

BLOOD DONATION SYSTEM FOR ONLINE USERS

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Abstract

Most of people desire to know about online blood donation to the patients at once. Patients want to get blood to live at emergency time. At present people are needed to know how to contact blood donors online. This system provides how to get blood at their serious time to be longer life time. Matcher system is implemented with Decision Tree and Decision Table by rules. This matcher applies the rules based on Blood Donation in Blood Bank in Myanmar. Information about donors and patients has been reserved in the system so that it is ready to donate blood instantly.

Keywords

Decision, Major, Matcher, Minor, Patient

1. Introduction

The development of a Blood Donation System depends on web-based application. System has web-based matcher which acts as server to match donors and patient pair compatibly by using rule-based knowledge. All Clinic System should have patient and donor information control matcher system. Nowadays, computers are the most useful for all fields; they can also stand for information distributing, catching, matching, etc. All doctors who are system's members can see donors' and patients' data and matching information. The health systems using web based application were aided human beings. In this system, blood matcher can help donors' and patients' to get the best matcher.

The establishment of web-based matcher for blood donation system is to encourage blood donor society. Current knowledge applications mainly focus on the discovery, creation, preservation, sharing and direct use of information. Web-based matcher is Web-based application by using knowledge rules, will help the cost of living and saving lives.

2. Background Theory

2.1. Web-based Application

A web application is any application that uses a web browser as a client. Web based applications make effectiveness for our organization to take good profit. Opportunities come up from Web based application that can be accessed the information from anywhere in the world. It is also providing user to save time and money and making the interactivity better with customers and partners. It permits the administrative plan for staff to be better working from any location. Moreover, users can find to meet their purposes in time and they proceed ultimate aims without wasting valuable things like energy, time, even clothes.

Issue area	
SYSTEM CONDITION SET	SYSTEM CONDITION SPACE
SYSTEM ACTION SET	SYSTEM ACTION SPACE

Figure 2. General Flow of a System's Decision Table

The decision table is divided into three main areas:

- System's Conditions
- System's Actions
- System's Rules

2.5.1. Decision Table Development for Example

There are five stages may be distinguished.

- Definition of conditions, condition states, actions and action states for the specific choice issue;
- Specification of the issue in terms of decision rules;
- Building of the decision table on the basis of the decision rules;
- Check for completeness, contradictions and correctness;
- Simplification, optimization and depiction of the decision table.

(a) Full table

C ₁	Y				N			
C ₂	Y		N		Y		N	
C ₃	Y	N	Y	N	Y	N	Y	N
A ₁	X	-	X	-	-	-	-	-
A ₂	-	X	-	X	-	X	-	X
A ₃	X	-	-	-	X	-	X	-
R	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆	R ₇	R ₈

(b) Table contraction

C ₁	Y				N	
C ₂	Y		N		-	
C ₃	Y	N	Y	N	Y	N
A ₁	X	-	X	-	-	-
A ₂	-	X	-	X	-	X
A ₃	X	-	-	-	X	-
R	R ₁	R ₂	R ₃	R ₄	R ₅	R ₆

(c) Row order optimization

C ₃	Y			N
C ₁	Y		N	-
C ₂	Y	N	-	-
A ₁	X	X	-	-
A ₂	-	-	-	X
A ₃	X	-	X	-
R	R ₁	R ₂	R ₃	R ₄

Figure 3. Optimization of a Decision Table using Two Different Transformations for Example

Yes/No questions

Conditions	RULES							
Car is in good condition	Y	Y	Y	Y	N	N	N	N
Its price is under \$7500	Y	Y	N	N	Y	Y	N	N
Its registration is current	Y	N	Y	N	Y	N	Y	N
Actions								
Purchase the car	X	X			X			
Reject the car			X	X		X	X	X

Possible outcomes

Y= Condition is true
N= Condition is false

X=This action matches the given rules

Figure 4. Decision Table for Purchase Car with Conditions for Example

1. Identify conditions and their alternative values.
 - o Gender's alternative values are: F and M.
 - o City dweller's alternative values are: Y and N.
 - o Age group's alternative values are: A, B, and C.

2. Compute max. number of rules.
 - o $2 \times 2 \times 3 = 12$.
 - o Rule 4 corresponds to M, N, and A. Rule 5 corresponds to F, Y, and B. Rule 6 corresponds to M, Y, and B and so on.

