Technologies:

SNO	Component Description	Description	Technology
1	User Interface	The interaction between th use and application e.g., Web UI, Mobile App, Chatbot	HTML, CSS, JavaScript Bootstrap etc.
2	Application Logic-1	Framework used for designing the application.	Python, Python - Flask
3	Application Logic-2	Accessing the cloud and storing details of the users both donors and patients.	IBM Cloud, IBM DB2
4	Application Logic-3	Docker is an open-source platform for building, deploying and managing containerized application	Docker
5	Database	Data Type, Configurations etc.	SQL.
6	Cloud Database	Database Service on Cloud	BM Cloud and IBM DB2
7	File Storage	File storage requirements	IBM Block Storage or NO Storage Service or Local File System

Table-2: Application Characteristics:

sno	Characteristics	Description	Technology
1	Open-Source Framework	Python – flask is an open-source framework used to develop the application.	Python – flask is an open source framework used to develop the application.
2	Security Implementation	Container registry and Kubernetes Cluster are used for encryption of data.	Container registry and Kubernetes Cluster
3	Scalable Architecture	Kubernetes Cluster allow containers to run across multiple machines and environments.	Kubernetes Cluster
4	Availability	Kubernetes Cluster provides all time availability.	Kubernetes Cluster
5	Performance	Docker improves the application performance.	Docker

5.3 User Stories

User Type	Functional Requirement (Epic)	User Story Number	User Story / Task	Acceptance criteria	Priority	Release
Customer (Mobile user)	Registration	USN-1	As a user, I can register for the application by entering my email, password, and confirming my password.	I can access my account / dashboard	High	Sprint-1

		USN-2	As a user, I will receive confirmation email once I have registered for the application	I can receive confirmation email & click confirm	High	Sprint-1
		USN-3	As a user, I can register for the application through facebook.	I can register & access the dashboard with facebook Login	Low	Sprint-2
		USN-4	As a user, I can register for the application through Gmail	I can receive confirmation email click confirm	Medium	Sprint-1
	Login	USN-5	As a user, I can log into the application by entering email & password	I can enter into my account	High	Sprint-1
	Dashboard	USN-6	As a user ,Display all details about plasma application	I can donate/get details about the plasma	High	Sprint-2
Customer (Web user)	Application	USN-7	As a user ,I can register, login and see details about plasma	I can access the donor details and availability of plasma	High	Sprint-3
Customer Care Executive	Update Plasma storage	USN-8	Keep track the availability of the Plasma	I can provide application for customer needs	High	Sprint-4
Administrator	Verify donor details	USN-9	To add the donor plasma details in application	I can Control the all details in this application	Medium	Sprint-3
Customer Care Executive	Verify Customer Feedback	USN-10	To design the application that meets user's desires	I can satisfy the customer expectations	Medium	Sprint-4
Customer Care Executive	Control all Plasma details	USN-11	Make sure to check the availability of plasma in application	I can alert notification through email and SMS	High	Sprint-2
Administrator	Performance of application	USN-12	To make the process more efficient	I can save time, cost by improving the Plasma management application	High	Sprint-4

6. PROJECT PLANNING & SCHEDULING

6.1 Sprint Planning & Estimation

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Simulation creation	USN-1	Connect with python code	2	High	Kavya s Keerthana s Gayathri Shree I S Laksita P
Sprint-2	Software	USN-2	Creating an IBM Watsonin Cloud platform	2	High	Kavya s Keerthana s Gayathri Shree I S Laksita P
Sprint-3	MIT App Inventor	USN-3	Develop an Plasma donor application	2	High	Kavya s Keerthana s Gayathri Shree I S Laksita P
Sprint-4	Dashboard	USN-4	Design the Modules andtest the app	2	High	Kavya s Keerthana s Gayathri Shree I S Laksita P
Sprint-5	Web UI	USN-5	To make the user to interact with software.	2	High	Kavya s Keerthana s Gayathri Shree I S Laksita P

