CO303 – DBMS FINAL PROJECT REPORT

BLOOD BANK SERVICE PORTAL

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1. INTRODUCTION

Accidents, major surgeries all require one thing in common – Blood. Without the required amount of blood and the specific type, the recipient of that cannot survive. Thus, it is essential that blood be available at any place, time without any problems.

Blood donation is one of the most significant contributions that a person can make towards the society. It is not harmful for an adult person to donate blood. The body of the donor can regenerate the blood within few days. An ailing body needs blood for various reasons. He may be attacked with anemia, undergone an operation or may meet with an accident. But such a patient may die for want of blood as it is not always available. Even a pregnant mother may need blood in case of emergency situation.

The patient needs blood or his or her group of blood whenever necessary. It is another important thing. Blood has four groups namely, A. B, AB and O. The required group must be the same while transplanting otherwise the transplantation will go in vain and even the patient may die. Blood can be stored for a limited period of time that is why the blood banks need a steady and constant collection.

Nowadays a public awareness is noticed to donate blood. Many clubs, colleges, societies, offices, etc. organize blood donation camps on different occasions. It is a healthy gesture. We must keep this aptitude up at any cost. Our blood banks are running short of required blood. By organizing such blood donation camps we may help them to enrich their capacity.

Blood donation is our human duty. Our body does not get affected if we donate blood. The body can repair the loss within a few days. So we must come forward to donate blood as it can make sure the return of a dying man again into the light of life.

Despite all this, there are so many cases when we are met with shortage of blood or its unavailability in certain critical situations. Thus, there arises a need to set up a service/portal that provides and supplies blood to victims of accidents, patients undergoing surgeries or having chronic blood-related diseases whenever

and wherever they want in a very short period of time. It is for this purpose that we have designed a “Blood Bank Service Portal” to make this task easier.

2. AIM

This portal has been designed with the following aims in mind:

- Provide a user friendly interface for any user.
- Provides quick and easy access to donor records and notifies the donors immediately if the requested blood type is available.
- It allows for finding not only the available donors in the specified area but also the blood banks, social organizations, etc. that have registered with our portal.
- Develop a blood bank service system that assists in the management of blood donor records and provides fast distribution of blood in case of emergencies.
- Provides to manage timely, confidential and secure medical reports that facilitates planning and decision making and hence improved medical service delivery.
- Generate a list of all transactions i.e. requests for blood made so that if anyone wishes to analyze or make a survey on the same, he/she can get a clear idea of facts such as the location requiring most blood requests , the major accident prone areas or the blood type whose stock needs to available the most in order to supply the patients at a short notice.

3. GENERAL CHARACTERISTICS

Through this section a description is given about the characteristics about the entire system.

3.1 PRODUCT PERSPECTIVE

This portal is mainly meant for requesting blood for those in need of immediate help and also for donors who are willing to donate blood at a short notice. The blood bank authorities will have their stock of specific blood types which they supply on demand. Through this system, it will be easier to find a donor for exact blood type and easy to build a connection between the recipient and donor. It hopes to promote and motivate more and more people to donate blood.

3.2 USER CHARACTERISTICS

- Here the donors as well as the recipient are users of the portal, so is the blood bank.
- The donor who registers himself with the portal can understand English and he/she can fill the application without errors and he has sufficient knowledge in using a computer and mobile phone.
- User is very generous to attend to the donation with such a small announcement (via e-mails / SMS messages).

3.3 GENERAL CONSTRAINTS

- The program will be written in PHP language.
- Donors and Blood banks who register with the portal get their own username and password.
- After registration of a donor/blood bank, the authenticity of his/her mobile number will be validated by counting the number of digits in it.
- If there are no donors available, there will be nothing displayed.

3.4 Assumptions and Dependencies

- Every donor has a mobile phone.
- The system database is accessible in real time.
- The donor doesn't submit any fake reports to the system.
- Donors who want to contribute to a donation will definitely reply to the request of the portal.
- An organization registered with the portal is expected to have one fixed location.

4. Specific Requirements

The system provides a single interface to the various users of the portal. Due to our portal not requiring the need of an admin, there is no need for a separate interface. The user will be authenticated based on login credentials if he/she wishes to register himself with the portal.

The following provides a brief idea about how the portal works and how a user can operate the same.

4.1 Functional Requirements

Case 1: *Display the list of available blood donors and organizations with the specified criteria*

1. This is the default home page.
2. Recipient is asked to enter all details pertaining to his request.
3. She/he enters his name, admitted hospital, mobile number, blood group required, state and district (current).
4. Once all details are filled, he hits the search button which displays the list of available donors and organizations in the specified area.

Case 2: *Send Donation Details to the selected donor or organization*

1. If there are available donors or organizations, the recipient can request for donation by clicking the send button which sends a notification to the selected donor.
2. Currently a pop-up notification with contact details of donor/organization is displayed.

Case 3: *Donor Registration*

1. A donor who wishes to register himself with the portal needs to click on the "Donor" tab on the home page.
2. By default, the 'Sign In' page is shown. The donor needs to click the 'Sign Up' tab to register.
3. Once the donor is taken to the sign up page, a small questionnaire is given to the donor which requests for his personal and contact details.
4. After filling in his details, he registers himself in the portal.
5. The system does the authentication.
6. If valid, the donor details are sent and stored in the system database.
7. If some of the details are invalid or compulsory fields are left blank, a pop-up message indicates the donor to fill in the corresponding details again.
8. After complete verification, the donor now has a unique username and password by which he can login to the portal.

Case 4: *Donor Login*

1. By clicking on the "Donor" tab, the user is taken to the donor 'Sign In' page.
2. A donor who has already registered himself has a unique username and a password with which he can login.
3. If username and password match with those in the system database, user is able to login.
4. If they do not match, the donor has to enter valid credentials.
5. On successful login, the donor details are displayed.

