LOCATION BASED BLOOD BANK USING CLOUD STORAGE

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ABSTRACT

Emergency situations, such as accidents, create an immediate, critical need for specific blood types. In addition to emergency requirements, advances in medicine have increased the need for blood in many on-going treatments and elective surgeries. Despite increasing requirements for blood, only about 5% of the Indian population donates blood.

In this paper we propose a new and efficient way to overcome such scenarios with our project. A large number of blood donors are attracted using an Android application. Cloud-based services can prove important in emergency blood delivery since they can enable central and immediate access to donors' data and location from anywhere and almost any device. Since almost everyone carries a mobile phone with him, it ensures instant location tracking and communication. Using GPS and nearest neighbour algorithm we find donors nearer to the location from where the request is generated.

Thus the Mobile Blood Bank can prove to be a boon for blood requesters.

ACM Keywords – Life and medical sciences, Information storage and retrieval, Cloud computing, Android.

Acronyms- *MBB-(Mobile Blood Bank), SBD-(SearchBlood Donor).*

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1. INTRODUCTION

Location Based Blood Mobile Blood Bank Using Cloud is basically a Cloud based solution for primary and emergency blood transfusion services. The main aim is to provide fast and efficient way to gain attention of potential donors in the need of hour.

MBB assists in the process of blood donation .It consists of an application which is present on the donors smart -phone, a website which acts as an interface for the users of the system and it also uses cloud for storing the donor's data.

The user's location will be detected using GPS. If there is need of blood, the donor with the required blood group is identified and notified of the requirement. The project includes algorithm which detects accurate location of the donors, identifies the donors who are available nearby to the location of requester and notifies them. If the identified donors are not available or not willing to donate blood at present then the scope of detection is increased. (This is done by increasing the scope of search).

Notifying the donor about the need of the blood is the most important task of the system

1.1. PROBLEM DEFINITION

In spite of the availability of the potential blood donors not more than 5% of the total Indian population donates blood.

Advancement in medical science has increased the blood demand. Also blood-donors usually don't come to know about the need for blood.

These reasons motivate us to develop a more efficient system that will assist the present blood donation system.

1.2. CONTRIBUTION

The objective of this project is to develop and deliver a new blood donation system. The system will efficiently eliminate all the problems from the present blood donation system. Most importantly the donors would come to know about the emergency situation. The system will accelerate the current process of blood donation.

2. RELATED WORK

Traditionally the blood requesters are dependent on hospitals and blood banks to fulfil their requirement. This makes the system slow and less efficient. Recently efforts are being made to automate this process. Some of the recent works in this field are given below-

2.1 VIRTUAL BLOOD BANK PROJECT [9]

The VBB project in India's National Capital Region of Delhi uses smart phones to build a pervasive network that gives people instantaneous information about available blood donors

in their vicinity. This is done using a simple java application and a website. This system uses the donors' residential address to locate them.

2.2 GIVE BLOOD WITH VZP

The 'Give Blood' android app is a fast and simple tool for anyone who already is a blood donor or wants to become one. The user can schedule blood donation appointments and check blood stock levels in hospitals. Blood stock levels are regularly updated and transfusion facilities can actively invite a donor to come and give blood.

2.3 EMERGENCY BLOOD BANK DIRECTORIES BY BLOODBANKER.COM

Emergency blood bank and plasma centre directory. Find a local place if you get hurt and need blood. This is also an android application with a website.

However none of these systems track the current location of the donor neither they are cloud based.

3. SYSTEM DESIGN

3.1. MATHEMATICAL MODEL

Let us consider S as a system for assisting blood donation (i.e. Location based blood bank using cloud storage.)

S= {D, R, Rq, f (), loc (), near (), notify (), alert}

It consists of following sets.

INPUT:

1. D= $\{d_1, d_2, d_3 \ldots\}$; set of all the registered donors.

   $\forall$ d_i where $1 <= i <= n$

Name	Phone no.	Address	Gender	DOB	Height	Weight	Allergies	Diadetes	BP

2. R= $\{R_1, R_2, R_3, \ldots. | R \in H \text{ or } R \in BB\}$

   where

   H= $\{h_1, h_2, h_3, \ldots.\}$; set of all the registered hospitals.

   BB= $\{bb_1, bb_2, bb_3, \ldots\}$; set of all the registered Blood banks.

