IOT Based Blood Bank Services

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Abstract – IOT based Blood Bank is an associate work that brings voluntary blood donors and those in need of blood on to a common platform. The mission is to complete every blood request in the country with a promise android application and motivated individuals who are willing to donate blood. Donor will be provoked to enter a person's points of interest, similar to name, telephone number, and blood gathering. In the earnest time of a blood prerequisite, you can rapidly check for blood donation centers or healing centers coordinating a specific or related blood gathering and contact them through the App. Blood donation center App gives rundown of blood donation centers in your general vicinity. An expansive number of blood givers are pulled in utilizing an Android application. Since practically everybody conveys a cell phone with him, it guarantees moment area following and correspondence. Just an enlisted individual, with ability to give blood, will have the capacity to get to the administration. In this application we are utilizing the IOT innovation that will be utilized far and wide to the blood donation center. The system has been implemented and tested using the Raspberry Pi 3 board, HTML language.

Index Terms – Raspberry Pi, HTML.

1. INTRODUCTION

Every year the nation requires about 4 Crore units of blood, out of which only a meager 40 Lakh units of blood are available. There are multiple blood banks around the world, however none of them offer the capability for a direct contact between the donor and recipient. This project aims to beat this communication barrier by providing an immediate link between the donor and therefore the recipient by victimization low price and low power Raspberry Pi 3 module. It requires Micro USB of 5V and 2A power supply only. The main aim of developing this system is to provide blood to the people who are in need of blood. The number of persons who are in need of blood are increasing in large number day by day. Using this system user can search blood group available in the city and he can also get contact number of the donor who has the same blood group he needs. In order to help people who are in need of blood, this IOT based Blood Bank services can be used effectively for getting the details of available blood groups and user can also get contact number of the blood donors having the same blood group and within the same city. So if the blood group is not available in the blood bank user can request the donor to donate the blood to him and save someone life. Using this bank management system people can register himself or herself who want to donate blood. To register in the system they have to enter their contact information like address mobile number etc.The proposed work explores to find blood donors by using IOT based Smart Card CPU - Raspberry Pi 3 Module.

2. SYSTEM DESIGN&ARCHITECTURE

The proposed system uses Raspberry Pi 3 Module. The heart of this system is the core module which is realized using the Raspberry Pi 3, its responsibilities include, maintaining the Donor database. The core module also acts as an embedded web server responsible to provide the direct contact between the Donor and Recipient. The willing Donor has to register himself/herself and help the person who is need of blood. The Donor has to enter his details like Name, Blood group, Mobile Number, Address etc. The Raspberry Pi acts as main server and updates the information of Donors list in the database. The figure below represents the block diagram.

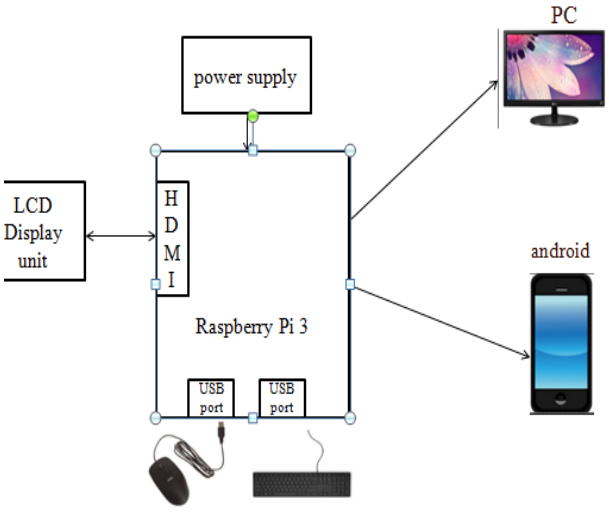

Figure. 1. Block Diagram

2.1. Raspberry Pi Module

The core module of the system is realized using a Raspberry Pi 3 board; it's a $ 25 bare-bones computer designed and developed by the Raspberry Pi Foundation, the Pi 3 features a BCM 2837.System-on-Chip which includes a Quad-Core 64-

Bit A RM Cortex A8 CPU clocked at 1.2GHz paired with 1 GB of RAM. It also has Video Core IV GPU for graphical processing applications, it also includes four USB ports for peripherals and 40 Pin General Purpose Input Output (GPIO) pins for interfacing the Pi with external electronic circuits.The Raspberry Pi is designed to run various Linux based operating systems and has Raspbian as its official operating system and Python as its official programming language.