6.2 Sprint Delivery Schedule

Sprint	Total Story Points	Duration	Sprint Start Date	Sprint End Date (Planned)	Sprint Release Date (Actual)
Sprint-1	20	6 Days	24 Oct 2022	29 Oct 2022	29 Oct 2022
Sprint-2	20	6 Days	31 Nov 2022	05 Nov 2022	05 Nov 2022
Sprint-3	20	6 Days	07 Nov 2022	12 Nov 2022	12 Nov 2022
Sprint-4	20	5 Days	14 Nov 2022	19 Nov 2022	18 Nov 2022

6.3 Reports from JIRA

7. CODING & SOLUTIONING

7.1 Feature 1

Python

- Python is a widely-used, interpreted, object-oriented, and high-level programming language with dynamic semantics, used for general- purpose programming. It's everywhere, and people use numerous Python-powered devices on a daily basis, whether they realize it or not.
- Python was created by Guido van Rossum, and first released on February 20, 1991.
- Python is derived from many other languages, including ABC, Modula-3, C, C++, Algol-68, Smalltalk, and Unix shell and other scripting languages.
- Python is copyrighted. Like Perl, Python source code is now available under the GNU General Public License (GPL)
- It is easy to learn – the time needed to learn Python is shorter than for many other languages; this means that it's possible to start the actual programming fast
- It is easy to use for writing new software – it's often possible to write code faster when using Python.
- It is easy to obtain, install and deploy – Python is free, open and multiplatform; not all languages can boast that.
- Programming skills prepare you for careers in almost any industry and are required if you want to continue to more advanced and higher- paying software development and engineering roles.
- Python is now maintained by a core development team at the institute, although Guido van Rossum still holds a vital role in directing its progress.

7.2 Feature 2:

Flask

- **Flask** is a micro web framework written in Python. It is classified as a Micro framework because it does not require particular tools or libraries.
- It has no database abstraction layer, form validation, or any other components where pre-existing third-party libraries provide common functions. However, Flask supports extensions that can add application features as if they were implemented in Flask itself.

- Extensions exist for object-relational mappers, form validation, upload handling, various open authentication technologies and several common framework related tools.
- Applications that use the Flask framework include Pinterest and LinkedIn.

7.3 Database Scheme

IBM Db2

- DB2 is a database product from IBM.
- It is a Relational Database Management System (RDBMS). DB2 is designed to store, analyze and retrieve the data efficiently.
- DB2 product is extended with the support of Object-Oriented features and non-relational structures with XML.
- Provide a massively parallel processing (MPP) architecture Exploits Hive, HBase and Apache Spark concurrently for best-in-class analytic capabilities.
- Provides low latency support for ad-hoc and complex queries, high performance, and federation capabilities Understands dialects from other vendors and various products from Oracle, IBM® Db2® and IBM Netezza® Enables advanced row and column security

Kubernetes

- **Kubernetes** is also known as **'k8s'.**
- **Kubernetes** is an extensible, portable, and open-source platform designed by **Google** in **2014**.
- It is mainly used to automate the deployment, scaling, and operations of the container-based applications across the cluster of nodes.
- Kubernetes helps to manage containerised applications in various types of physical, virtual, and cloud environments.
- Google Kubernetes is a highly flexible container tool to consistently deliver complex applications running on clusters of hundreds to thousands of individual servers
- Kubernetes is the Linux kernel which is used for distributed systems.
- It helps you to be abstract the underlying hardware of the nodes(servers) and offers a consistent interface for applications that consume the shared pool of resources.

8. TESTING

8.1 Test case

- It is the process of exercising software with the intent of ensuring that the Software system meets its requirements and user expectation and does not fail in an unacceptable manner.
- There are various types of test. Each test type addresses a specific testing requirement

