

IOT Based Smart Blood Bank Data Management System Using Wi-Fi

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Abstract- *Blood Donation and Blood Transfusion Services are crucial for saving people's lives. Blood banks suffer frequent shortage of blood and Transfusion safety so We are proposing a paper "IOT Based smart blood bank data management system using WI-FI" This system uses Wi-Fi based smart bud vase and smart tag to provide transfusion safety and web applications which allows the user to search blood bag details to get the specific blood group based on their availability, in a short period of time. In this smart tag is attached with the blood bags. This tag is used to communicate the blood identity as well as donor information. The smart bud vase has smart tag reader reads information which stored in smart tag and sends to web server through Wi-Fi.*

Keywords- Smart tag, Tag reader, Wireless communication protocol, Web applications and Cloud server.

I. INTRODUCTION

In many different cases, such as accidents, there could be an urgent need for specific blood type. As compared to the ratio of requirement of the blood very less amount of individuals donate the blood, hence the need of the blood increases. Blood donation and Blood Transfusion Service are crucial for saving people's lives. Blood banks suffer frequent storage of blood. Hence advertisements are frequently seen on social networks urging healthy individuals to donate blood for patients who urgently require transfusion. The smart blood bank is a web application which allows the user to search blood bag details to get the specific blood group based on their availability, in a short period of time. This application will not only display the blood bag details but also facilitated with identification of the blood donors along with their information. The smart tag is introduced in the system which is attached with the blood bags. This tag is used to communicate the blood identify as well as donor information through wireless communication protocol. Cloud based services are proved very vital in urgent blood delivery as they care able to central and immediate access to donor's data and blood availability and blood bag's location in the blood bank.

II. LITERATURE REVIEW

A. A Smart blood Bag management System Using a Load

Integrated U-Shaped Near Field RFID Antenna Array Paper presented by Min-Gyo Jeong and Wang-Sang Lee student member of IEEE. It can be used to manage blood bags and to prevent mishandling of blood transfusions.

B. Blood Bank App Using Raspberry PI

Paper presented by S.Pohandulkar and S.Khandelwal in the year 2018 is based on Raspberry PI. It proposes a communication between blood bank and recipient with the help of GSM.

C. Automated Blood bank System Using Raspberry PI

Paper presented by Ashlesha C.Adsul, V.K.Bhosale and Dr.R.M.Autee based on android application. This system aim is fulfill the needed blood requirement by using android application and raspberry pi.

III. PROPOSED SYSTEM

This paper consists of smart tag, tag reader, Arduino Uno microcontroller, and Data base server system and power supply unit. The blood donor information along with the tag attached to their blood bag is stored in this system at the time of blood donation. When the smart card read by using the smart card reader it will obtain the blood bag and donor details. This increases the search efficiency of the system. Each time the availability of the blood will be updated to the server through Wi-Fi network. This system also indicates the arrangements of the blood bag are placed in different array then the buzzer will produce the sound for misallocation of the blood bag.

a) Array

In this paper, array is an arrangement of blood bags. These arrays are separated by the blood groups. Each array has an individual smart card reader.

b) Smart card reader

Smart card reader is a RFID card reader. It can be used to collect details from the RFID tag. The tag can transfer data to a reader by the help of Radio waves. In this paper the smart card reader is fixed at top of the each array. The blood bag is entering the array the reader will automatically detect the blood bag tag to collect the blood information. Each smart card reader is separated by the blood groups. Output of the smart card reader is connected to the Arduino Uno microcontroller.



c) Arduino Uno

Arduino Uno is an open-source microcontroller board. It is based on the microchip 8-bit ATmega328P microcontroller. It can operate at 5V. It includes other components such as serial communication, crystal oscillator, voltage regulator, etc. to support the microcontroller. It has 14 digital I/O pins (0-13) and 6 analog input pins (A0-A5).

In this digital 14 I/O pins out of which 6 can be used as Pulse Width Modulation (PWM) outputs. It can be used to communicate with another Arduino board or other microcontrollers, computer. Arduino IDE is required to program this board. Its major advantage is that we connect the board to the computer via a USB cable which does a dual purpose of supplying power and acting as a serial port to interface the Arduino and the computer.

It also can be powered by a 9V-12V AC to DC adapter. It is a SRAM memory type. "Uno" Means one in Italian. Clock speed of this board is 16 MHz and weight is 25 g.



The Arduino Uno has only 32K bytes of non-volatile storage and 2K bytes of SRAM. EEPROM is lasting storage similar to a hard drive in computers. It can be read, easily erased and re-written electronically.

