

Automated Blood Bank System using Raspberry Pi

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Abstract - —“Raspberry pi based blood bank system” proposed to bring blood donors to the one place. The aim of this system is to fulfill every blood request by using android application and raspberry pi. In the proposed system, data about the donors will be collected by using android application and raspberry pi by installing systems at places such as hospitals, blood banks etc. These data will be stored in the database. User/Patients needs to access application and needs to enter his requirements about the blood in the application the requirements are matched with the database and message will be to that particular blood donor through GSM modem.

Key Words: Raspberry Pi; Embedded Blood Bank; Blood donor; GSM; Android;

1. INTRODUCTION

Need of blood is drastically increasing. Per annum we require 5 million blood units and only 5 million blood units are available. This is the major drawback in case of emergency blood required some patients have daily need of blood those suffering from cancer. Even though the technology is developed still we fail to bring blood donors and recipients on the common platform. Accidents cannot be predicted. There may be blood requirement at any moment so direct communication between donor and user becomes necessary to avoid longer time span in the availability of blood [1].

Proposed System overview is shown in figure 1. Basically user/patient needs to send the request with required blood details from database data will be fetched and notification will be send to the respective blood donor.

This paper consists the object tracking system diagram, system flow and software design in section II. Kalman filter algorithm and its mathematical equations are explained in section III. Results of the system are given in section IV. Finally the work is concluded in section V.

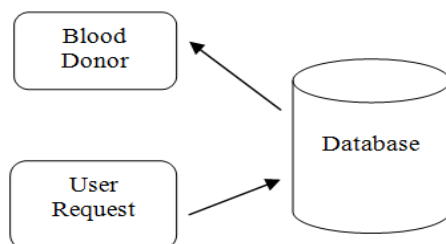


Fig -1: System Overview

2. RELATED WORK

Blood bank is responsible for the storage, processing and collection of blood. Blood plays important role in blood bank as it is the necessity of everyone. Many researchers worked on the development of blood bank management system. Some of them are given below [2]:

1. Virtual Blood Bank Project

This system implemented by using java and web applications. This allows us to find donors from their respective address which are collected from hospital database.

2. Location based blood bank system based on cloud storage

This type of system is based on mobile app which is linked to cloud server. Donor registration details and other details will be stored in the cloud. In case of an emergency anybody can use this app to locate the donor.

3. Emergency Blood Bank directories using www.bloodbanker.com:

In this type of system, www.bloodbanker.com website holds the details of hospitals and blood banks in USA. Website can be used to find the nearest blood donor.

3. PROPOSED SYSTEM

3.1 Block Diagram of the 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].

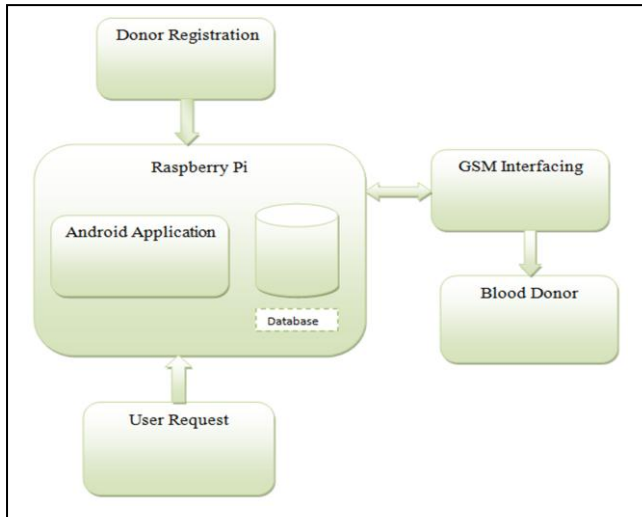


Fig -2: Block Diagram of the proposed system

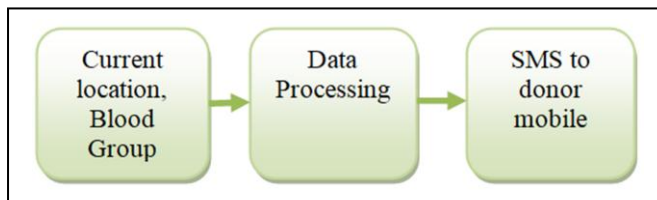


Fig -3: Level 1 flow diagram

Level 0 and level 1 flow diagram are shown in figure 3 and 4. Level 0 diagram shows interaction between the external agents and the system. Level 1 flow diagram shows subsystems included which provide system as a whole. It shows flow of data among the various parts of the system.

3.2 Android Application:

In proposed system, android application is designed using MIT app inventor MIT App Inventor is a visual programming based environment. App Inventor is an open-source web application for android which is originally provided by Google, and maintained by the Massachusetts Institute of Technology. It is provided with graphical user interface, it allows users to drag-and-drop visual objects for creating an application [4].

