INTERNATIONAL JOURNAL OF RESEARCH
In Advanced Engineering Technologies

Volume 5, Issue 3 JULY 2016

REMOTE MONITORING OF VITAL SIGNS USING GPRS TECHNOLOGY

M. NARSING YADAV[1], R. RAJA KISHORE[2], M. PRADEEP KUMAR REDDY[3]

[1] M. Narsing yadav, M.S,PhD, Professor, H.O.D., Dept Of ECE, Mallareddy Institute Of Engineering And Technology, Maisammaguda, Dhulapally Mandal, Rangareddy, Telangana, India.

[2] R. Raja Kishore, Assistant professor, Dept Of ECE, Mallareddy Institute Of Engineering And Technology, Maisammaguda, Dhulapally Mandal, Rangareddy, Telangana, India.

[3] M. Pradeep Kumar Reddy, M-Tech Student, Dept Of Ece, Mallareddy Institute Of Engineering And Technology, Maisammaguda, Dhulapally Mandal, Rangareddy, Telangana, India.

Abstract*—In order to improve the way of data collection and workflow of vital signs measurement in hospital, this paper proposed a Tablet PC based vital signs data collection and information system. This system comprises a database server, Tablet PC, and wireless devices such as blood pressure monitor, infrared thermometer and barcode scanner. The Tablet PC and wireless devices are put on a cart to serve as a mobile nursing information system unit. All of the devices have Bluetooth interface, therefore they can communicate with the Tablet PC via Bluetooth. Moreover, the designed user interface on Tablet PC can inspect patients' information and upload the collected vital signs data to a database server via wireless local area network (WLAN). The system has a pilot trial in hospital, and the results show the system can reduce the time of data transcription. Besides, the benefits of this system are also including: (1) eliminating the error rate caused by hand written, (2) providing real-time vital signs data recording and access, (3) speeding up the overall process of nursing documentation*.

Key words: *LPC2148, Sensors, GPRS, TEMPERATURE SENSOR, RFID.*

I. Introduction

In general the way to record vital signs data is recording vital signs data on the paper by handwritten, and then transcribed these vital signs data to an information system by typing on a computer. Duplicate to record vital signs data by handwritten and typing to transcribe the data into information system not only increase workload of nurses but also waste the direct care time for providing to patients. Furthermore, it may cause recording error during handwritten and could also cause error by typing vital signs on the computer. Because of these reasons it may lead misdiagnose. There has a study proposed a clinical documentation system with a Tablet PC affixed to the vital signs monitor to achieve machine to computer clinical documentation. Nurses can transcribe vital signs data from measuring device to Tablet PC immediately. The data can be stored into database information system without handwritten and hence shorter the time delay for providing data on information system. Although the result of this study has lower error rate and shorter medical records transcribed delay time, the process of typing values into Tablet PC could still have errors [6]. Because of the vital signs data still can't direct input from a measuring device to the information system, it is means that human involved is still needed. If the vital signs data can direct input from a measuring device to the information system, then it can reduce the error rate and delay time. Therefore, nurses can spend more time on direct care of patient. In this paper, we proposed a Tablet PC

based vital signs data collection and information system in order to improve the way of data collection and workflow of vital signs measurement in hospital. We used Bluetooth blood pressure monitor and Bluetooth infrared thermometer that can automatic output measured data, the measured data from measuring device can transmit to Tablet PC directly. Then Tablet PC can transmit data to database by using Wi-Fi wireless transmission technology. Therefore, the measured vital signs data can be uploaded into the database in real-time. It means that data from measuring device can direct feed to the information system by using Bluetooth and Wi-Fi technology, the Tablet PC serves as an intermediary media. Therefore, the system can reduce the time of data transcription and eliminate the error rate caused by handwritten and typing.

II. The Hardware System

Micro controller: This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

ARM7TDMI: ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

Liquid-crystal display (**LCD**) is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock. They use the same basic technology, except that arbitrary images are made up of a large number of small pixels, while other displays have larger elements.