Figure. 2. Raspberry Pi 3 Module

In this system the core module i.e. Raspberry Pi 3 module plays a highly pivotal role and is responsible for various functions, the core module is responsible for maintaining the Donor's database which consists details of Donors like Name ,Blood group, Mobile Number, Area, City etc. It is also responsible to provide the Blood Bank details located in particular area. The Raspberry Pi 3 Module updates the information of Donor list. This system provides direct link between the Donor and Recipient. All the process takes place with the help of IOT, any person can contact Donor from any place.

2.2. Embedded Server & IOT

Another crucial function of the core module is to act as an embedded web server, the primary responsibilities of this server include to contact the Donor, the Recipient has to search for the particular blood group to save one's life. This communication takes place through IOT that means anyone can access this system from anywhere around the world. This system can also be used Android Application to contact the Donor.

The system is configured using Apache to act as a server, which is useful to remotely monitor the conditions. The owner can log in to the server using a dedicated static IP assigned to the Raspberry Pi. Apache is a popular web server application you can install on the Raspberry Pi to allow it to serve web pages. On its individual Apache can serve HTML files over HTTP. You can use a web server on a Raspberry Pi to host a full website (locally on your network or globally on the internet), or just use it to display some information you wish to share to other machines on your network.

2.3. Raspbian Wheezy

Raspbian wheezy is an open source operating system based on Debian optimized for the raspberry pi hardware. It is Linux kernel based operating system which uses on the light weight ARMv6 instruction set that a typical Broadcom processor understand. Apache2:It is also known as "Apache HTTP Server" which allows the online distribution of website service using Hyper Text Transfer Protocol (HTTP). It is wide widespread net server for various operating systems like Linux, Unix, Windows, Solaris, Novell NetWare, Mac OS X, OS/2 etc.

Apache2 version was utilized in this project for making net server. Figure below shows the scenario of the proposed Blood bank system.

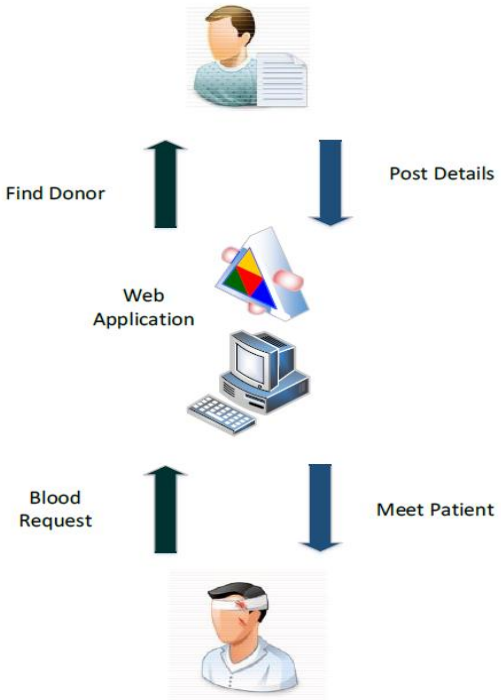

Figure. 3. Scenario of the proposed system

2.4. Blood Donor

Today in the developed world, nearly all blood donors are owing volunteers who donate blood for a community supply. In poorer countries, established supplies are limited and donors usually give blood when family or friends need a transfusion (directed donation). Numerous donors give as a demonstration of philanthropy, however in nations that permit paid gift a few donors are paid, and now and again there are motivators other than cash such as paid time off from work. Donors can also

have blood drawn for their own future use (autologous donation).

- Today in the developed world, most blood donors are unpaid volunteers who donate blood for a community supply.
- Here we store data for blood donors Name, Mobile Number, Blood Group and address.
- Automatically we enter the blood group then all display on system we select the persons then contact with a Donor.

2.5. Recipient

This system can be used to view all the donor details and accordingly select the right donor. The android mobile user will be able make quick decision in selecting a donor. Usage of this application will greatly reduce time in selecting the right donor.

3. HARDWARE IMPLEMENTATION

This section emphasizes on the actual hardware implementation of the proposed system, the various modules, components, peripherals and the interconnections between them are discussed here. The proposed design uses Raspberry Pi 3 board. The first process begins with initially booting up the Raspberry Pi. A 16GB micro SD card is given a proper format using SD Formatter and setup with latest Raspbian OS. To do so, the Raspbian OS is downloaded from Raspberry Pi's official website in Zip file format. The downloaded files are then extracted to the micro SD card, after which it is inserted into the SD card slot on the Raspberry Pi.