6. Apart from checking his/her details, the donor can update his details to match his current contact and location.
7. Donors can logout by clicking the logout button (which appears on login).

Case 5: *Organization Registration*

1. An organization needs to register itself to use the portal. By clicking the "Blood Bank" tab, the user is taken to the Blood Bank 'Sign In' page by default.
2. To register, the user needs to click on the 'Sign Up' tab.
3. Similar to donor registration, a questionnaire is given to the organization asking them to fill details such as unique username, location, manager name, types of blood available, etc.
4. The register button, on being clicked, successfully completes the registration process.
5. Details such as username, contact details and blood stock available are authenticated by the portal and in case of ambiguity prompted to fill again.
6. If any fields are left blank, the user is prompted to fill that particular field.
7. Once all details are verified, the details of the organization are sent to the system database and the organization has its own username and password.

Case 6: *Organization Login*

1. A registered organization can login to the portal with its unique username and password.
2. If the entered username does not exist in the database or doesn't match with the password, then the user will be prompted to enter valid credentials.
3. On entering the right username and password, the organization is able to login.
4. On login, the details of the organization are displayed.
5. There is also a provision to edit and update the details already present such as contact details, the amount of a particular blood type available.

6. The users can logout by clicking the logout button (which appears on login).

Case 7: *View Request History, the list of requests made till date*

1. By clicking the "History" tab available on the home page, any user can view all requests made till date sorted by the most recent request.
2. Requests made can be filtered according to Blood Group, State or District as per our needs.
3. Only those requests will be shown which matches all the filters we have set, else nothing is displayed.

4.2 NON-FUNCTIONAL REQUIREMENTS

- Data should not become corrupted in case of network failure, system crash or power failure.

- The portal should be functioning at all times and any patient should be able to request blood without failure apart from scenarios where specified blood is unavailable or the network has failed.

- Security – This system does not have a tight security system because people who log into the system are mostly volunteers or volunteer organizations that have been created with one purpose in mind i.e. to donate blood for innocent patients. But the system does provide basic security features.

    - Any donor or organization cannot see the details of any other donor or organization.
    - Only a particular donor/organization can edit and update its details.

5. IMPLEMENTATION

5.1 FRONT END

Graphical User Interface is coded in HTML, CSS and AngularJS.
Consider the following pages such as:
1. Request Managing
2. Donor Sign In and Sign UP
3. Organization Sing In and Sign Up
4. History of Request Log
5. About the Website

These are included under header navigation bar which are controlled by angular controller. Each JavaScript functions are defined under the respective controller and invoked from respective HTML tag. HTTP GET and PUT request are defined in each function body whenever it is needed. Result is stored in an angular variable and passed to corresponding HTML. Common styling is done under style stag on top of each page .where as individual styling is done on corresponding tags. Bootstrap, Jquery and AngularJS are accessed online whenever is needed. Each html page is in views directory. Angular routing and controller are defines under js/ng

5.2 BACK END

Back end is running in Apache server with MySQL database. Backend scripting language used is PHP5.
That is backend script is distributed over three files:
1. api/index.php
2. api/includes/DbHandler.php
3. api/dbConnection.php

DbHandler contains the functions to query the database for respective purpose. Hence dbConnection.php contains authentication details to the database is invoked from DbHandler.php. DbHandler is working on NotORM framework which is used in order to avoid database injection and more abstraction to database from hackers. In this framework database is considered as an Object, querying is done not by injecting the value to the variable which is done in normal case. Here it is

done by replacing variable with the values hence outside party can't access the database without the permission.

The query result then passed to the API which invoked that DbHandler object which defined in api/index.php. Server side processing is done here. This is working on SLIM framework .which is a micro API framework normally designed to make application based on API much easier. After processing the data it is then passed to the client side where the request came from. As a whole this website work with the principle of AJAX that is we can make multiple HTTP request from client side even though previous request's response has not came.

This technology will enhance the user experience because each time only data is flowing to and fro from client to server and vice versa. Hence Web Page layout remains as it is once it is loaded; only the data will change. Hence this will save bandwidth as well as cost and delay will be less.

6. FUTURE WORK

1. Add signup via Google/Facebook to include features like :

    - Check validity of email.
    - Sending OTP to update password in case where the user forgets his current one and fails to login.
    - Notifications when a patient requests blood can be sent via email.