Test case ID	Feature Type	Component	Test Scenario	Steps To Execute	Test Data	Expected Result	Actual Result	Status	Comments	TC for Automation(Y/N)	BUG ID	Executed By
LoginPage_TC_OO1	UI	Admin Login Page	Verify user is able to see the Login/Signup popup when user clicked on My account button	1.Enter URL http://127.0.0.1:8000/ and click go 2.Click on My Account dropdown button 3.Verify login/Singup popup displayed or not	Username: rit password : rit123	Login/Signup popup should display and navigate to Admin dashboard	Working as expected	Pass		Y		Admin
LoginPage_TC_OO2	Functional	Patient Login page	Verify user is able to log into application with InValid credentials	1.Enter URL http://127.0.0.1:8000/ and click go 2.Click on 3.Verify login/Singup popup with below Patient elements: a.username text box b.password text box c.Login button	Username: shriram password : 20190112 80	Application should show 'Incorrect Username or password ' validation message.	Working as expected	Fail	Steps are not clear to follow	N	BUG-1234	Patient
LoginPage_TC_OO3	Functional	Donor Login Page	Verify user is able to log into application with Valid credentials	1.Enter URL http://127.0.0.1:8000/and click go 2.Click on 3.Enter Valid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: sathish password: 201901120	User should navigate to user Donor Home Page	Working as expected	Pass		Y		Donor
LoginPage_TC_OO4	Functional	Patient Login page	Verify user is able to log into application with InValid credentials	1.Enter URL http://127.0.0.1:8000/and click go 2.Click on 3.Enter Valid username/email in Email text box 4.Enter valid password in password text box 5.Click on login button	Username: shriram password: 201901128	User should navigate to user Donor Home Page	Working as expected	Pass		Y		Patient

8.2 User Acceptance Testing

1. Purpose of Document

The purpose of this document is to briefly explain the test coverage and open issues of the Plasma Donation Application project at the time of the release to User Acceptance Testing (UAT).

2. Defect Analysis

This report shows the number of resolved or closed bugs at each severity level, and how they were resolved

Resolution	Severity 1	Severity 2	Severity 3	Severity 4	Subtotal
By Design	8	4	2	3	17
Duplicate	1	0	2	1	4
External	2	3	0	1	6
Fixed	10	2	5	18	35
Not Reproduced	0	0	1	0	1
Skipped	0	0	1	1	2
Won't Fix	0	3	2	1	6
Totals	21	12	13	25	71

3. Test Case Analysis

This report shows the number of test cases that have passed, failed and untested

Section	Total Cases	Not Tested	Fail	Pass
Print Engine	8	0	0	8
Client Application	50	0	0	50
Security	2	0	0	2
Outsource Shipping	3	0	0	3
Exception Reporting	10	0	0	10
Final Report Output	6	0	0	6
Version Control	3	0	0	3

9. RESULTS

9.1 Performance Metrics

- Project metrics are used to track the progress and performance of a project.

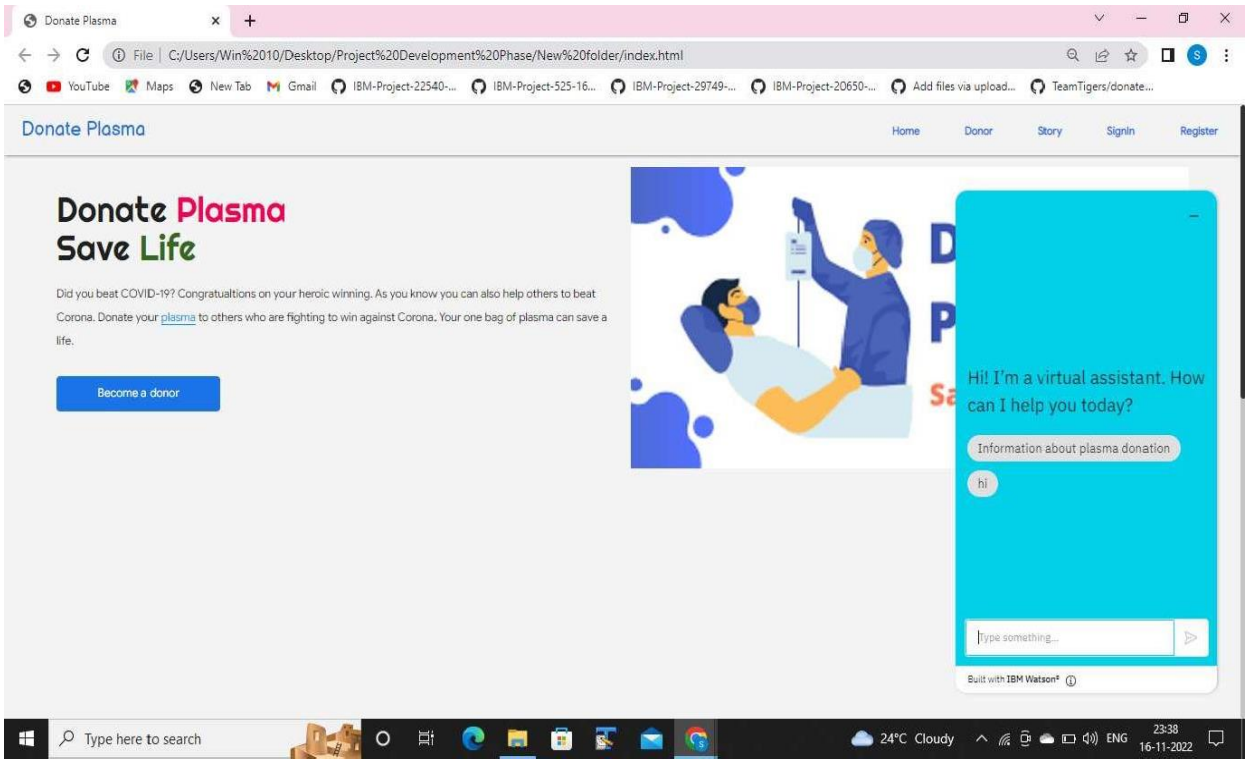
- Monitoring parts of a project like productivity, scheduling, and scope make it easier for team leaders to see what's on track.

