Automated Blood Bank System using Raspberry PI

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Abstract— A blood bank is a system where blood components or blood is gathered as collection of blood. This blood is preserved and stored or future blood transfusion. In this paper automated blood bank system is implemented which brings voluntary blood donors and user/patient those in need of blood on to the common platform. Proposed work consists of android application and raspberry pi in which user needs to enter required blood group details so that message will be send to that corresponding blood donor through GSM Modem. This paper aims to overcome this communication barrier by providing a direct link between the donor and the recipient by using low cost and low power Raspberry Pi kit. This system can be installed at hospitals for direct contact between the donor and the patient/user.

Key words: Automated Blood Bank; Raspberry Pi; GSM Modem; Android application; SMS

I. INTRODUCTION

Every year 4 Crore units of blood are needed, out of which only a few units of blood are available. There are many blood banks available, but none o them provide direct contact between donor and recipient [1].This is a major drawback in cases when there is urgent need of blood. Annually, more than one million individuals are diagnosed with cancer. Some of them need blood daily throughout their treatment [1].

Automated blood bank system finds donors based on collected database. Blood bank database can be created by collecting donor's information from NSS, NGO'S, blood banks and from web interface. Data collected can be stored in a central server or in a system which is to be installed at hospitals as automated blood bank system [2].Basic idea of the system is shown in figure [3].
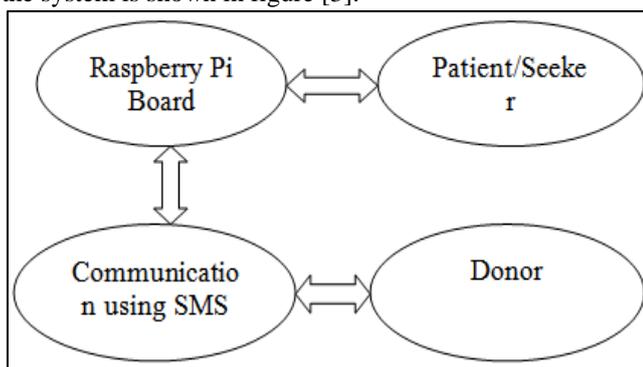

Fig. 1: Basic idea of the System

II. PROPOSED WORK
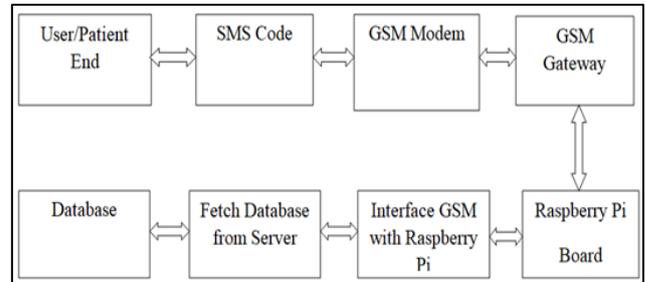
A. Block Diagram of Proposed Scheme

Fig. 2: Block Diagram of the Proposed System

The proposed work explores to find blood donors by using GSM modem and raspberry pi based system. In this system, it consists of android application, GSM Modem, raspberry pi kit. In android application, the person who wants to donate blood needs to register so that his information will be stored in the database. Application display three different screens such as Register, Query and about us screen. Donor needs to register his/her details such as Name, Gender, Address, Blood group and Mobile number. In query section patient needs to select required blood group and current address. Whole system is implemented using raspberry pi kit. Whenever there is requirement for blood then patient will enter required blood group details. Then that information will be fetched from database and SMS will be send to the donor directly on his number which is stored at the time of registration. Hence there will be direct communication between donor and patient [3].
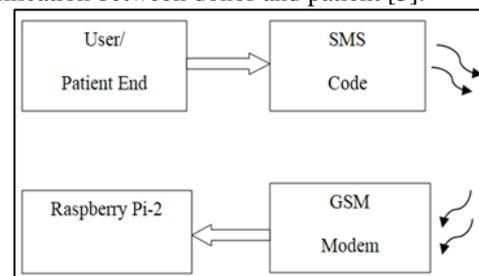

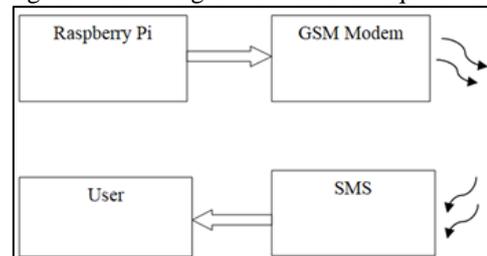Fig. 3: Block Diagram of Patient Requirement

Fig. 4: Block Diagram of Raspberry PI Acknowledgement

In this blood donors or patients in need of blood can send a SMS to a specific number. This SMS is received through GSM. Raspberry Pi acknowledgement side it is

stored in raspberry pi and according to that SMS it checks availability. Then, reply is send through GSM on same number according to requirements of patient/user [3].

B. Module Description

1) Blood Bank Application:

First module was designed with registration form. Registration form was used to fill donor's information which was saved in the database.

2) Raspberry Pi Interfacing:

In second module raspberry is interfaced with the GSM SIM-900A through which SMS will be send to donor.

3) User End:

In this module, application was designed to enter user requirements such as user's address and blood group [4].