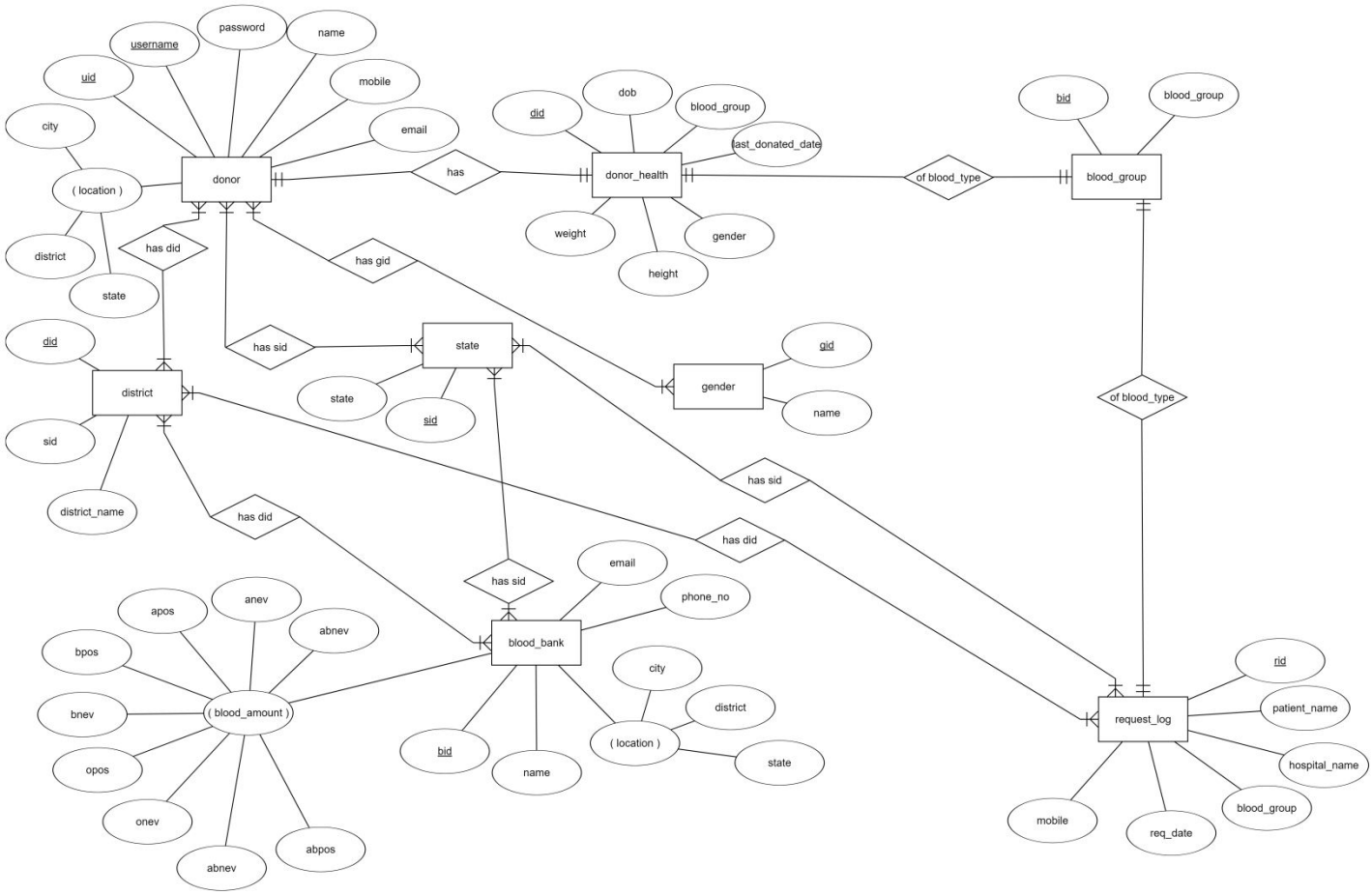
2. Design of an Android App to make location services more accurate by means of GPS.

    - If a donor registered at a particular area is out of station or unavailable at his prescribed region and a blood request is made at the region where he is, he will be able to donate blood to the patient regardless of his originally given address.
    - Updating of location by the donor is avoided in this case which not only saves the users time but also improves rate of blood donation universally.

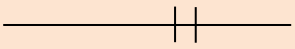
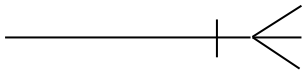
3. Including an API to send SMS messages or push notifications to the donor or organization in collaboration with Twilio , Way2SMS, etc.

7. E-R DIAGRAM

Tool Used: ERDplus



LEGEND:

Symbol	Meaning
	One-Mandatory
	Many-Mandatory

8. NORMALIZATION

The obtained relational schema upon decomposition of the E-R Diagram is as follows:

donor (did, username, password, name, city, district, state, mobile, email)

donor_health (did, dob, blood_group, height, weight, last_donated_date, gender)

request_log(pid, patient_name, hospital_name, blood_group, district, state)

state (state_id, name)

district (district_id, state_id, district_name)

blood_group (bid, blood_group)

gender (gid, gender)

First Normal Form (1NF):

Test: Relation should have no multivalued attributes or nested relations.

The above schema passes the test since there are no multivalued attributes or nested relation. Hence, the Schema is in 1NF.

Second Normal Form (2NF):

Test: For relations where primary key contains multiple attributes, no non-key attribute should be functionally dependent on a part of the primary key.

The above schema passes the test since the primary key in every relation consists of just a single attribute. Hence, the Schema is in 2NF.

Third Normal Form (3NF):

