

Smart Blood Bank Based On IoT: A Review

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Abstract - The unit which administers and controls the requisition and dispatching of the blood is termed as blood bank. The main objective of the blood bank is to provide the blood to the patients with minimal blood transfusion error. Blood is very important medical supplies, so it has to be managed well. As the blood bank management consist of the number of manual steps, hence it becomes difficult for the blood banks to provide a high level of accuracy, reliability and automation in blood storage as well as transfusion process. The proposed system will improve the management and response time of the blood bank by connecting all the blood banks to the cloud storage.

Keywords: Blood bank, blood transfusion, medical supplies, blood storage, cloud storage.

1. INTRODUCTION

Blood is a very important entity in the medical field. There is need of blood for different types of illnesses; the blood is collected from the voluntary donors. Blood or the components of blood are used to treat patients with medical conditions such as anaemia, cancer, blood disorders, and those having surgery. Hence, the blood cannot be evaluated in terms of the cost. Blood is having a moderate life span of about 45 days within prescribed duration have to be brought in use. Consequently, blood is known to be the most critical element for human life referred as “river of life” so the blood must be managed well to minimize the blood losses.

There are four types of blood groups. The blood comprised of the several components such as plasma, platelets etc., depending upon the different diseases the different type of blood components are given to the patient. Each of these can be used to treat many different conditions. Among four blood group as A,B,AB and O , the blood group ‘O’ is known as universal Donor because it can be transfused to any person with any Blood group , and the AB blood group is known as the universal acceptor. The blood can be stored for a limited period of time hence it requires steady and constant collection.

In India, for every two second, some person requires the blood transfusion. Therefore, the blood unit required for a year is near about 5 crores but among that only 2.5 crore units of blood merely would available for the same. Any healthy adult with a minimum weight of 45KG can donate the blood. Among the total population of India near about 38 thousand blood donation required every day. But due to improper management in last 5 years, there was wastage of 28lakh units of blood. Therefore, it is necessary to have proper work in the blood bank for minimizing the wastage of blood.

The blood bank plays very important role in the blood supply chain hence their major responsibility is to supply blood to meet the rising demand from the hospitals. The distribution of blood in the correct amount at the correct time to the correct destination is key to an efficient management of blood supply system. Therefore it is necessary that blood bank must have a proper administration to minimize blood transfusion area and blood wastage.

2. LITERATURE REVIEW

Blood bank system refers to the process of collecting, separating, and storing the blood, which will later use in blood transfusion process. Blood transfusion is very common; this procedure is used for people of all ages. Many people who have surgery need blood transfusions because blood loses during their operations. For example, during heart surgery, one third of the patients have a transfusion. The people who have serious injuries such as from car crashes, war, or natural disasters need blood transfusions to replace blood lost during the injury. It may come as a surprise that due to adequate management practices thousands of liter of blood get wasted every day across the country, therefore, there is need of adoption some of the best technique for the blood bank. So the adoption of IoT can also become beneficially for the blood bank to improve the management system the blood banks. Many authors confirmed about the beneficiary of Blood Bank management system, therefore many researchers have developed for the blood bank management some of them summarized below.

The author [1] proposed short message services based blood bank system, it consists of two module as data processing module and packet account module. The data processing module responds the user request and the packet count module checks the availability of the blood samples. The user can communicate with the system via SMS whenever in

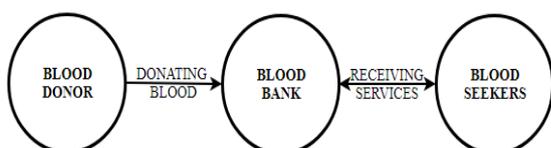


Figure: 1. Block Diagram of Blood Bank Management System

person required blood then that person has to send a request to the system via SMS. Then the system will respond to these request and send SMS consisting the address of blood bank which having availability of the bloodstock. If the bloodstock is not available in such case the donor's contact number will be sent to the patient. All the working of the system is conducted using Raspberry Pi board.

Author [2] describes the system based on the RFID and ubiquitous sensor network. The system helps to ensure the error-free blood transfusion process. This system is developed and demonstrated for the continuous report of blood packet temperature and track the location of blood bags. The LTS unit of the system a useful way to track the location of moving blood banks and time required of the medical staff was reduced. This system makes managing blood bags simple and reliable.

Authors [5] developed the system used for the effective management of blood bank based on the RFID. The system reduces the number of transfusion error the system by continuous track the inventory status of the blood bank in real time and has crossed checks at a various location to ensure correct blood transfusion process. The system becomes more efficient because the read time of RFID (0.001s) is far greater compared with barcodes (1s).

In Literature [4] the system provides direct call routing technique using the asterisk hardware. The Asterisk software is covert normal computer into the communication server. The blood bank consist database which will maintain in Centre server, whenever any blood seeker made a call on the toll-free number then blood seeker will get connected to blood donor call then the detail about the blood seeker will send to the donor on his mobile. If the call is not connected to 1st donor then the call has been connected to another donor. After accepting the request for blood donation, the donor name gets removed from the donor list for next 56 days.

The author [3] developed a website which consists information related to the blood stock of given specific area. It uses .PHP for designing a website and also uses my SQL for storage of database. When any hospital requires the blood then that hospital required to fill the data on the blood bank website then according to the required blood group the website will display the amount of blood stock available at the different blood banks within a specific Geographic area. Then the hospital has to send a request to the blood bank for the blood, the blood bank will give them replies for providing the blood. The main objective of the system is improving the efficiency of data communication within the supply chain to reduce response time for each demand request.

In literature [6] an application is developed for finding the blood donation for making a request for the blood. Any bloodseeker would login to the given application then using GIS the patient will get detail about the nearest blood donor. Also, any blood donor can add themselves for donating the

blood then he will receive the notification related to the blood camp.

3. METHODOLOGY

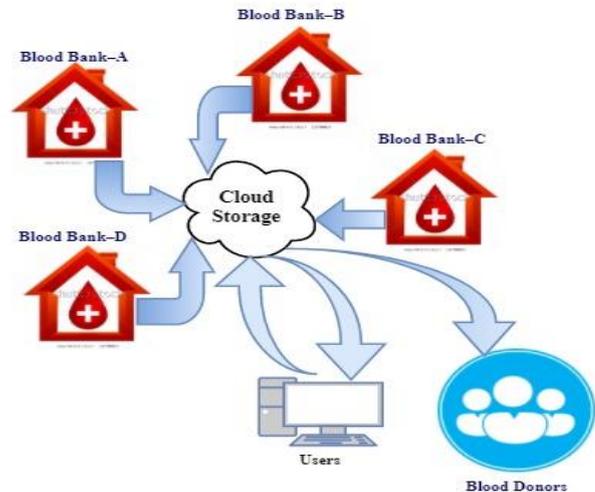


Figure: 2. System Overview of Smart Blood Bank

In this paper, all the blood banks are connected to the cloud storage. The cloud storage provides the real-time information related to the available blood stock in every blood bank. If the blood is out of stock then in such case the system will provide the contact details of the blood donors of different blood groups.

4. CONCLUSIONS AND FUTURE SCOPE

In this paper, we have studied the trends related to the blood bank in the past years that has changed and is still changing. Most of the researches were done on the blood banks and its managements. The use of IoT will become beneficially for the bank for the management system the blood banks.

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