Blood Bank App using Raspberry PI

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***Abstract*—The paper "Blood bank application using raspberi pi" proposed to bring near blood bank and the person who need the blood due to accident or any emergency. Our aim to propose this paper is to reduce the time span between the donor and recipient. By using Raspberry pi 2 and GSM modem SIM900A, we collect all the data base from blood bank and fetch the given data as per request from recipient. The fetched blood donor data is sent to the recipient and also with addition an IP Address is attached to the message which allows the recipient to download an app and get all the information. The vision of this paper is "To provide a better service of every person who is in search of blood**

Keywords – Raspberry PI 3 , Blood Bank, Information system.

I. INTRODUCTION

According to Survey by NHO for the Year 2018 nation needs 8 Crore units of Blood but available units are only 10 lakhs. India being country of massive Population demand for blood is increasing day by day.Statistics are clearly indicating alarming situation. Ratio of Number of blood bank Present and number of blood bank required is not Ideal. It is because of lack of awareness present. Blood bank is which collects blood from donor then various components are verified of the donated blood through standard precise test and blood components like RBC,WBC,Plasma are separated for the recipient. One donor can save three lives. As we all know we can not make blood in laboratories and we are totally dependent on human source only. Every day there is average need of at least two thousand donations but mostly do not meet the required numbers. Situations like Accident, operations, delivery etc. always needs external source of blood is case of emergency. Blood Bank Application can help to lower down barrier between Person in need of blood and authentic source of the same. Our Proposed Application aims to give service for emergency situations. Proposed System uses Android Application with Rasperi PI at back end as Hardware and give out result on Real time basis.[3]

II. LITERATURE SURVEY

A. Android Blood Donor life saving Application

Paper Presented by T. Hilda Jenifah and R. Backiya Lakshmi in the year 2014 is based on cloud computing application. It Propose development of a system that will link between blood donors and blood banks.

B. Reducing Complexity of blood donation

Paper Presented by Y. M. Balonekar & S. Dharde uses Data Mining concept is widely used now a days in various applications as data base driven system are in demand. Data present on data base is formatted in particular form so it can be fetched easily.

III. PROPOSED SYSTEM

Currently there are various systems presents to connect blood banks to donors as well as those who are in need of blood. But very few of them are capable to meet the expectation. Communication between blood bank and person in need of blood is the most crucial part of the process.

Proposed system contains Raspberry PI acts as processor as well as web server which helps in communication between blood bank and the recipient with the help of global positioning system and fetch the details of blood bank present near to the recipient's location. The details will mainly contain address and contact number. So recipient can easily get help for Emergency situations. Following are details of the different main components with their functionality of proposed system [2]

A. Raspberi PI

For every electronic system in order to perform good it is necessary to have a powerful processor. The processor with small size good memory and speed are always desirable. According to the need of the proposed system Raspberry PI 3 module present is a perfect choice. It is compact credit card size single board computer developed in UK by Raspberry PI Foundation. The intention behind development of the Raspberry PI is to promote teaching of basic computer science in schools and developing countries. The core processor is based on BCM 2836 system on the chip SoC. It's latest model 3 has 1.4 GHz 64 bit quad core ARM Cortex A53 with 512 KB shared cache. Raspberry PI 3 is Real Time Operating system(RTOS)

- Most of Raspberry PI model can be overlocked upto 1000 MHz also in extreme cases it can be raised to 1500MHz also but this will trigger shutting down as temperature may raise more than standard. Latest model contains Turbo which will Protect board from getting damage.
- Random Access Memory (RAM) is 1 GB in the PI Model 3. There are three default splits present for memory Standard split file are arm256_start.elf, arm384_start.elf , arm496_start.elf
- For any communication application networking plays very important role. Raspberry PI 3 can connected with wired like USB Port and wireless medium like WiFi and Bluetooth with speed of approximately 300 Mbit/s