   $\forall$ r_i where $1<=i<=n$

Registration no.	Name	Address	Phone no.	Blood availability

3. Rq= {rq_1, rq_2, rq_3, ….}; set of all blood requests generated
   ~~V~~ Rq_i where 1<=i<=n

Blood group	Request address	Request ID	Emergency level

4. f(Rq)= D'; f is a function to identify donors to be notified
   D'= {d_i | loc (d_i) is nearby loc (rq_i) AND blood_group (d_i) = blood_group (rq_i)}

5. loc (d_i)= {latitude, longitude}
6. near (rq_i)= { minimum(loc (rq_i) - loc (d_i)}
7. notify(d_i)= alert
8. alert= {SMS, call, flash message, alarm}
9. D"= {D' who are actually notified}
   Success is- D"= D
   Failure is- D' ∩D" = ϕ
   Hence final S will comprise of:
   S= {D, R, Rq, f (), loc (), near (), notify (), alert}

3.2. FRAMEWORK

A. REGISTRATION

The interested blood donors will be registered in the system. If any hospital or blood bank intends to use MBB, it has to first get registered into the system.

Also, it can be used for authentication of the existing users who intend to use the system.

B.MOBILE APPLICATION

A Mobile Application developed in ANDROID will be installed on the donors smart phone once he is registered into the system The application provides an interface to the user so as to enable him/her to be a part of the system. It also provides the following functionalities.

1. Location detection and updation.
2. Blood donor's status(willingness)
3. Notification of the request.

A. REQUEST GENERATION

The request for blood is to be done using the website of MBB. The user has to go to the website and make a request through the GUI provided. The request for blood can be done by the registered hospital or a blood bank.

Thus, after the verification of the requester, its request will be accepted by the system.

B. LOCATION DETECTION

Retrieval of user's location will be done using GPS. With the help of this information the system will identify the nearest location of the required donor (blood group).The identification of the user will be made with the help of the data available and the information from the requester. Accurate and quick detection of donor's location is of high priority

C. NOTIFICATION

Once a valid (blood group, medical requirements) donor is identified and detected, he/she is notified about the need of the blood. The notification is done by a flash message, SMS or call. After notification the donor is expected to come at the required location for donating blood.

3.3. ARCHITECTURAL DIAGRAM

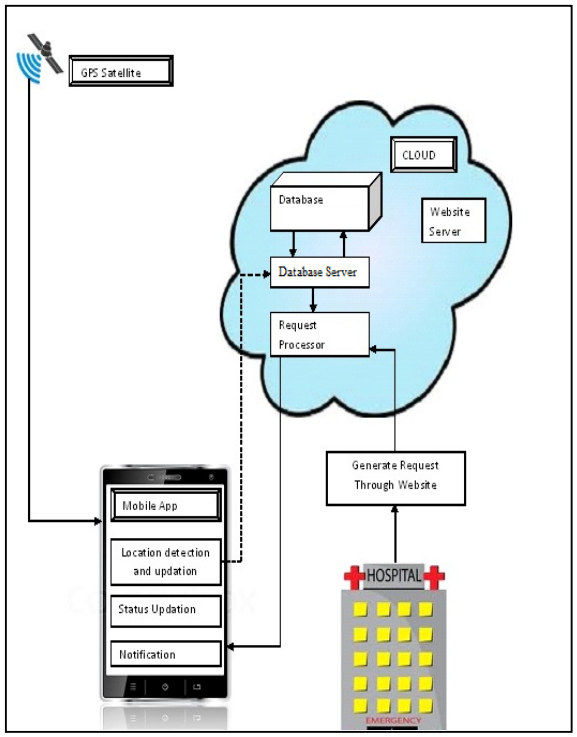

Figure 1. ARCHITECTURE OF MBB

Figure 1. Shows the overview of the system architecture. It can be described as:

GPS satellite: The donor's smart phone requests for its current location from the GPS satellite location. In turn the GPS satellite returns the location. This helps in tracking the user's current location.

Mobile Application: The application provides an interface to the user so as to enable him/her to be a part of the system. It also provides the following functionalities.

- Location detection and updation: The donors' location is detected and updated in the cloud after encryption.
- Status updation: The user's willingness to donate blood at present is updated as yes or no.
- Notification: The donor is notified of the need for blood.

Cloud: Cloud is used for maintaining data of the users of the system.

The Database server includes all the information about the donor as well as the requester. On request for blood, the request processor manager fires a query to the database server. After this the required information is provided to the request manager.

Apart from this the web server is also maintained on the cloud.

Requester: The requester i.e. the hospital or blood bank can request for blood via the website. The website acts as an interface between the requester and the system

3. IMPLEMENTATION AND RESULT

The android application is developed in eclipse. The MBB website is developed on cloud. For this purpose SALESFORCE cloud is used. The entire server side logic in implemented in apex language and visualforce pages are used to display the webpages.

The donors are detected using the SBD algorithm by searching the nearest one from the location of the request.

As a result of this system the donors who are nearer to the location of request are searched and a notification is send to all these donors. The donors who acknowledge the notification are shown to the requester.

4. CONCLUSION

Thus, working on the lines of traditional blood bank system, using the latest technology we have presented a framework of Mobile Blood Bank (MBB) based on cloud storage. We have also provided the mathematical model and system architecture for the same. The implementation and results of the system are also explained.

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