3. Identify possible actions
 - o Market product W, X, Y, or Z.

4. Match each of the actions to take given each rule.

Table 1. Decision Table with Possible Actions

	1	2	3	4	5	6	7	8	9	10	11	12
Gender	F	M	F	M	F	M	F	M	F	M	F	M
City	Y	Y	N	N	Y	Y	N	N	Y	Y	N	N
Age	A	A	A	A	B	B	B	B	C	C	C	C
MarketW	X				X				X			
MarketX	X		X									
MarketY								X				
MarketZ	X	X	X	X	X	X	X	X		X		X

5. Check that the actions given to each rule are correct.
6. Simplify the table.
 - o If so, remove those columns.
 - o In the example scenario, columns 2, 4, 6, 7, 10, and 12 have the same action. For rules 2, 6, and 10; the age group is a “don’t care”.

Table 2. Decision Table with Optimize Actions

	1	2	3	4	5	6	7	8	9	10
Gender	F	M	F	M	F	M	F	M	F	M
City	Y	Y	N	N	Y	N	N	Y	N	N
Age	A		A	A	B	B	B	C	C	C
MarketW	X				X			X		
MarketX	X		X							
MarketY							X			
MarketZ	X	X	X	X	X	X	X			X

3. Our System

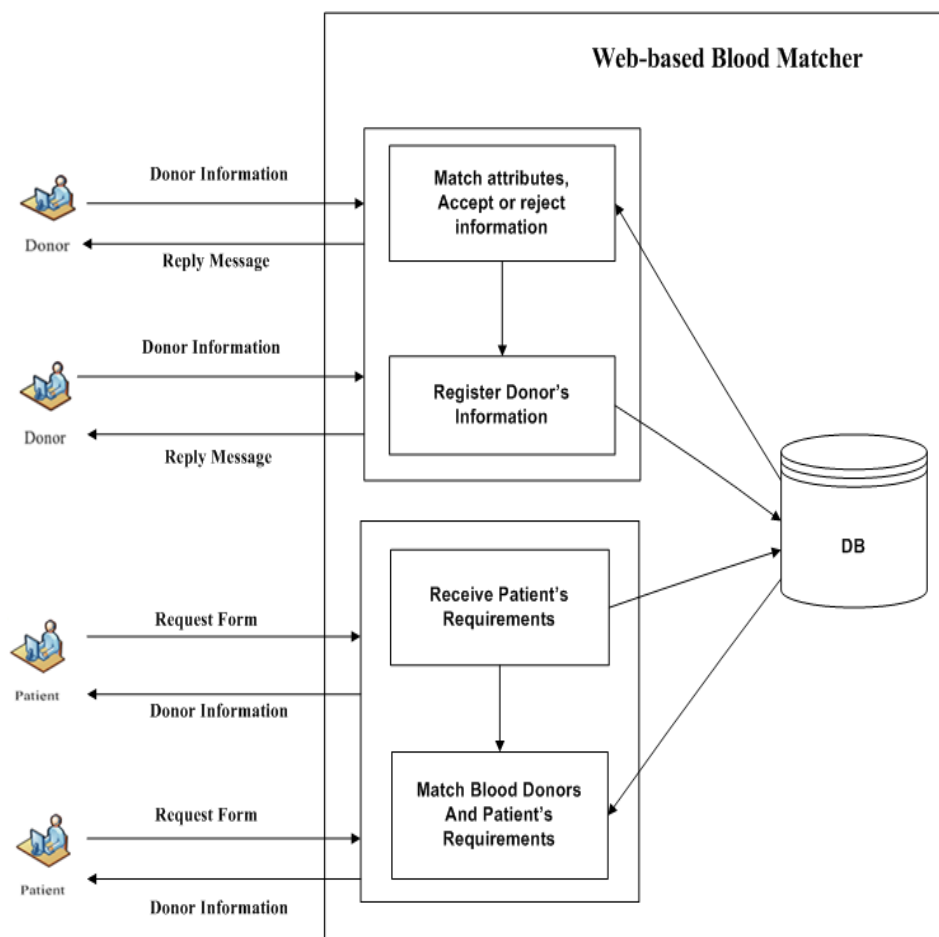


Figure 5. System Architecture of Blood Matcher

The system is designed to process as follows: two types of users are allowed in this system, the donor type and the patient type. For donor account, as input, the donor needs to enter the information needed for patient to inquire necessary blood. Then the matcher decided to accept the donation of donor or not by using their rules based knowledge.