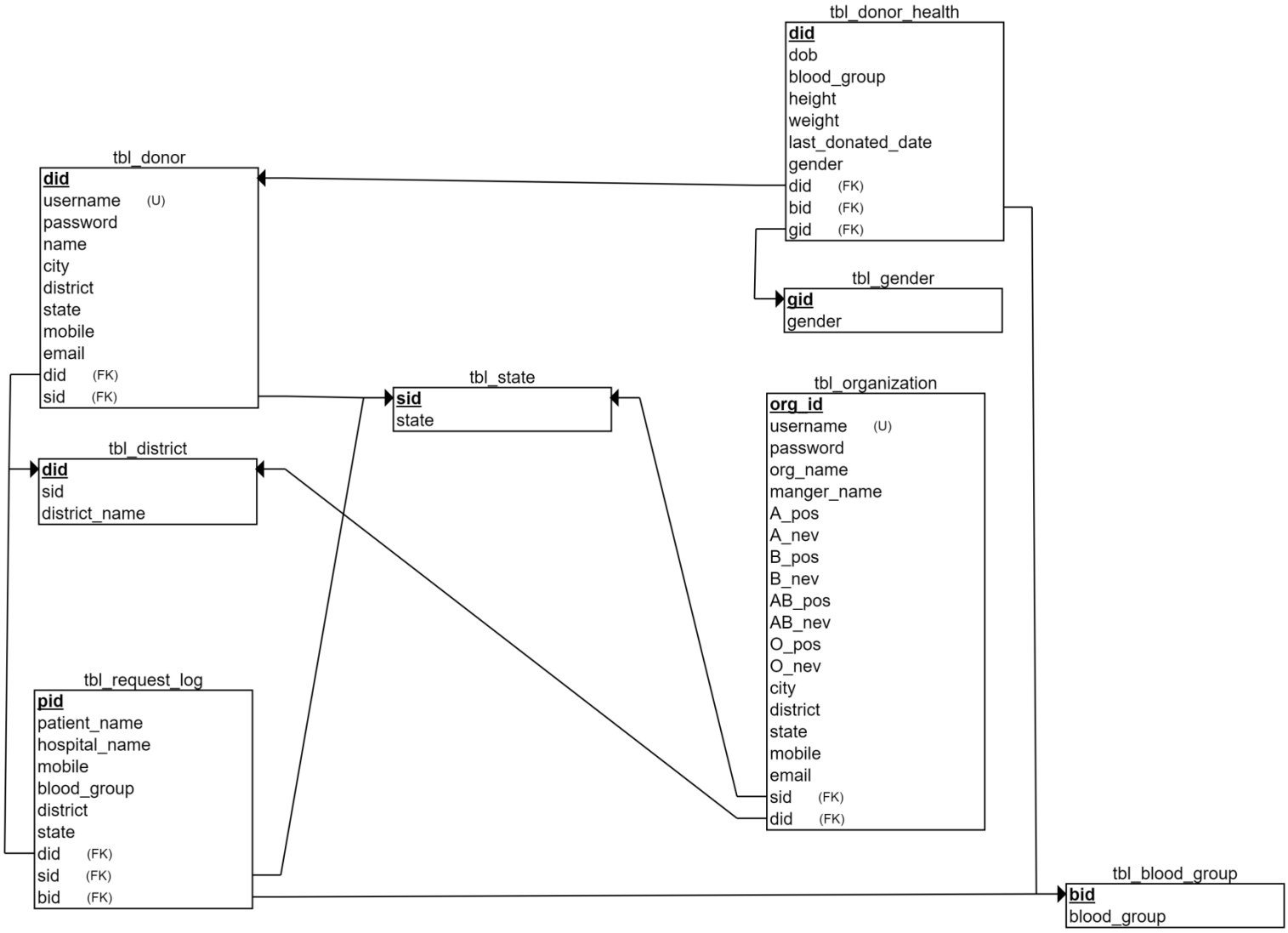
Test: Relation should not have a non-key attribute functionally determined by another non-key attribute (or by a set of non-key attributes) i.e. there should be no transitive dependency of a non-key attribute on the primary key.

The above schema passes the test since there are no transitive dependencies. Hence, the Schema is in 3NF.

Therefore, the initial relational schema obtained from the decomposition of the Entity-Relationship diagram is in Normal Form and can be considered to be following a good relational design. Hence no changes are necessary. The diagrammatic representation along with the foreign key relationships is shown below.