III. HARDWARE IMPLEMENTATION

A. Raspberry Pi

Rraspberry pi is based on Broadcom system on a chip (SoC), which consists of on-chip ARM compatible central processing unit (CPU) and an on chip GPU (Graphics Processing Unit). CPU speed of the raspberry pi ranges from 700 MHz to 1.2 GHz. Most boards have HDMI composite video output, a 3.5 mm audio phone jack, and one and four USB slots
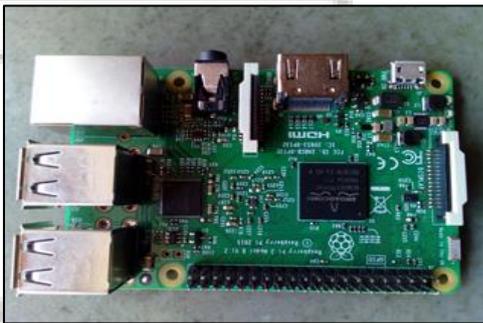

Fig. 6: Raspberry Pi Kit

It has on board memory range from 256 MB to 1 GBRAM. In raspberry pi, operating system is stored in SD cards. Lower level output is provided through number of GPIO pins which support common protocols like I²C. Pi 3 and Pi Zero W have on board Bluetooth and Wi-Fi 802.11n The B-models have an 8P8C Ethernet port [5].
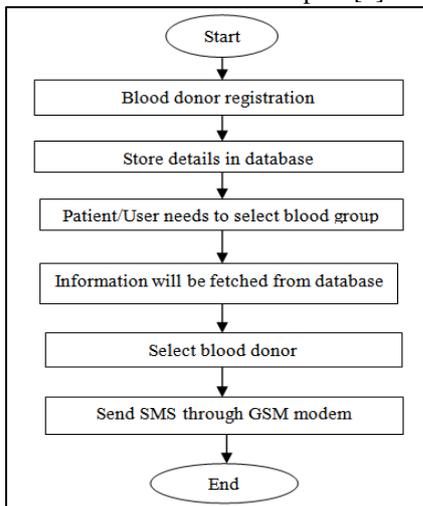

Fig. 5: Algorithm of Proposed Work

B. GSM Modem

SIM900A Modem is built from SIMCOM GSM/GPRS based with Dual Band modem which works with frequency 900/ 1800 MHz. SIM900A have capability to search these two bands automatically. It is also possible to set frequency bands by using AT commands. The baud rate can be configured from 1200-115200 by using AT command. It is provided with The GSM/GPRS Modem with internal TCP/IP stack which enable us to connect to the internet through GPRS. This is a wireless module with ultra-compact size. This module comes with SMT type and with single chip processor AMR926EJ-S core

Fig. 7: GSM Modem

This is a complete GSM/GPRS module in a SMT type and designed with a very powerful single-chip processor which benefits cost effective solutions and small dimensions [6].

1) Proposed System Flow:

1) Person/donor who wants to donate blood needs to register his details
2) This details will be stored in raspberry pi system database
3) User in need of blood will have to select required blood group and current address
4) Corresponding blood donors information will be fetched and displayed on screen
5) Patient needs to select donor and send SMS option on the screen
6) SMS will be send to blood donor directly through GSM Modem

IV. IMPLEMENTATION RESULTS

A. Application Main Screen

Figure shows the output screenshots for the android application main screen. It displays three tabs Register, Query and about us.
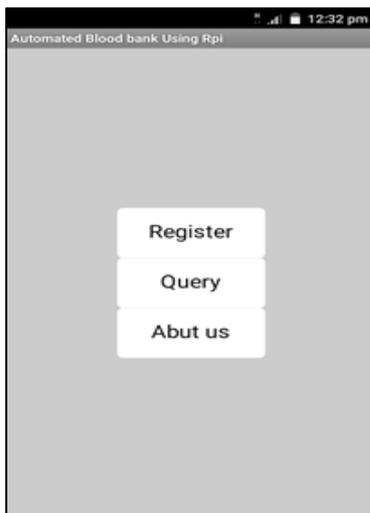
Fig. 8: Android Application Main

B. Registration Screen

Donor needs to register his/her details such as Name, Gender, Address, Blood group and Mobile number.

C. Query Screen

In query section patient needs to select required blood group and current address.
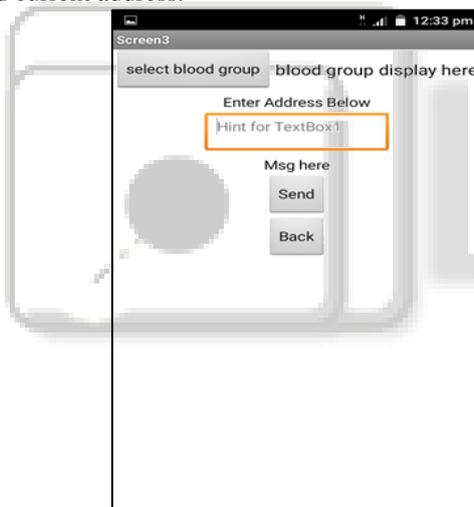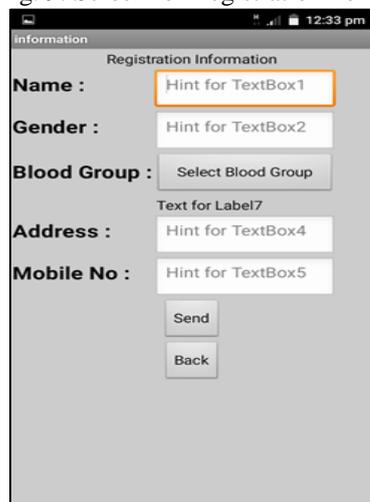

Fig. 9: Screen for Registration Form

Fig. 10: Screen for Query

V. CONCLUSION

When there is an urgent need for blood it may not be possible to connect to the internet and search for the online database. If people will use this model user/patient will be directly contacted to donor. Consider a SMS database system in which SMS will be send to respective person based on demand.

Another advantage is that location details are also considered by the proposed algorithm. This ensures that nearest donor is contacted and immediately requirement can be fulfilled. Also, due to SMS system internet is not essential for working of the system. This system is suitable for rural areas where well connected internet service is not available.

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