The architecture for Blood Donation System is as shown in Figure 5. There are three main roles and three main processes. The three main roles are donor, patient and matcher. The three main processes are record the memberships of donors and patients, acquire to get the donor's purification blood and matching the patient with related donors. It needs main database for requirements like specific rules for donors. Main rules are divided into two classes in which man and woman. In donation for blood, specifications for man are not same for woman. The system has three level specifications like major, minor and serious. Patients can search on this page for their needs when they want the blood seriously.

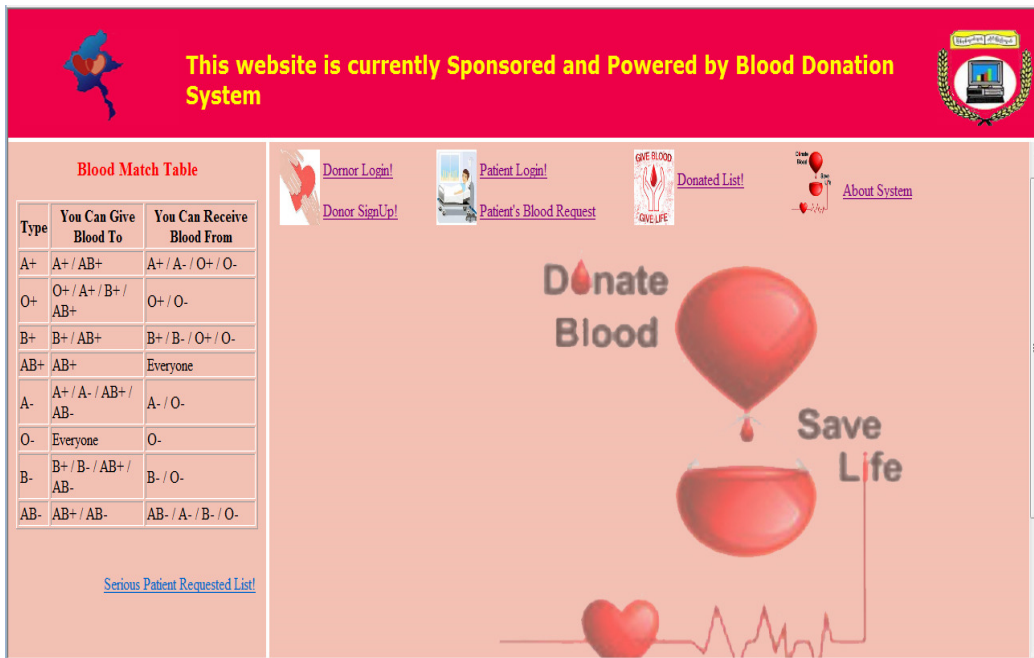


Figure 6. Home Page of the Blood Donation System

First of all, the system shows the home page Figure 6. The blood match table is shown on the left side of the page. And the right side of the page is included Donor Login!, Donor SignUp! for donors, Patient Login!, Patient Blood Request for patients, Donated List! , Home and About System for all.

Blood Match Table

Type	You Can Give Blood To	You Can Receive Blood From
A+	A+ / AB+	A+ / A- / O+ / O-
O+	O+ / A+ / B+ / AB+	O+ / O-
B+	B+ / AB+	B+ / B- / O+ / O-
AB+	AB+	Everyone
A-	A+ / A- / AB+ / AB-	A- / O-
O-	Everyone	O-
B-	B+ / B- / AB+ / AB-	B- / O-
AB-	AB+ / AB-	AB- / A- / B- / O-

[Serious Patient Requested List!](#)