9. RELATIONAL SCHEMA

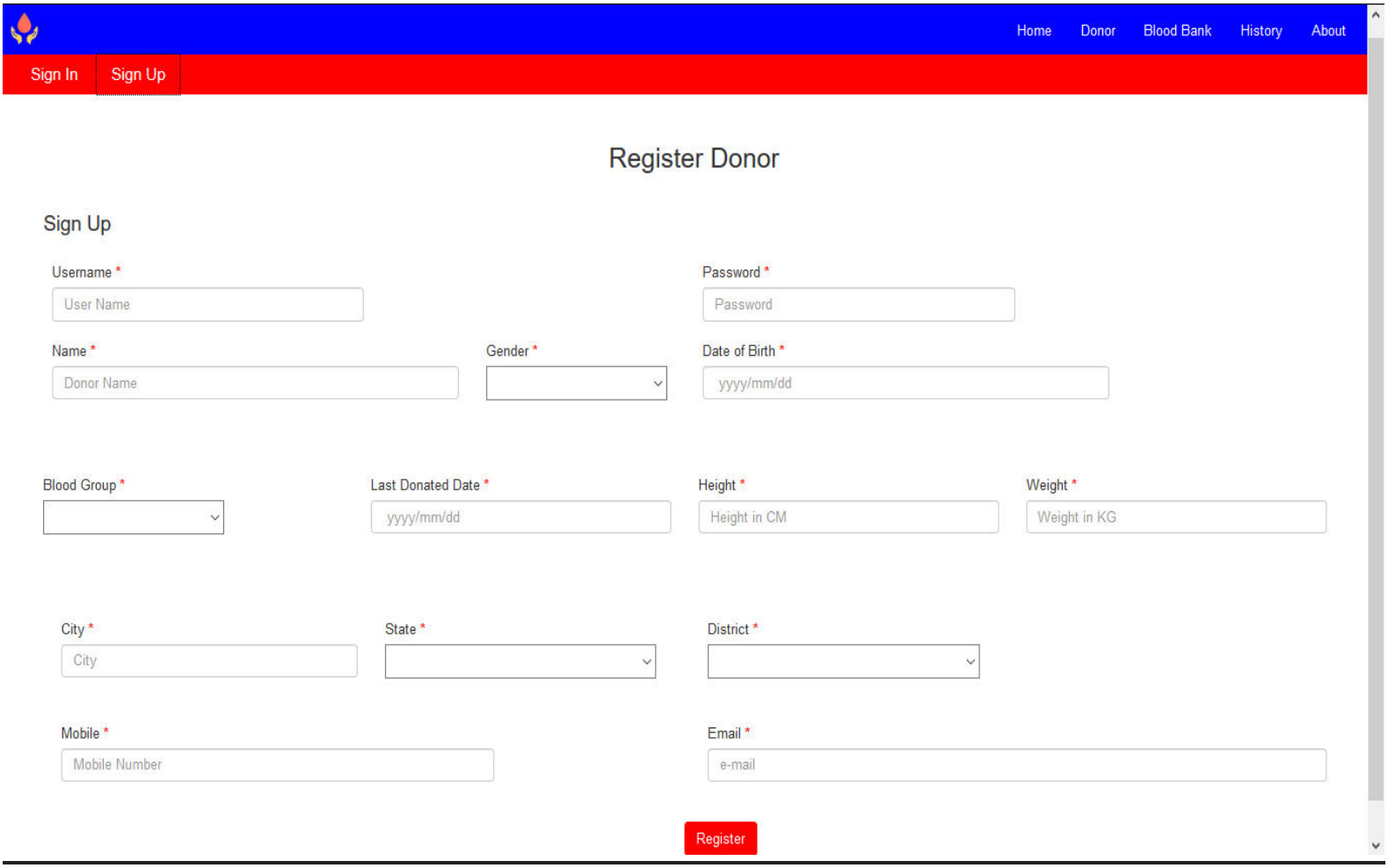
Tool Used: ERDplus



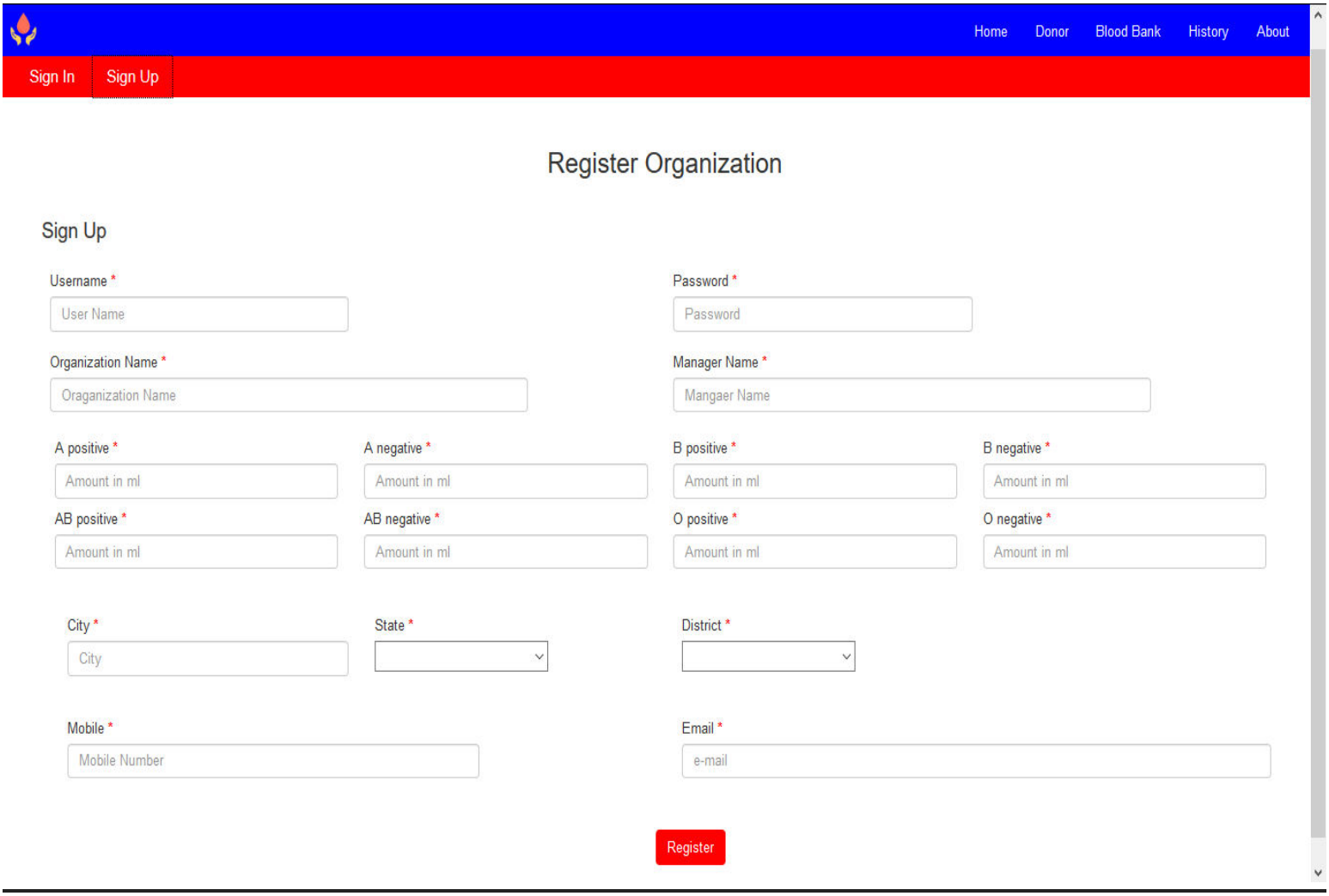
10. SCREENSHOTS

- Search Blood Availability (Home Screen)