III. Design of Proposed Hardware

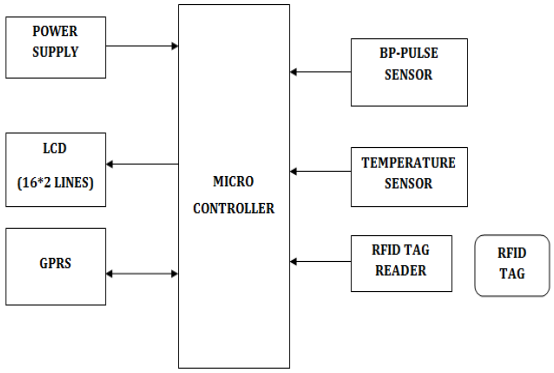

Fig. 1.Block Diagram

In this paper, we use the state-of-the-art mobile technologies to design a GPRS based vital signs data collection and information system. Fig. 1 shows the system architecture, which is consisted of three units, database server and graphic user interface (GUI) unit, mobile nursing system unit and ward unit. Patient's information and vital signs history record is stored in the database on server. When nurses make routine measurement, they just need to push the mobile nursing system unit to ward to measure patient's vital signs. Fig. 2 shows the mobile nursing system unit, which is equipped with the Tablet PC, infrared thermometer, blood pressure meter and barcode scanner on a cart and data will upload to database

server directly via Wi-Fi. In ward, there is patient's identification number in barcode which is wearing on every patient's hand and the number can be scanned by the barcode scanner.

IV. Board Hardware Resources Features

Technologies used in our project to get effective data of a patient health details are:

RFID:

Many types of RFID exist, but at the highest level, we can divide RFID devices into two classes:active and passive.

Fig 2 : RFID Module

Active tags require a power source i.e., they are either connected to a powered infrastructure or use energy stored in an integrated battery. In the latter case, a tag's lifetime is limited by the stored energy, balanced against the number of read operations the device must undergo. However, batteries make the cost, size, and lifetime of active tags impractical for the retail trade.

Passive RFID is of interest because the tags don't require batteries or maintenance. The tags also have an indefinite operational life and are small enough to fit into a practical adhesive label. A passive tag consists of three parts: an antenna, a semiconductor chip attached to the antenna and some form of encapsulation. The tag reader is responsible for powering and communicating with a tag. The tag antenna captures energy and transfers the tag's ID (the tag's chip coordinates this process). The encapsulation maintains the tag's integrity and protects the antenna and chip from environmental conditions or reagents.

GPRS:

GPRS (general packet radio service) is a packet-based data bearer service for wireless communication services that is delivered as a network overlay for GSM, CDMA and TDMA (ANSI-I36) networks. GPRS applies a packet radio principle to transfer user data packets in an efficient way between GSM mobile stations and external packet data networks. Packet switching is where data is split into packets that are transmitted separately and then reassembled at the receiving end. GPRS supports the world's leading packet-based Internet communication protocols, Internet protocol (IP) and X.25, a protocol that is used mainly in Europe. GPRS enables any existing IP or X.25 application to operate over a GSM cellular connection. Cellular networks with GPRS capabilities are wireless extensions of the Internet and X.25 networks.

Fig 3 : GPRS Module

V. CONCLUSION

We used the Tablet PC and wireless measuring devices to build vital signs data collection and information system. This system has been used in

hospital for a pilot trial. Results show the system can reduce the time of data transcription and eliminate the error cause by handwritten on paper, and let clinicians and nurses can real-time access vital sign record. Therefore, the quality of patients' care can be increased indirectly.

VI. REFERENCES

[1] M. Clauson et al., "Legacy mentors: Translating the wisdom of our senior nurses," *Nurse Education in Practice*, vol. 11, 2011, pp. 153-158.

[2] C. B. Jones, M. Gates, "Gender-based wage differentials in a predominantly female profession: observations from nursing," *Economics of Education Review*, vol. 23, 2004, pp. 615–631.

[3] I. A. Mitchell et al., "A Prospective Controlled Trial of the Effect of a Multi-faceted Intervention on Early Recognition and Intervention in Deteriorating Hospital Patients," *Resuscitation*, vol. 81, no. 6, 2010, pp. 658-666.

[4] C. P. Subbe, M. Kruger, P. Rutherford, and L. Gemmel, "Validation of a modified Early Warning Score in medical admissions," *Quarterly Journal of Medicine*, vol. 94, 2001, pp. 521-526.

[5] H. Cahill et al., "Introduction of a New Observation Chart and Education Programme is Associated with Higher Rates of Vital-sign Ascertainment in Hospital Wards," *BMJ Quality and Safety*, vol. 20, 2011, pp. 791-796.

[6] K. A. Wager et al., "Comparison of the Quality and Timeliness of Vital Signs Data Using Three Different Data-Entry Devices," *CIN: Computers, Informatics, Nursing*, vol. 28, no. 4, 2010, pp. 205-212.