Thu Thu Han

The Second Section's Major Facts of the Blood Donation System

No	Question	Answer
1	Donor between the ages of 18 and 55 and have a good level of general health will be able to donate blood?	<input checked="" type="radio"/> Yes <input type="radio"/> No
2	Your Haemoglobin is less than 12.5g/dL	<input type="radio"/> Yes <input checked="" type="radio"/> No
3	Have you had body weight lost in the last three month?	<input type="radio"/> Yes <input checked="" type="radio"/> No
4	Have you made blood or blood plasma transfusion in last year ?	<input type="radio"/> Yes <input checked="" type="radio"/> No
5	Have you often visited a doctor or dentist?	<input type="radio"/> Yes <input checked="" type="radio"/> No
6	Have you had a serious illness or major surgery in the past?	<input type="radio"/> Yes <input checked="" type="radio"/> No
7	Have you ever had malaria in the past 12 months?	<input type="radio"/> Yes <input checked="" type="radio"/> No
8	Have you traveled to a malaria risk area in the last year?	<input type="radio"/> Yes <input checked="" type="radio"/> No
9	Have you had a tattoo in the last four months?	<input type="radio"/> Yes <input checked="" type="radio"/> No
10	Have you had an ear piercing in the last four months?	<input type="radio"/> Yes <input checked="" type="radio"/> No
11	Have you had a body piercing in the last four months?	<input type="radio"/> Yes <input checked="" type="radio"/> No
12	Have you been treated for syphilis or gonorrhoea in the past 12 months?	<input type="radio"/> Yes <input checked="" type="radio"/> No
13	Have you had sexual activity with a male or female sex worker?	<input type="radio"/> Yes <input checked="" type="radio"/> No

Figure 7 (a). Major Facts Page

Blood Match Table

Type	You Can Give Blood To	You Can Receive Blood From
A+	A+ / AB+	A+ / A- / O+ / O-
O+	O+ / A+ / B+ / AB+	O+ / O-
B+	B+ / AB+	B+ / B- / O+ / O-
AB+	AB+	Everyone
A-	A+ / A- / AB+ / AB-	A- / O-
O-	Everyone	O-
B-	B+ / B- / AB+ / AB-	B- / O-
AB-	AB+ / AB-	AB- / A- / B- / O-

[Serious Patient Requested List!](#)

5	Have you often visited a doctor or dentist?	<input type="radio"/> Yes <input checked="" type="radio"/> No
6	Have you had a serious illness or major surgery in the past?	<input type="radio"/> Yes <input checked="" type="radio"/> No
7	Have you ever had malaria in the past 12 months?	<input type="radio"/> Yes <input checked="" type="radio"/> No
8	Have you traveled to a malaria risk area in the last year?	<input type="radio"/> Yes <input checked="" type="radio"/> No
9	Have you had a tattoo in the last four months?	<input type="radio"/> Yes <input checked="" type="radio"/> No
10	Have you had an ear piercing in the last four months?	<input type="radio"/> Yes <input checked="" type="radio"/> No
11	Have you had a body piercing in the last four months?	<input type="radio"/> Yes <input checked="" type="radio"/> No
12	Have you been treated for syphilis or gonorrhoea in the past 12 months?	<input type="radio"/> Yes <input checked="" type="radio"/> No
13	Have you had sexual activity with a male or female sex worker?	<input type="radio"/> Yes <input checked="" type="radio"/> No
14	Have you or your partner been a male or female sex worker?	<input type="radio"/> Yes <input checked="" type="radio"/> No

If you are a Woman, Please Answer Following Questions. If you are Man, you do not need to answer them.

No	Question	Answer
15	Are you breast feeding your child?	<input type="radio"/> Yes <input checked="" type="radio"/> No
16	Have you given birth or abortion in the last six months?	<input type="radio"/> Yes <input checked="" type="radio"/> No
17	Are you pregnant now?	<input type="radio"/> Yes <input checked="" type="radio"/> No

Figure 7(b). Major Facts Page with Woman Sections

The Major Facts acquisition woman case will be answered for blood donor is a woman. Therefore, the questions for the woman are no need to answer for a man. But a man who is a blood donor makes a mistake that he fills the questions for the woman blood donor. Then the system automatically understands and these answers will be taken as don't care condition and operate the acquisition action as shown in Figure 7(a) and 7 (b).

4. Conclusion

This system provides communication between the Blood Donors and Patients compatibly. Web-based matcher draws up acceptable Blood Donors information for Patient by using Knowledge-based Rules. Moreover, the Web-based system provides more suitable application for health care and life saving processes. This system can be extended to other welfare societies and health organizations.

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