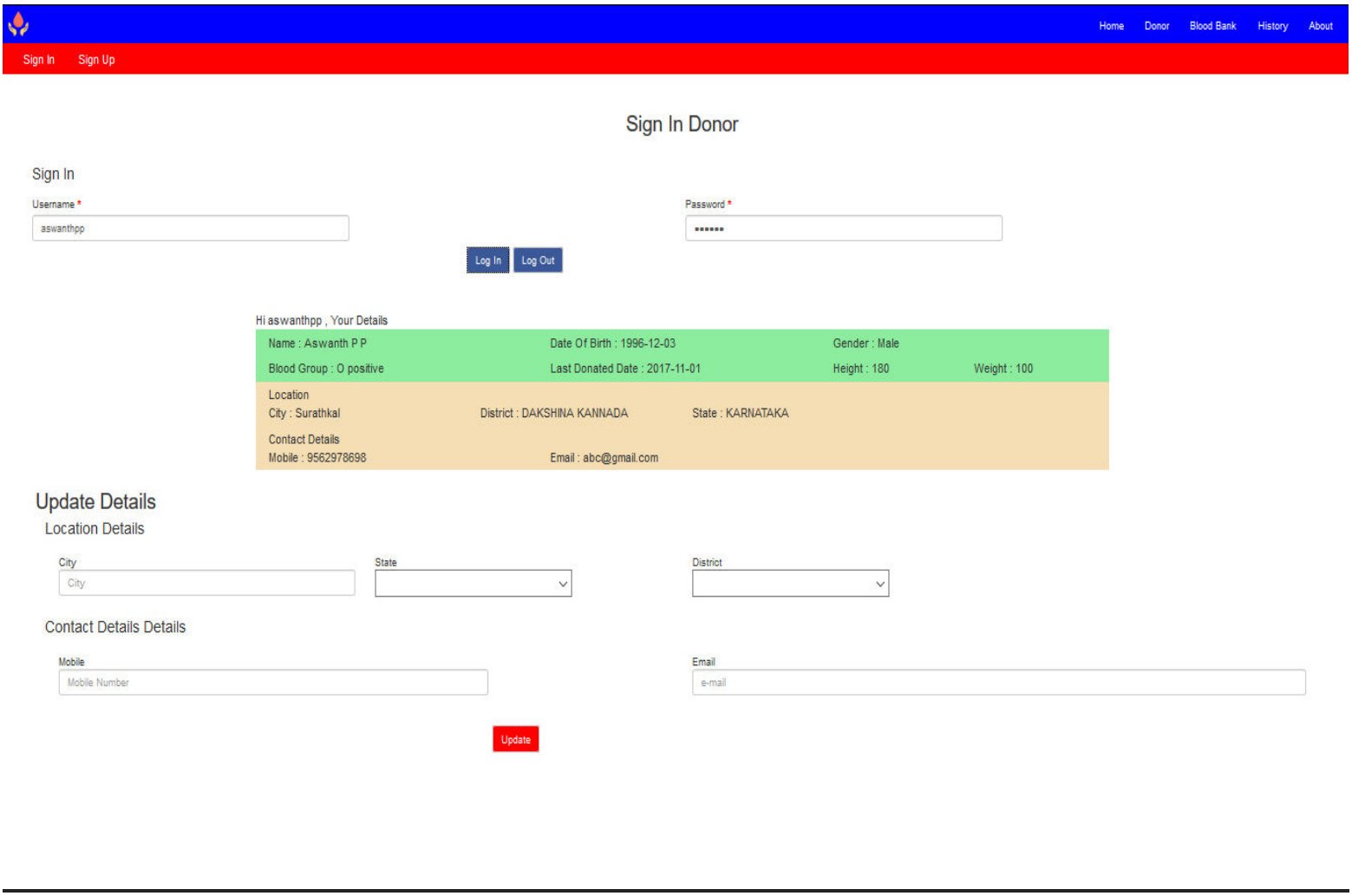
- Donor Registration



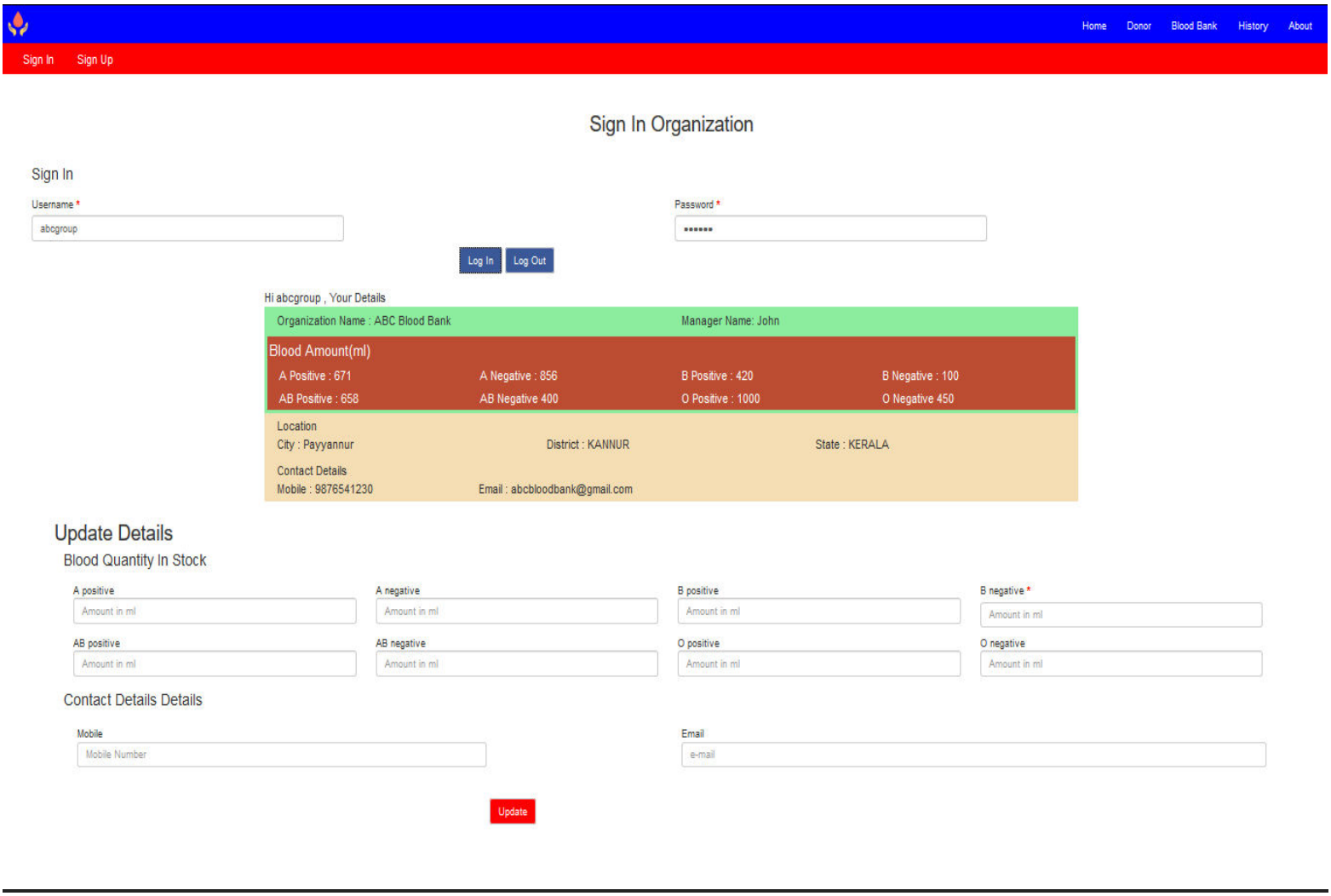
- Organization Registration



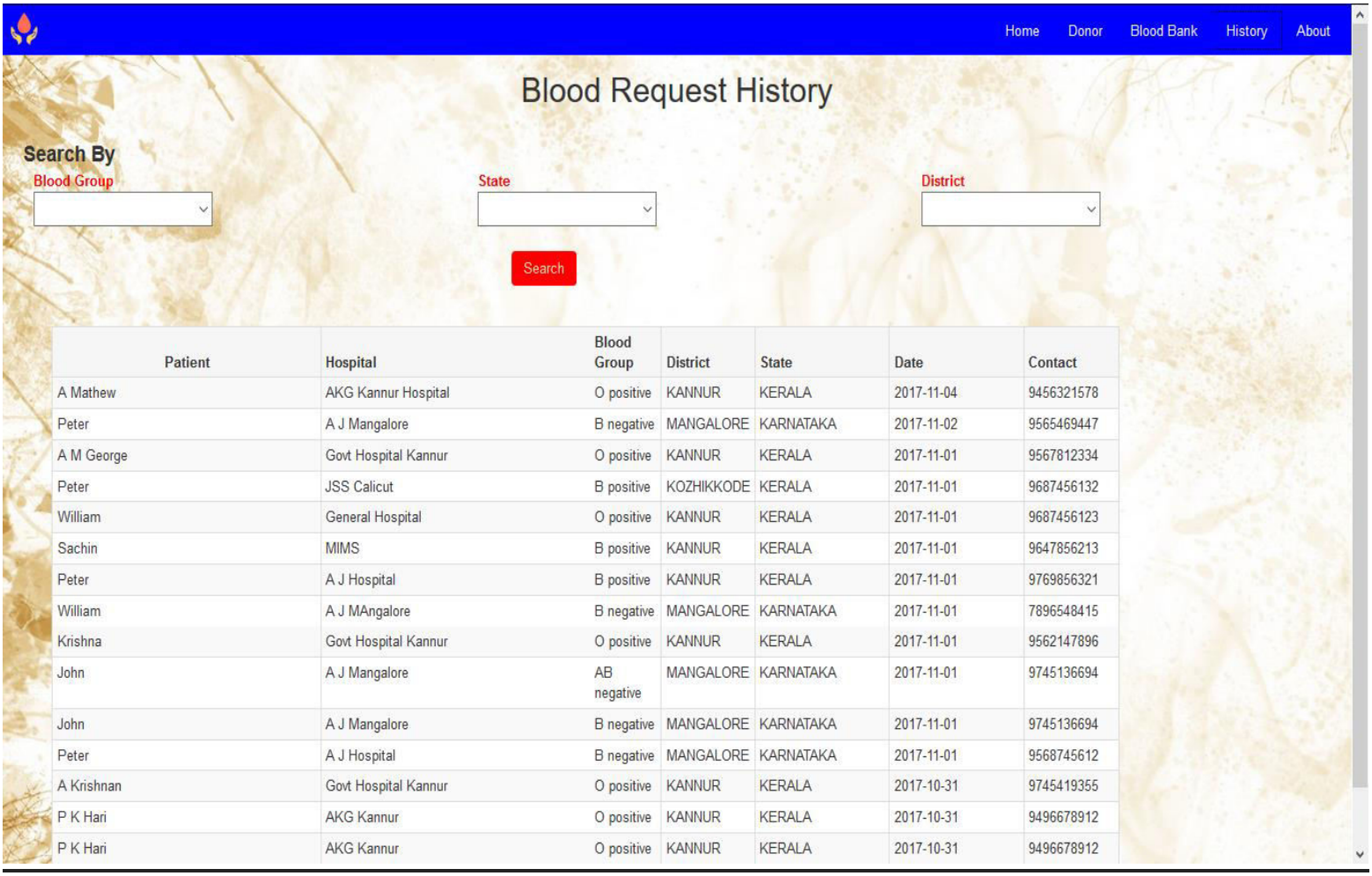
- Donor Sign In



- Organization Sign In

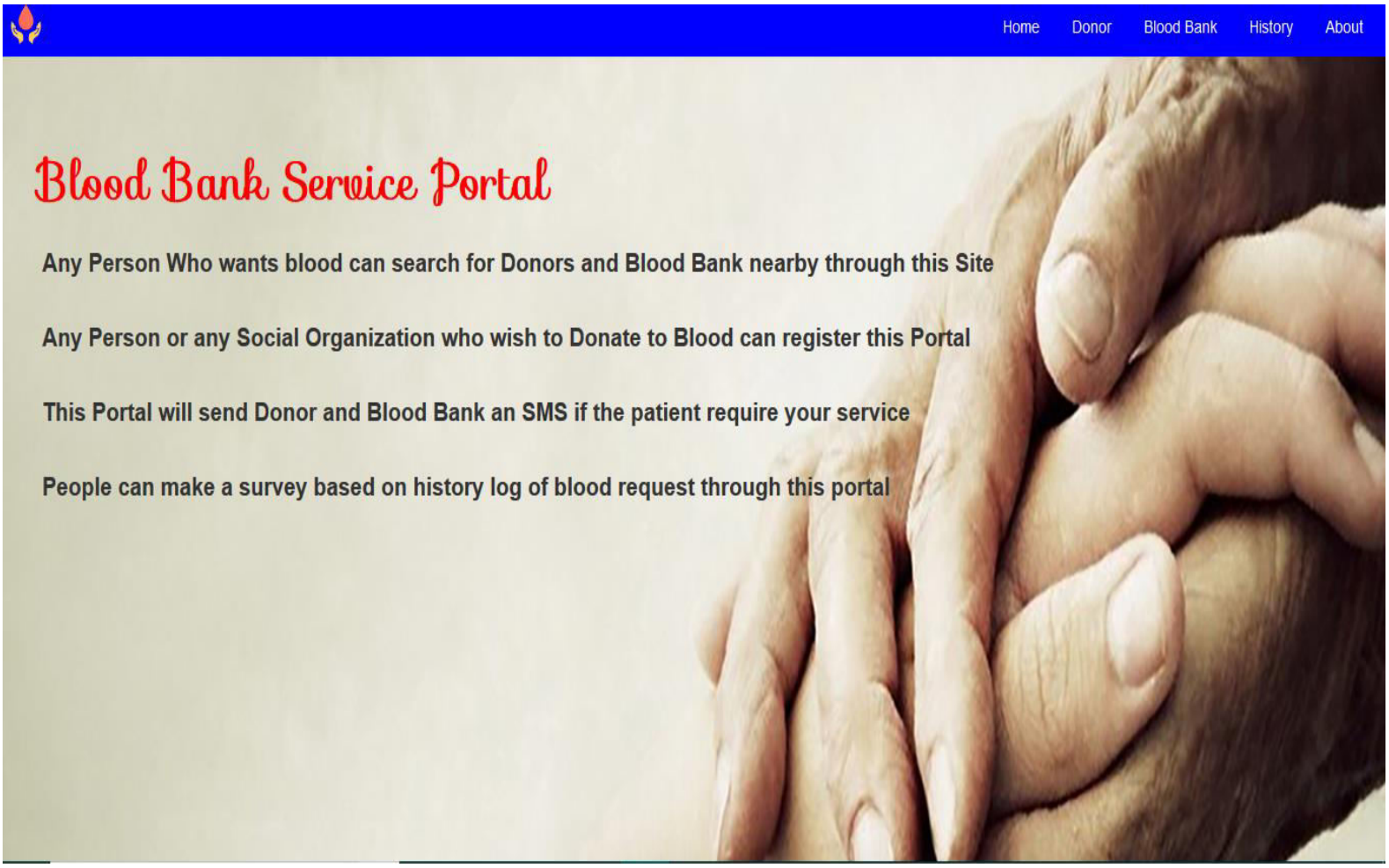


- Blood Request History



Patient	Hospital	Blood Group	District	State	Date	Contact
A Mathew	AKG Kannur Hospital	O positive	KANNUR	KERALA	2017-11-04	9456321578
Peter	A J Mangalore	B negative	MANGALORE	KARNATAKA	2017-11-02	9565469447
A M George	Govt Hospital Kannur	O positive	KANNUR	KERALA	2017-11-01	9567812334
Peter	JSS Calicut	B positive	KOZHIKKODE	KERALA	2017-11-01	9687456132
William	General Hospital	O positive	KANNUR	KERALA	2017-11-01	9687456123
Sachin	MIMS	B positive	KANNUR	KERALA	2017-11-01	9647856213
Peter	A J Hospital	B positive	KANNUR	KERALA	2017-11-01	9769856321
William	A J MAngalore	B negative	MANGALORE	KARNATAKA	2017-11-01	7896548415
Krishna	Govt Hospital Kannur	O positive	KANNUR	KERALA	2017-11-01	9562147896
John	A J Mangalore	AB negative	MANGALORE	KARNATAKA	2017-11-01	9745136694