- As a project evolves, managers need access to changing

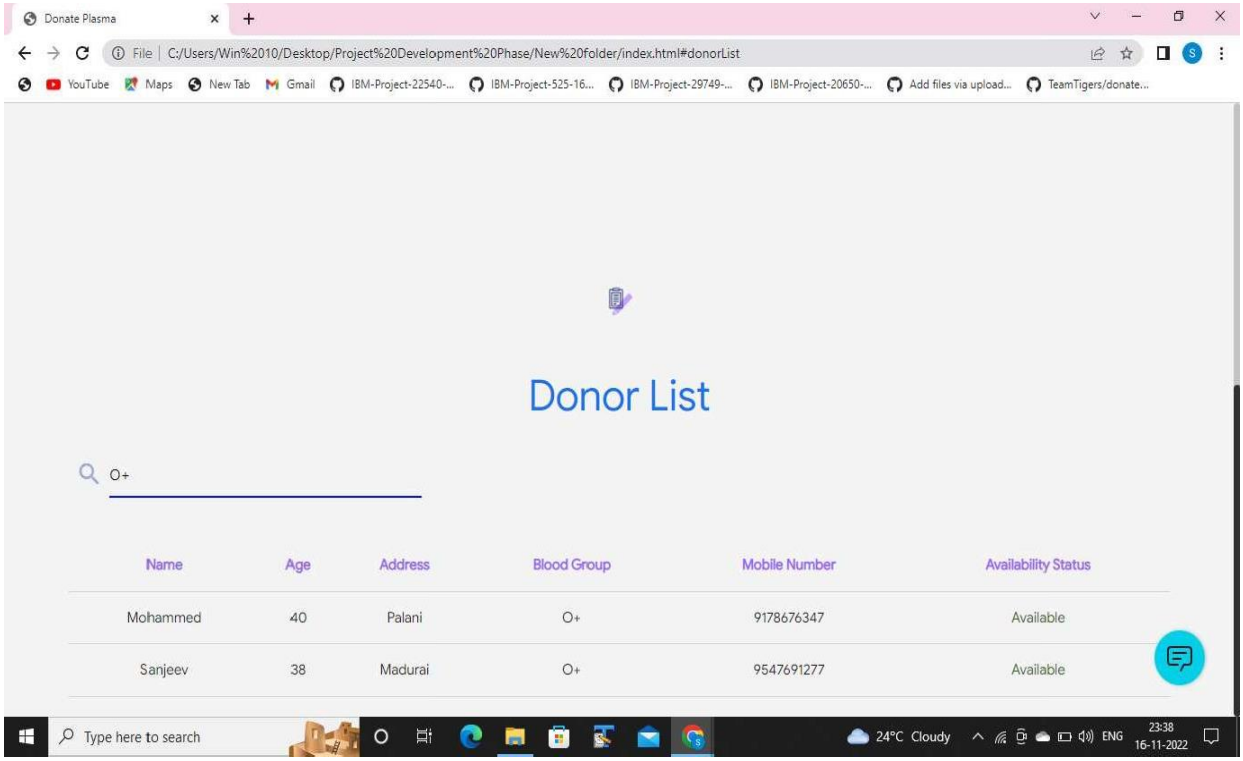
- deadlines or budgets to meet their client's expectations