Figure 1: Shows Raspberry PI 3 Model

- The Raspberry Pi Foundation provides Raspbian a Debian-based Linux distribution for download, as well as third-party Ubuntu, Windows 10 IoT Core, RISC OS, and specialized media center distributions. It promotes Python and Scratch as the main programming language, with support for many other languages.
- None of the currently present Raspberry PI model has built in real time clock so they can not keep track of time independently. PI can retrieve time from network server. Real time clock such as DS1307 can be added via I2C Interface.
- It has 15 Pin Camera Interface with video output of HDMI 1.3 & Analog of 3.5 mm Phone Jack also has Micro SDHC Slot
- Apache is a web server application which can be installed on Raspberry PI to serve web page. It can serve HTML files over HTTP with using scripting language such as PHP [1]

B. GSM Modem

GSM is abbreviation for Global System for Mobile communications it is a standard developed by the European Telecommunications Standards Institute In order to describe protocols for cellular network. GSM modem is a specialized type of modem which has a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. GSM 900 delivers GSM/GPRS 900/1800MHz performance for voice, data, SMS and Fax services. Its is very compatible as its very small and compact .Ssubscriber identification module is an Integrated circuit which stores international mobile subscriber identity number & its key which serves as authentication point for mobile device and subscriber.

A modem is capable of modulation and demodulation it is network hardware device that modulates one or more carrier wave signal in order to encode or decode the information. Capacity of a modem is defined by number of bits transmitted and received while transmitting or receiving. Modems uses different modulation techniques to send and receive data like Audio frequency-shift keying & Frequency shift Keying & Phase shift keying. Modem used in the proposed system is a broadband modem also called as wireless modem and uses orthogonal frequency division multiplexing. A source to modem could be a electrical signal or Optical. To get maximum speed it uses channel coding techniques. While coding information algorithms like Viterbi are used. [1]

PHP stands for Hypertext Preprocessor is server side scripting language also can be used for general purpose programming. The reason behind using PHP is its code can be embedded into HTML. Thus it can be deployed on most of the web server. It has wide range of classes and variable also 32 bit and 64 bit signed integers. PHP is widely used because it is open source, can be used on cross platform it makes web site or application dynamic. It can handle form, count visitors and restrict on site. In the Proposed project it will interact with web server in order to fetch data from database. It will be mediator between database, server, application and user.

One of the most important factors for an application to run is database. In proposed system end user will be provided processed and extracted data from database present according to the query input. Interaction to database will be done with coding via application program interface or database language. API or language chosen must be supported by DBMS. Database language have different types most commonly used are Data control language which controls access, Data definition language which defines creating, altering, or dropping and the relationships among values, Data manipulation language which enables tasks such as inserting, updating, or deleting, Data query language which allows searching for information and computing derived information. The Proposed system uses MySQL which is open-source relational database management system (RDBMS) the structured query structure of this database helps to extract information from given query input.

The Blood bank application using Raspberry PI is executed on Android platform. Android operating system is multi user Linux system in which each app is a different user. System generates unique ID for every app. Each app has its own virtual machine so app's code runs in isolation from other apps. There are four different types of app components. First is Activities an activity is the entry point for interacting with the user. It represents a single screen with a user interface, activities work together to form a cohesive user experience. A service is a general-purpose entry point for keeping an app running in the background. A broadcast receiver is a component that enables the system to deliver events to the app outside of a regular user flow. A content provider manages a shared set of app data that can store in the file system, in a SQLite database, on the web, or on any other persistent storage location that app can access.

In order to make Blood bank app useful in emergency situation it should have GPS enabled so exact location can be tracked down. Every android phone these day have GPS app installed within it. GPS stands for global positioning is a satellite-based navigation system. GPS system works with the help of network of satellite present around and above surface of earth. For GPS service there is dedicated GPS satellite present. User acquires signal via GPS satellite acquired data sent to nearest tower using GPRS/TCP, tower relays data to Utrack server these provide redundancy after that Utrack server routes processed info to main back up server the main server present fetches final output data to the end user which could be viewed on mobile phone or a computer. GPS gives near about exact location by calculating Latitude and longitude.[5]

