Research Journal of Engineering Sciences ISSN 2278 – 9472
Vol. **2(9),** 7-9, September **(2013)** *Res. J. Engineering Sci.*

Short Communication

An autonomous Wireless Hospital Management System

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Available online at: www.isca.in
Received 4th August 2013, revised 29th August 2013, accepted 14th September 2013

Abstract

The report describes a Bluetooth based hospital management system which has some specific advantages in terms of time, daily wages etc. The methodology section describes the design and implementation of the proposed system in detail. A device has been set up to demonstrate some wireless advantages. The system includes following prime specialties (assuming the working people in the hospital contains Bluetooth device each). i. All the nurse of the hospital can order medicine from the shop residing in hospital territory through wireless media. ii. A server which is on the medical shop can generate the bill as per the order of the nurse as well as can update its stock of medicine. iii. A nurse can keep in touch with the particular doctor via his/her device, he/she can send the current status of patient to the doctor's server. iv. Correspondingly the doctor is fully aware of his/her patient via the server. The day by day changing parameters of the patients' are taken care of.

Keywords: Bluetooth, python, wireless networking, hospital management.

Introduction

Choosing Bluetooth as a transfer medium has some specific advantages[1]. First let us consider the difference between wired and wireless medium. i The wired medium requires certain amount of maintenance during regular intervals, which increases cost effect. ii. If we use wireless connection, the hazards faced by patient party in the medical shop or calling the doctor in any critical condition are being reduced to a high extent[2].

Now there are many different types of wireless networking technology mainly Wi-Fi, RFID.

The advantages of Bluetooth over Wi-Fi are that in hospital territory there are many patients with severe heart diseases having bypass surgery. The interference level of Wi-Fi is so high that it interferes with the instruments and can break the instruments down. In case of Bluetooth no such type of interference happens and cost is too low, gives us the flexibility. The installation and maintenance cost of Wi-Fi based system is much higher than the Bluetooth based systems.

RFID is another popular wireless medium of recent era. RFID has a very short rang and it is capable of transferring very small amount of data. So we have chosen Bluetooth for the proposed system as it has an adequate range as well as data transfer rate compared to RFID. i. So the main advantages of Bluetooth are as follows, ii. Low implementation and maintenance cost, iii. Less battery consumption, iv. Adequate Range, v. Adequate data transfer rate, vi. No interference with delicate medical devices such as pacemakers.

Methodology

In this section, I have described the methodology I have used to achieve what I have proposed. There is, some figures related to the data structure I have used and the flow diagrams, along with the step algorithms used.

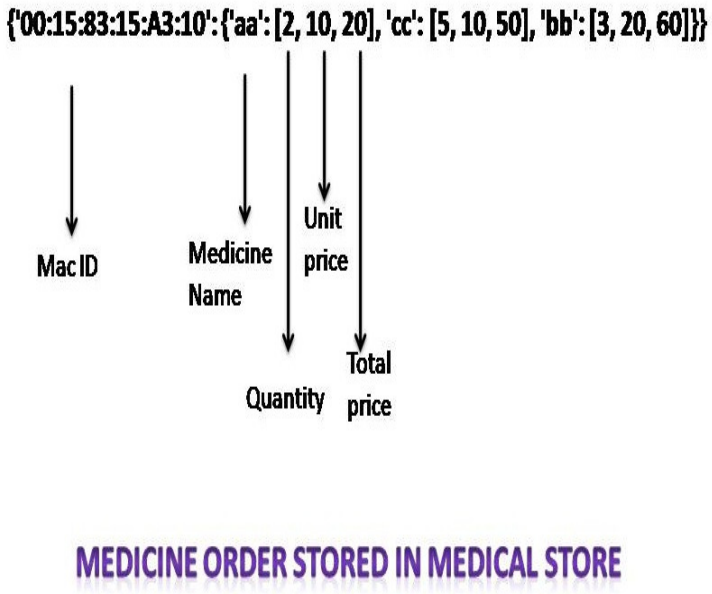

Figure-1
Data-Structure of Medicine Shop[3]