Output screens

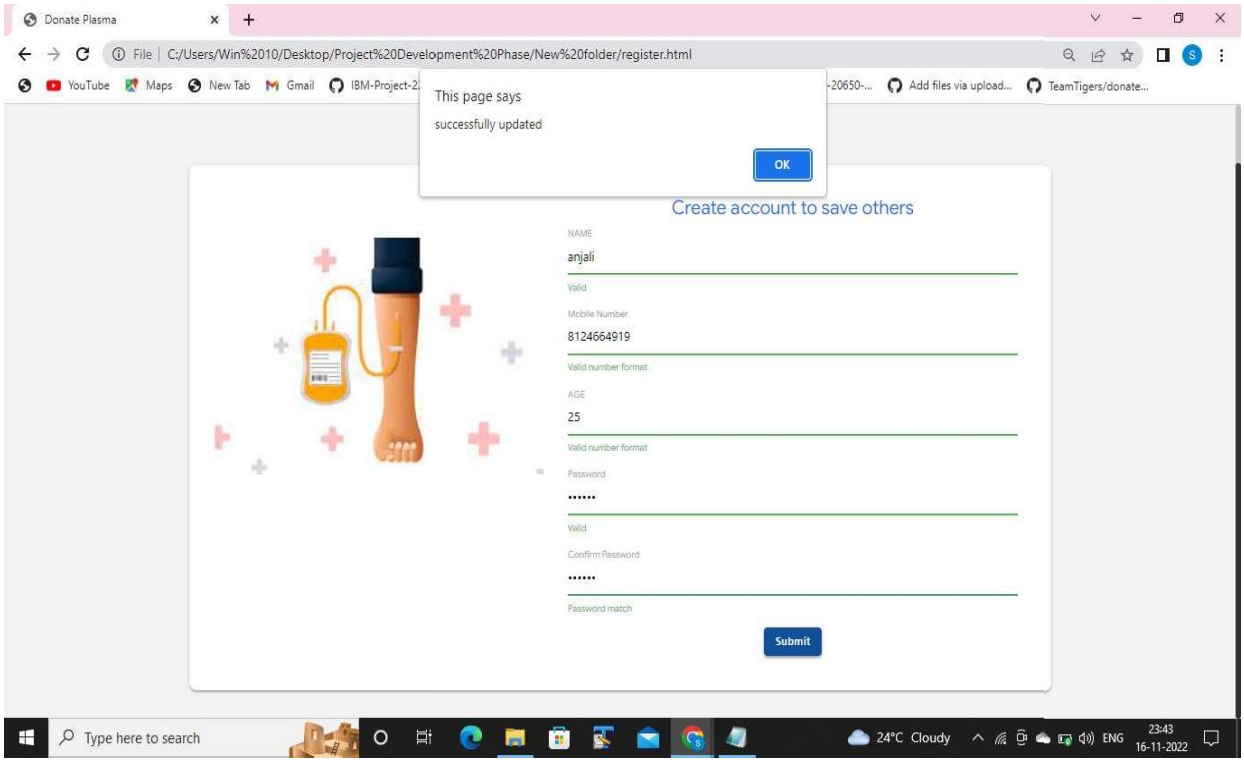
CHATBOT WORKING



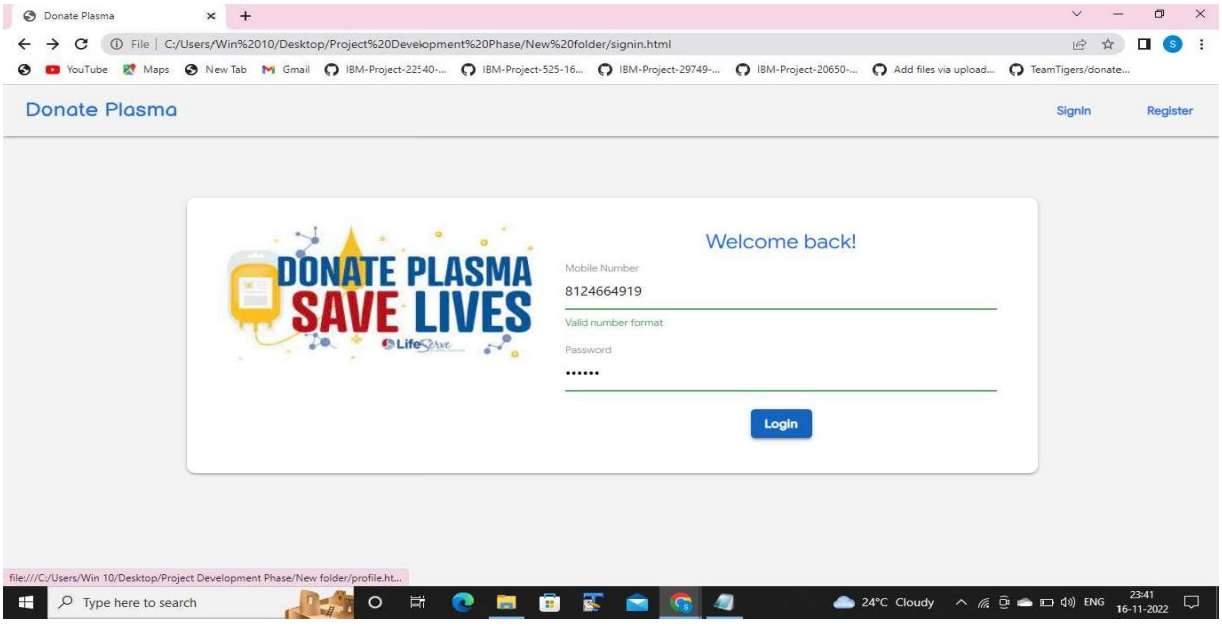
SEARCHING FOR DONOR



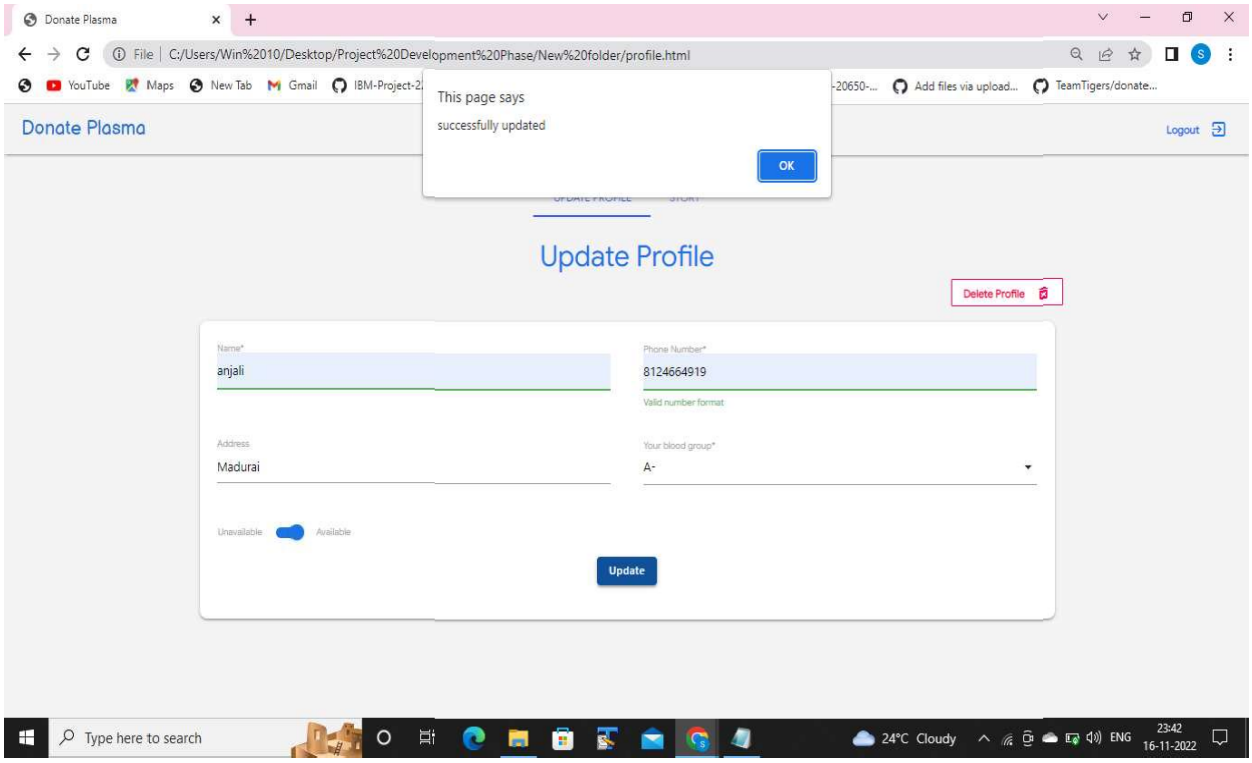
DONOR REGISTRATION



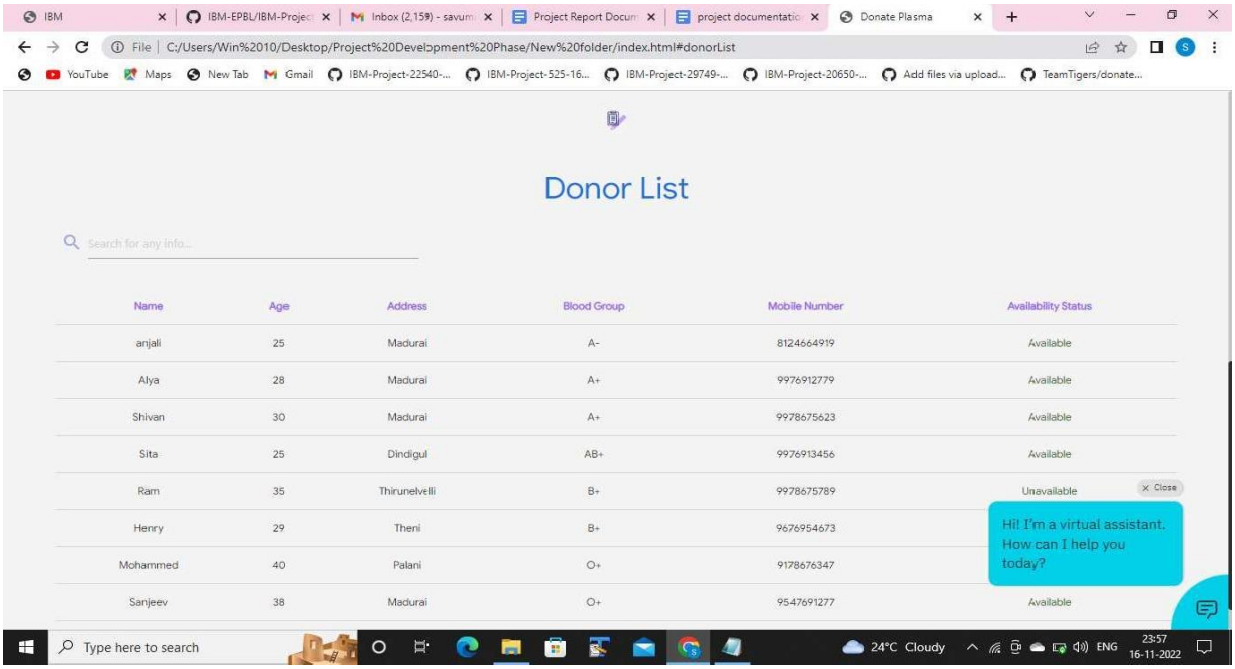
DONOR LOGIN

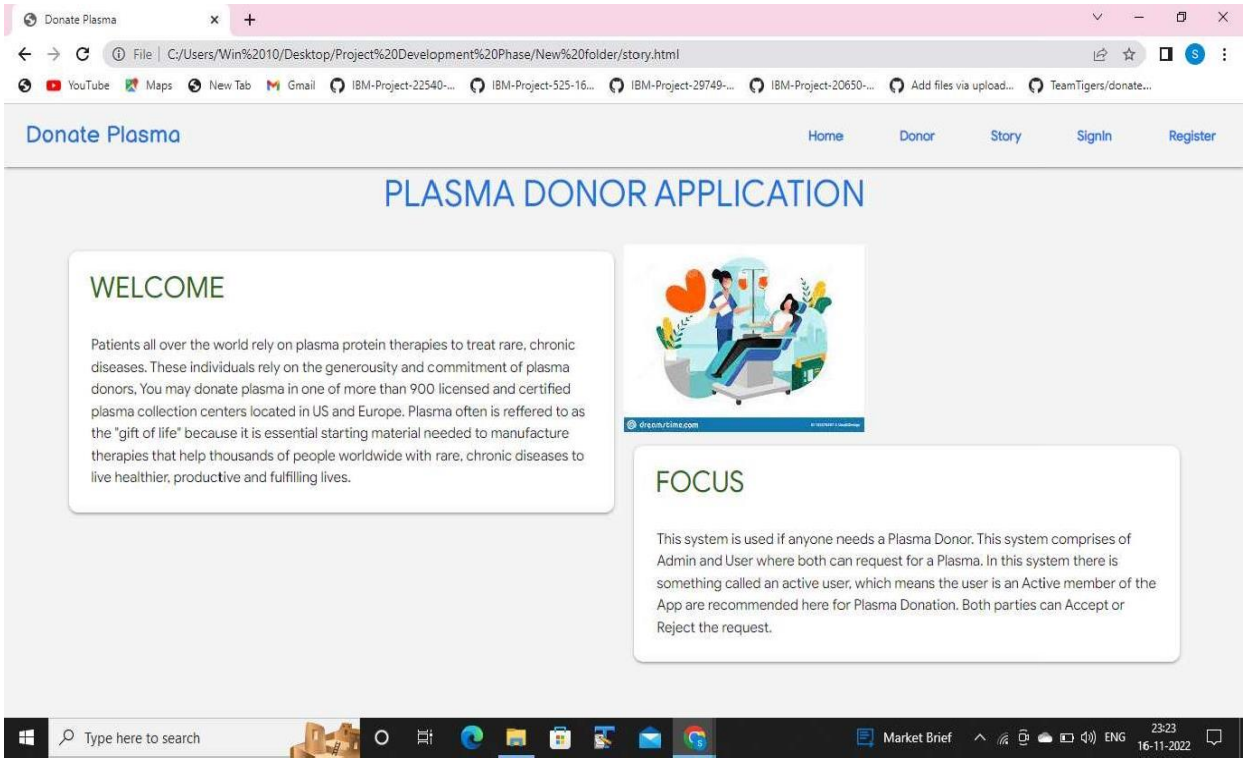


UPDATING DONOR PROFILE



DONOR ADDED





10. ADVANTAGES & DISADVANTAGES

ADVANTAGES:

1. Easy connecting donors and recipients makes plasma donation way more proficient.

2. Prime motive of the app is to solve the perpetual shortfall of plasma donors.

3. It connects plasma donors and recipients through a single and scalable platform.

4. Effortless access: Users on this platform will be able to use the app with just One-click.

DISADVANTAGES:

- **Internet:** It would require an internet connection for the working of the website.
- **Auto- Verification:** It cannot automatically verify the genuine users.

11. CONCLUSION

The efficient way of finding plasma donors for the infected people is implemented using the plasma donor website that is hosted on Cloud platform. To ensure the smooth functioning of the website operations. I have hosted the website on a cloud platform to make sure the operations are running successfully to deploy the application cloud service.

12. FUTURE ENHANCEMENTS

Upgrading the UI that is more user-friendly which will help many users to access the website and also ensures that many plasma donors can be added into the community. Using elastic load balancer, it helps to handle multiple requests at the same time which will maintain the uptime of the website with negligible downtime.

13. APPENDIX

GITHUB LINK:

https://github.com/IBM-EPBL/IBM-Project-15209-1659594980

DEMO LINK:

https://youtu.be/54bX-WSg_Lw