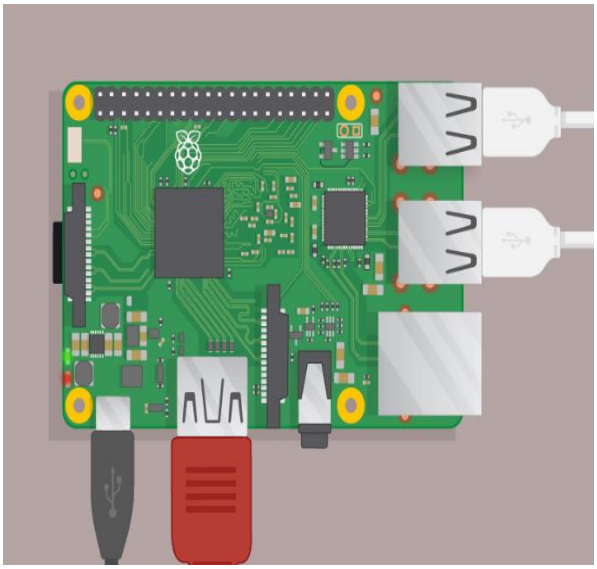

Figure. 4. Initial Setup

The Raspberry Pi is now plugged into a monitor via HDMI adaptor cable; input connections like keyboard and mouse are properly established and powered up using a 2.5A micro USB power supply or an equivalent battery pack. Once the Raspbian operating system is installed, the initial boot completes. The first boot is then completed on the Raspberry Pi connecting the required peripherals, such as power supply, keyboard, mouse, Ethernet cable, etc.

The Raspberry Pi for optimal operation requires a quality power supply; the Pi can be driven by using any Micro USB based mobile phone chargers with a good current rating, and this system is powered by a 5V 2A power bank for uninterrupted operation. Since the Raspberry Pi has inbuilt WiFi, natively support wireless internet a USB WiFi dongle is used for connectivity; the Pi also has an Ethernet port which can be used to gain wired internet access.

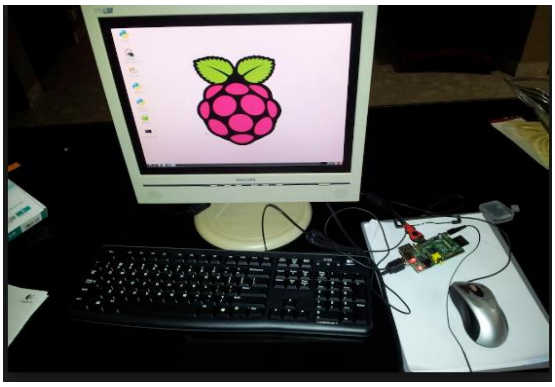

Figure. 5. Final Setup

The Raspberry Pi is then connected to the internet over LAN/WLAN and Pi's IP address is fetched, as well as Apache server, is enabled. Apache puts a test HTML document in the web organizer. This default site page is served when you peruse to http://localhost/on the Pi itself, or http://192.168.1.10 (whatever the Pi's IP address is) from another PC on the system. To discover the Pi's IP address, sort hostname - I at the order line i.e. on Pi terminal.

Figure.6.To Find IP Address

This is done locally and can access the process as the above. When you go for globally, the website name is given which is defined and can use by the Donor and Recipient by using IOT technology, which gives a link to contact the Donor and Recipient.

Any device connected to a Local Area Network is assigned an IP address. In order to connect to your Raspberry Pi from another machine using SSH or VNC, you need to know the Pi's IP address. This is easy if you have a display connected, and there are a number of methods for finding it remotely from another machine on the network. If you boot to the command line instead of the desktop, your IP address should be shown in the last few messages before the login prompt. Using the terminal (boot to the command line or open a Terminal window from the desktop),simply type hostname-I which will reveal your Pi's IP address.