Block Diagram

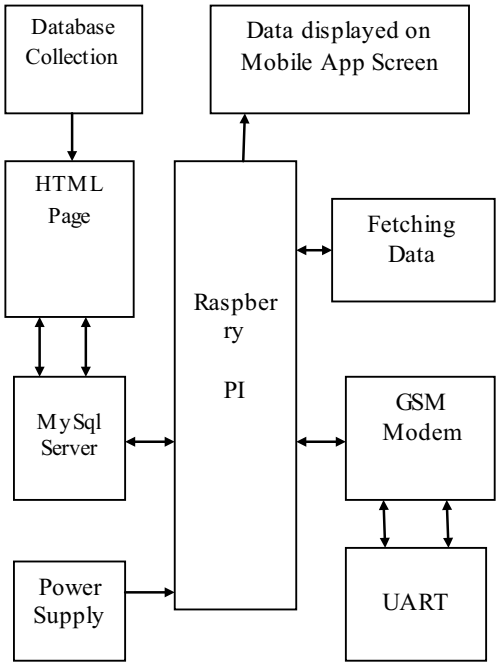


Figure 2: Block Diagram of Proposed System

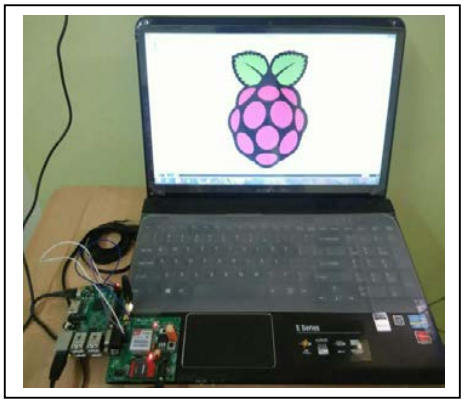
Process Flow

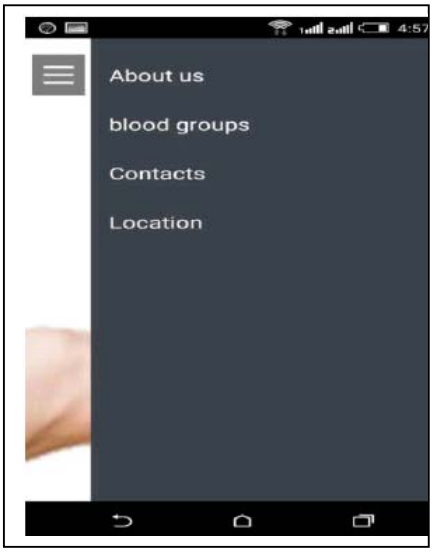
- Above diagram shows functional block diagram of the proposed system
- Hardware consists of Raspberry PI Module 3 which is the heart of the system. It is connected to database by MySql server. Communication between them is done by Hypertext Transfer Protocol.
- Power supply consist of standard Adapter with 240V input and 5V to 12V output.
- GSM SIM 900 is modem used for wireless communication between different parts of the Project
- UART is Universal asynchronous receiver transmitter hardware device used for asynchronous serial communication.
- Android App is the front end of the system which is accessible to user & can be installed on smart phone.
- When the person is in need of emergency blood it just needs to open the App and turn on the location settings.
- Once the GPS catches the location user need to select option blood bank near me.
- App with fetch the near by Bank information to the the user.
- Information will consist of blood bank address, contact information and location. Once user select the blood bank nearest GPS can route to the exact location
- If blood bank nearest are not accessible then user can select option of voluntary blood donor near me.
- App will fetch the user with nearest donor contact information and location.

Below is the Blood Types and Conditions regarding blood donor and acceptor are given.

Blood 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-

IV. RESULT





CONCLUSION

Blood is the vital part of the body. It can not be produced artificially in any laboratory. Considering this fact in emergency situation receptor of the blood is totally dependent on blood from authenticate source. Blood bank Application using Raspberry PI tries to lower the communication gap between the person in need of the blood and source of the like blood bank or any volunteer blood donor near by.

ACKNOWLEDGMENT

It gives us great pleasure in presenting this Paper titled "Blood Bank App using Raspberry PI" we wish to express our immense gratitude to the people who have provided invaluable Knowledge and support in completing the project. We express our gratitude toward project guide Prof. Chhaya Khandelwal who have provided with all guidance and encouragement throughout the project. We also would like to express sincere gratitude to Principal Prof. H. H. Shinde and the management of Jawaharlal Nehru Engineering College for providing such an ideal atmosphere to build up this project with well-equipped library and utmost necessary reference materials.

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