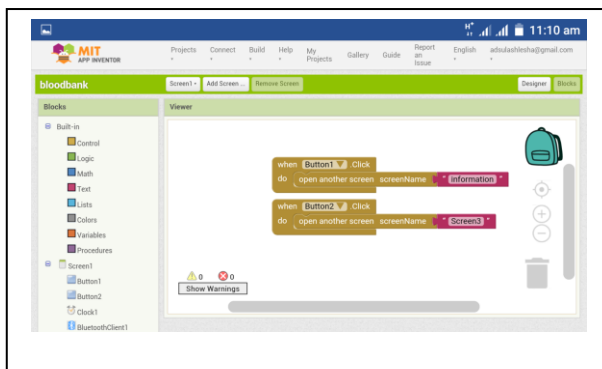


Fig -4: MIT app inventor environment

3.3 Proposed System Flow:

Input: Blood group and location

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

4. SYSTEM IMPLEMENTATION

4.1 Raspberry Pi:

Raspberry 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

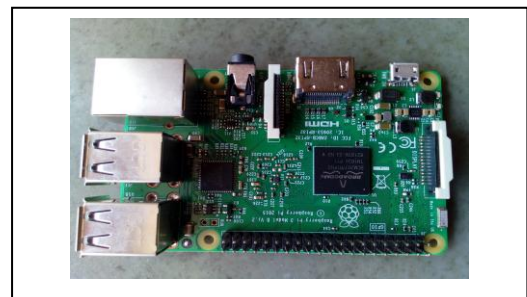


Fig -5: Raspberry Pi kit

It has on board memory range from 256 MB to 1 GB RAM. 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]

4.2 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 [6].

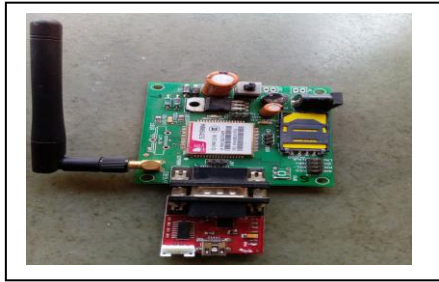


Fig -6: GSM Modem

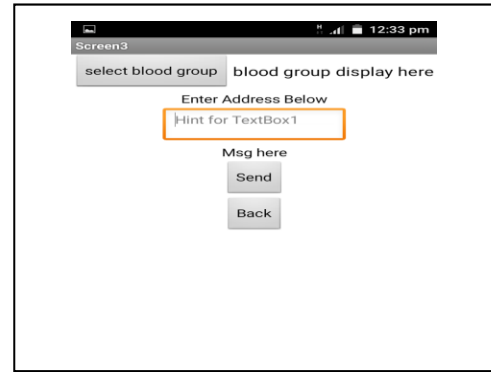


Fig -9: Screen for query

5. IMPLEMENTATION RESULTS

5.1 Application Main Screen:

Figure shows the output screenshots for the android application main screen. It displays three tabs Register, Query and about us.

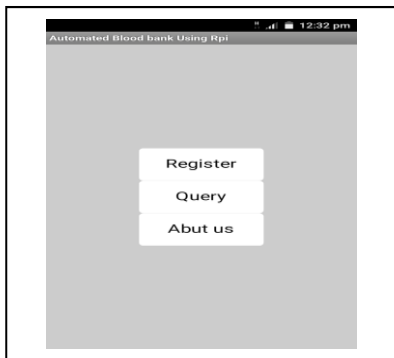


Fig -7: Android application main

5.2 Registration Screen:

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

5.3 Query Screen:

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

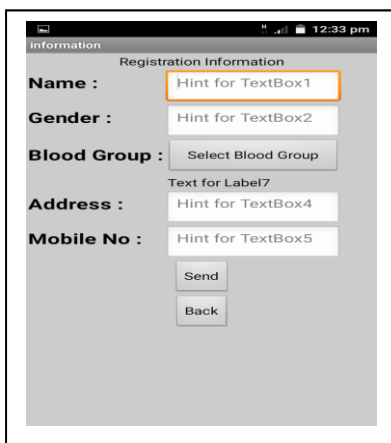


Fig -8: Screen for registration form

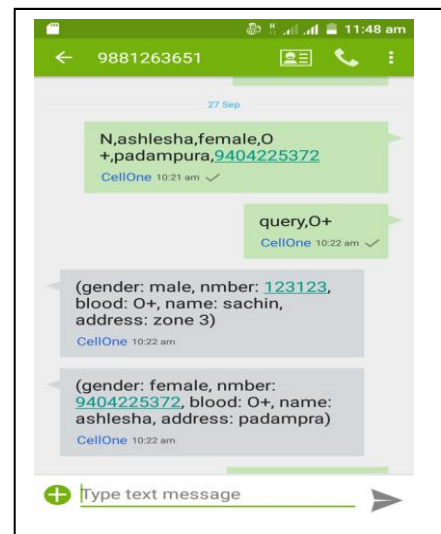


Fig -10: Results of query and SMS

6. CONCLUSION

The proposed system can be used to reduce time span between donor and patient. The system consists of android application, raspberry pi and GSM modem. There is direct communication between donor and recipient through SMS so in case of emergency this system plays important role. Results shows different screens of the android applications where user needs to enter blood requirements.

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