Flow Diagram

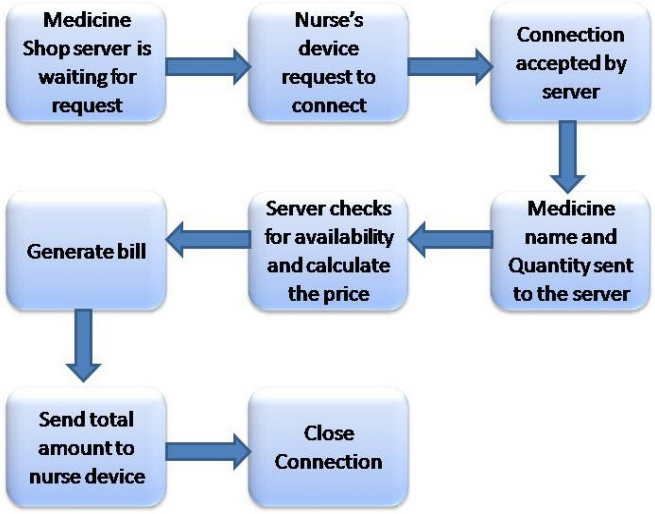

Figure-2
Medicine order from nurse's device

STEP ALGORITHM:
INPUT: ORDER MEDICINE
OUTPUT: GENERATED BILL
START
STEP 1: Medicine shop server is waiting for request.
STEP 2: Nurse's device request to connect.
STEP 3: Connection accepted by server.
STEP 4: Medicine name and quantity sent to the server.
STEP 5: Server checks for availability and calculates the price.
STEP 6: Generated bill.
STEP 7: Send total amount to nurse device.
STEP 8: Close connection.
STOP

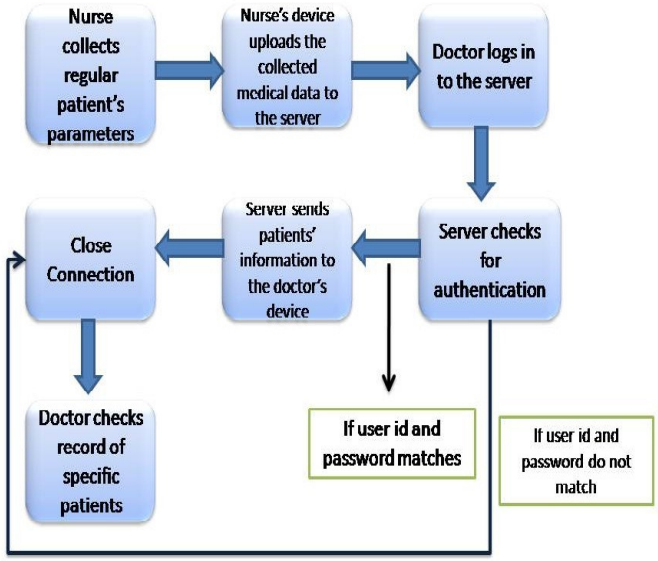

Figure-3
Fetching of patients' record from server by doctors

STEP ALGORITHM:
INPUT:
OUTPUT: GENERATED BILL
START
STEP 1: Nurse collects regular patient's parameters.
STEP 2: Nurse's device upload the collected medical data to server.
STEP 3: Doctor logs in to the server.
STEP 4: Server checks for authentication.
STEP 5: If -user id and password matches.
STEP 6: Server sends patients information to the doctor's device.
STEP 7: Close connection.
STEP 8: Doctor checks record of specific patients.
STEP 9: Else- Close connection.
STOP

Results

In this section, I have given some screen shots of the application I have designed. Here I have shown how the monitoring of the blood pressure is done graphically. The window, of various people working with this application, like, nurse, medical shop owner, and the doctors.