The smart card readers are connected to the Arduino board through the interfacing unit. It receives the data from smart card reader and it will store. Then the blood donor information is shared to the webserver through the Arduino transmitter. Suppose the blood bag is placed in wrong place it sends the signal to the buzzer, then the buzzer automatically ON. This board also calculates the number of blood bags in the array by the data from the smart card reader. This information also updated to the server immediately.

d) Web Server

Web server is like a computer. It can be runs websites. Major roll of the web server is store, process and deliver web pages to the recipients or users. The communication between recipient and server is done using Hyper Text Transfer Protocol (HTTP). In this system the Arduino Uno will send the data to the web server through the Wi-Fi module. That web server only stores the blood bag information and blood bank location. It is useful to know the blood availability in the blood bank at critical situation. These data's are display at the computer or smart phones by entering that web page. It can have a particular password and user name. put this information in that webpage we can easily see that information through the internet.

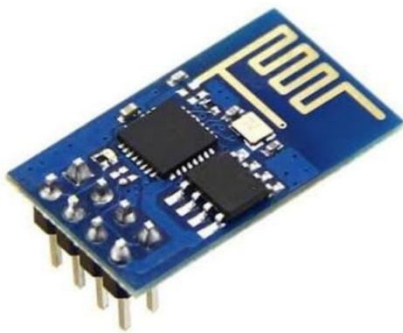
e) Buzzer

Buzzer is a piece of equipment that makes a buzzing sound. It is an audio signaling device. It has two pins. One is power pin and another one is ground pin. When the bloodbag is placed in wrong the buzzer will make a sound by the signal from the Arduino controller.



f) Wi-Fi Module

Wi-Fi Module is a wireless Module. It can be uses radio waves to provide wireless high speed internet and network connections. Short form of Wi-Fi is “Wireless Fidelity”. Wi-Fi is simply a trademarked phrase. In this system Wi-Fi is used to connect the web server to the computer or smart phones. Range of this Wi-Fi is 20m to 150 m.



g) Personal computer or Smart device

In this paper the computer or smart device is used for display the details about the blood bank. It will show the availability of blood at emergency. And also show a notification when the blood bag is takes wrong place.

IV. DESIGN AND IMPLEMENTATION

Transmitter unit

The transmitter unit consists of smart tag, reader, Arduino Uno microcontroller, Wi-Fi module and +5V power supply unit. The smart tag communicates the blood id and it scanned by the reader in the frequency range of 125 Kilo hertz. The ID shows the information about the blood donor. The output of the reader is applied to the input of the controller. The controller is used to transmit the information about the tag to Wi-Fi module. The reader fixed top of the bud vase. The bud vase consists of different arrays for arranging the blood bags based on their groups. The smart card reader is fixed in each array for identifying the bag group’s allocation. The smart card reader acts both send the blood donor information and identify the blood group. The controller activates the buzzer when the bag is entered in wrong place.

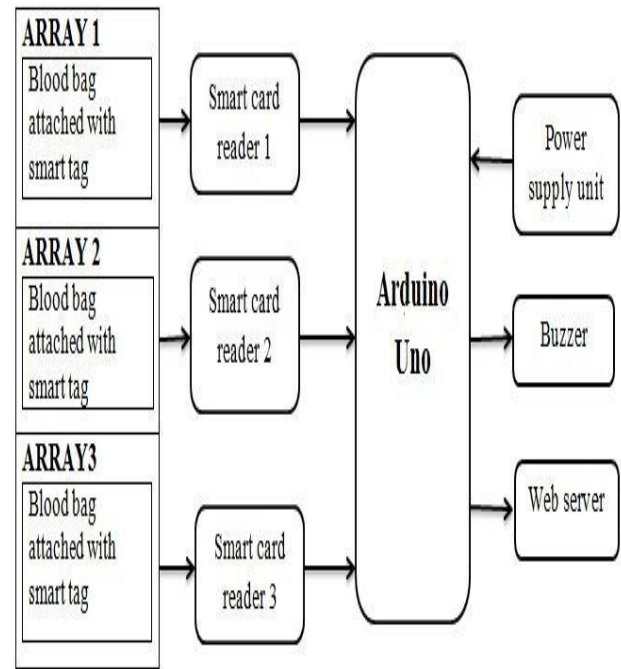


Fig 1: The functional block diagram of transmitter.

Receiver unit

The receiver unit may be a personal computer or any smart device such as mobile phone or laptop. The device must have Wi-Fi support for receiving the signal from transmitter. The output results can be viewed by using web browser.

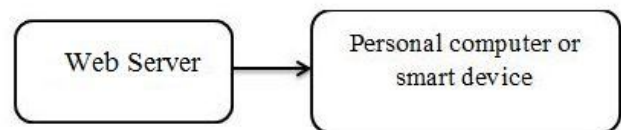


Fig 2: The functional block diagram of receiver.

V. CONCLUSION

Blood is one of the most important parts in human body. This paper is successfully designed by using smart communication with Arduino controller for accessing the blood units immediately and identifying the exact location of the blood bank location. In this paper mainly concentrate about to prevent the mishandling of blood.

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