John	A J Mangalore	B negative	MANGALORE	KARNATAKA	2017-11-01	9745136694
Peter	A J Hospital	B negative	MANGALORE	KARNATAKA	2017-11-01	9568745612
A Krishnan	Govt Hospital Kannur	O positive	KANNUR	KERALA	2017-10-31	9745419355
P K Hari	AKG Kannur	O positive	KANNUR	KERALA	2017-10-31	9496678912
P K Hari	AKG Kannur	O positive	KANNUR	KERALA	2017-10-31	9496678912

- About Page



11. SOURCE CODE

Given below is the **github link** to the Source Code.
https://github.com/aswanthpp/bloodBank_service_WebSite.git

- The "**views**" directory consists of the entire GUI.
- The front end client side processing has been implemented in **js/ng/blankController.js**
- Background scripts are in the "**api**" directory.
  - The server side processing has been done in **index.php**
  - MySQL queries are done in **api/includes/DbHandler.php**

12. CONCLUSION

Why Donate Blood?

- We don't need a special reason to give blood; you just need your own reason. Some of us give blood because we were asked by a friend. Some know that a family member or a friend might need blood someday and some believe it is the right thing to do.
- The major reason donors say they give blood is because "they help others".

So, whatever our reason might be, we know that the need for blood donation is constant and it is important to do as it can save not only one but many lives. The people's contribution is necessary for a healthy and reliable good supply.

For this we require not only a good heart, but also the means to do so. Thus, we felt the need to establish a free blood bank service portal.

The portal developed is very user-friendly to use and can be used by patients, donors and organizations as well and we were able to meet most of the requirements decided during the project proposal. After conducting all the required tests, we have concluded our portal to be fully efficient and sufficing all required conditions.

We hope to make the process of blood donation simple and fast as we can. Through this, we really hope to promote the noble task of blood donation and help save as many lives as we can.

"To the young and healthy there's no loss. To the sick it's a hope of life. Donate Blood to give back life."