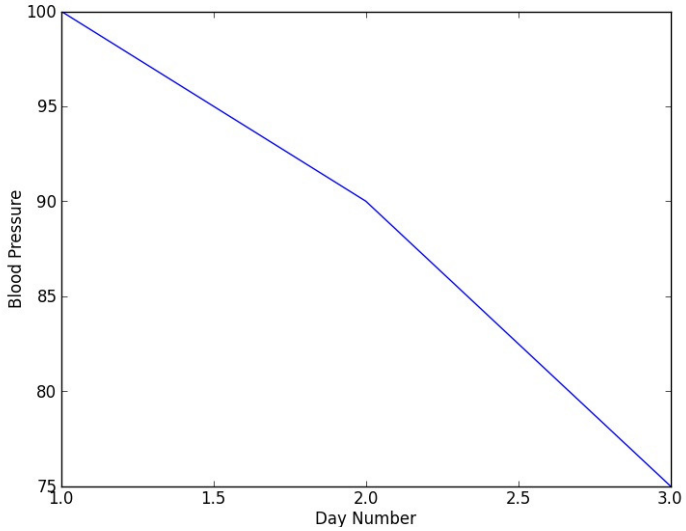

Figure-4
Blood-Pressure Monitoring Graph

Nurse Order

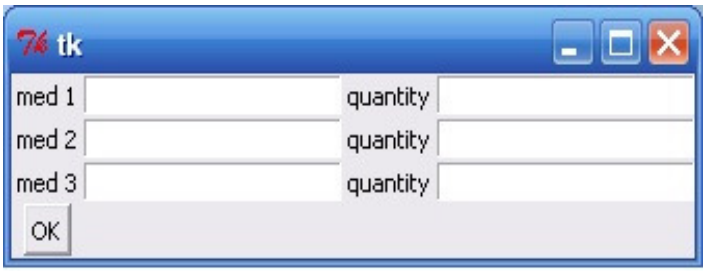

Figure-5
Window for the nurse to order medicine

This section describes the fast part of this project. When any nurse opens his Bluetooth device to order the required medicine from a shop, he receives an entry box. The above picture is the screen shoot of the entry box. Where one column is for Medicine Name and other column is for Quantity of the medicine.

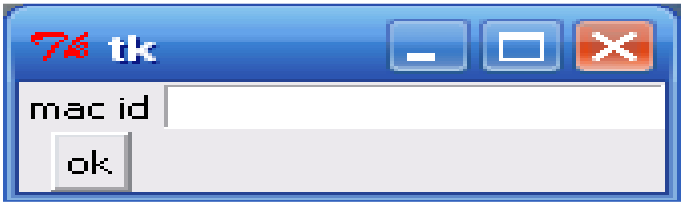

Figure-6
Bill generation window for the medicine shop

Bill Generate by Medicine Shop: When the medicine shop receives the order, the server of medicine shop generates a bill for corresponding machine id of the device of nurses. The above picture describes an Entry box to generate bill. After clicking the "OK" button the bill is generated.

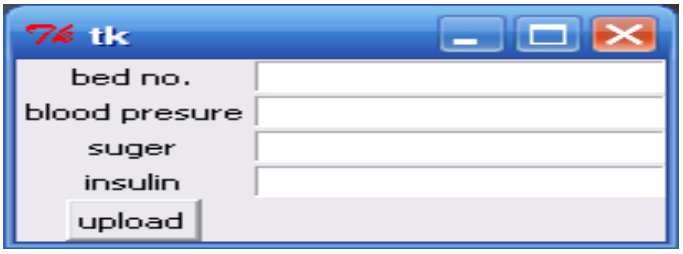

Figure-7
Window for the nurse to upload documents for the doctor

Nurse Upload to Doctor's Server: Nurse can upload the daily updates of the corresponding patients strictly distinguished by the bed number. The three different parameters B.P., SUGER, INSULIN are checked by nurse and uploaded on daily basis to doctor's server, so that the doctor can keep in touch with the patients. To upload the above Entry box is used.

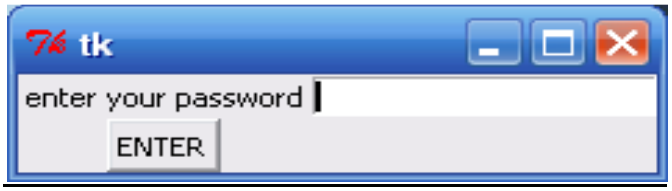

Figure-8
Window for the doctor to login

Doctor's Server: To check the daily updates of patients the doctor has to enter a password, which is allotted for each of them. The above Entry box is used.

Conclusion

Simplicity and easy to handle: To implement this we simply need a Bluetooth device, which is wireless. The person doesn't have to know about the internal hardware. Simply typing and clicking the right button can do the job.

Comparison with other ones present in the market: The main wireless medium present in the market except Bluetooth is Wi-Fi . It has its own demerits. Its range of area is so high that it can interfere with the pacemakers and other bio medical instruments and also can cause severe damage to the above mentioned ones. But Bluetooth is free from that.

Cost Effectivity: As Bluetooth is easy to handle and very low in cost, any person can access and apply. No extra wages of wire or device is needed[4].

Future Work: The system lacks security features in it. In future we can import security features in order to prevent outside attacks and unauthorized access. We can use encryption-decryption mechanism to implement the security features within this system. We hope that the concept described in this report will aid the developers' community in near future.

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