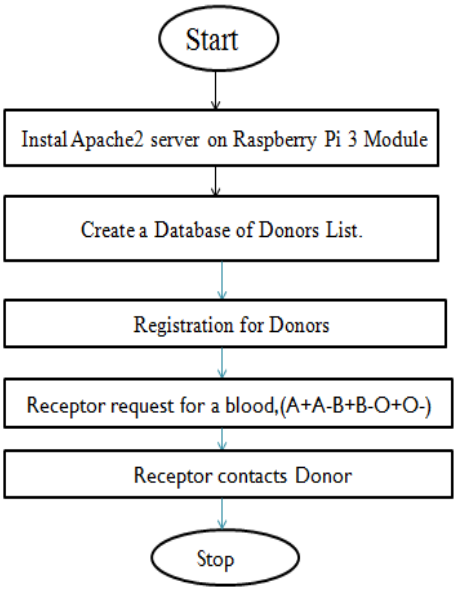

Figure. 7. Flow Chart

As with any system, the initial stage is to visualize the core modules, inputs, outputs and interrelations among them; this can be effectively done using a flow chart, above is a graphical representation of the proposed system.

4. EXPERIMENTAL RESULTS

This section emphasizes on the final results of the proposed system, the system has been configured to provide the direct link between the Donor and Recipient. There is a registration form for the donor, willing Donor can register himself/herself by providing appropriate details like Name, Mobile Number, Area, Blood group, City etc. The Receptor requests for a blood, with required Blood group (A+,A-,B+,B-,O+,O-) in the app or by the link which is provided by IP address (Locally or Globally). As well as the Blood Banks located in different Area and City has also been developed in the proposed system. There will be a number of people who will be in urgent need of blood of different blood groups. Using IOT technology, Once receptor connects to this system, it automatically directs to them the most eligible donor of that specific blood group.

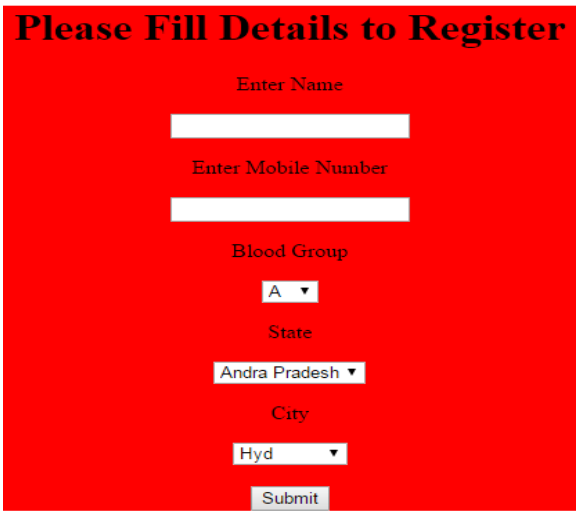

Figure. 8. Donor Registration Form

The people who are in need of blood can search in our site for getting the details of donors having the same blood group and with in the same city. They can directly click on the link search a donor and can select a city name as well as the blood group which he needs. He then gets the details of the donors who exist with in the city and the same blood group that he has selected. If no match was are found for the city and group selected by him he gets a message 'SORRY DONORS ARE NOT AVAILABE WITH THE FOLLOWING BLOOD GROUP AND AREA'.

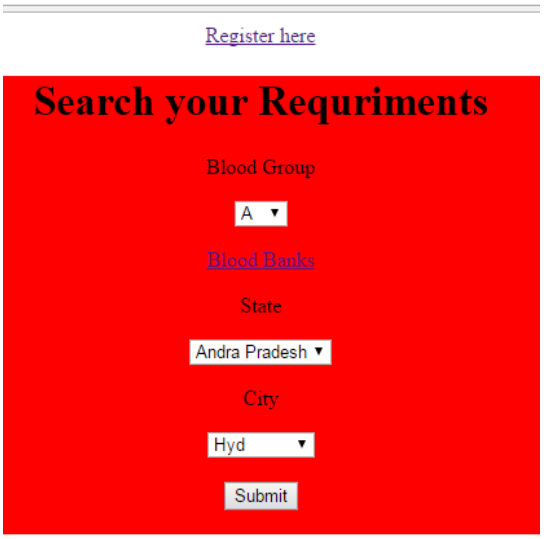

Figure. 9. Recipient login form

Figure.10 Details of Donor with Blood group (A+,A-,B+,B-,O+,O-).

The database of Donor's list is seen on the screen PC or Android Smartphone. The Recipient can contact with the Donor by taking the mobile number of the Donor as shown in the above figure. Thus the Recipient and Donor can contact to each other to help the person who is in need of Blood.

5. CONCLUSION

This paper presents the design and implementation of Blood Bank services using a robust, low-cost, low power single chip(Raspberry Pi 3 approach with the Internet as its backbone. By using IOT technology Donors and Recipient can communicate to each other to help the person who is in need of blood. The versatility and prowess of Linux operating system, the HTML language have also been explored, in depth.

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