Wireless Biomedical Data Transmission over Zigbee using ARM7

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Abstract- *Voice communication becomes ineffective in the industries & various places where there is a noisy environment. Industries and other places which offer ineffective voice communication require data transmission in text and image form. The first approach of the project is to draw the pattern on touch screen display which is interfaced with arm7 processor and transmit this pattern using zigbee transmitter.*

Keywords- GSM, ARM, LCD, LAN, BPM

I. INTRODUCTION

Today's healthcare practice, physicians have a need to monitor more than one medical parameter for patients that are either hospitalized or leading their normal daily activities at home or at work but in need of constant medical care. These patients, in turn, need a device that is easy to use, cost-effective, and reliable to provide them with vital data about their medical condition. Such device should allow physicians to view the measured parameters over a long period of time for parameter/daily activities correlation and trend analysis. Many patient remote monitoring devices were reported in the literature.

An otolaryngology procedure was reported in. The unit helps physician to perform a variety of procedures such as nasal endoscopy, biopsies and removal of foreign bodies. The developed protocol is implemented and tested to monitor the medical condition of a large number of patients. The protocol receives the temperature and pressure of a patient using a mobile device that is attached to the patient's body via short messaging system (SMS) message. The mobile device does not have data logging capabilities, nor does it have download and diagnosis features. The clinical usefulness of a wireless personal digital assistant (PDA) based on a GPRS-capable cellular phone and an Internet application for remote monitoring of real-time vital signs was discussed in. A wireless PDA-based physiological monitoring system for patient transport that uses wireless local area network (WLAN) technology to transmit patient's bio signals in real-time to a remote central management unit was presented in. Most of the above systems do not have logging capabilities to allow the patients to be away for a week or so without communicating with their physician. Instead, biomedical signals are transmitted in real-time to the physician in these solutions. This paper discusses the design of wireless mobile logging device using an embedded system platform. The unit is used to measure a patient's body temperature, heart rate in beats per minute (bpm), and ECG. While the patient practicing his/her normal day activities, the acquired signals values are logged for a period of time or until the next physician visit. For these reasons a C program was developed and customized for low-power consumption and reduced measurement time

II. LITERATURE SURVEY

Earlier in hospital wired communication used to take place which is very costly & complex. Wireless communication made it easy and efficient .In earlier centuries man power was unable to reach hard and remote areas but due to intelligent wireless sensor based controls it has been possible. Man safety was not given priority in the previous system. Various Bio-medical instruments are invented. But all the information /data given by the instrument is convey to the doctors by centralized system.

Care of critically ill patient, requires spontaneous & accurate decisions so that life-protecting & lifesaving therapy can be properly applied. Statistics reveal that every minute a human is losing his/her life across the globe. More close in India, everyday many lives are affected by heart attacks and more importantly because the patients did not get timely and proper help .This paper is based on monitoring of remote patients, after he is discharged from hospital. I have designed and developed a reliable, energy efficient remote patient monitoring system. It is able to send parameters of patient in real time. It enables the doctors to monitor patient's parameters (temp, heartbeat, ECG) in real time. Here the parameters of patient are measured continuously (temp, heartbeat, ECG) and wirelessly transmitted using Zigbee. In the field of health monitoring the current most important user groups are those aged 40 and more. The group of 40+ users shows more diversity in their health conditions than younger

people. There are ring-type pulses monitoring sensor available in the market in which the measured data are displayed in the LCD and cannot be transmitted out of the ring. Thus, it is not possible to continuously monitor the vital parameters such as temperature, pressure and pulse from a distant location.

III. BLOCK DIAGRAM

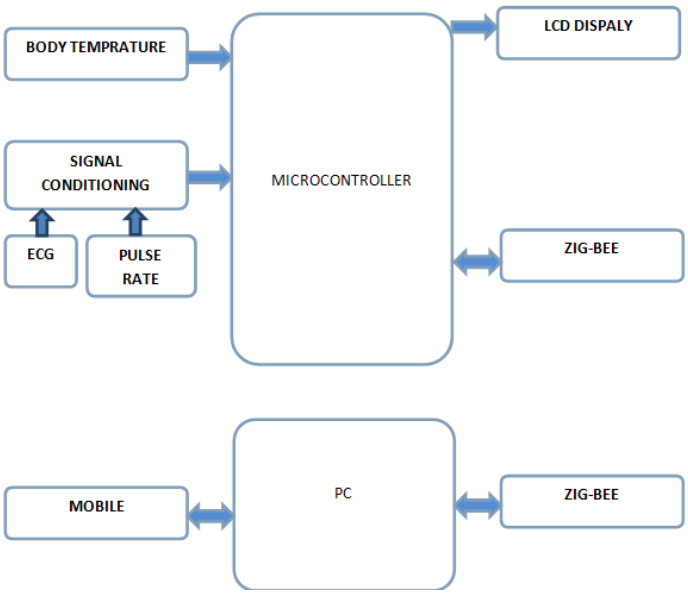

Figure 1. Block Diagram of System

Block diagram consists of two parts i.e. Transmitter (slave) and Receiver (master). Transmitter consists of microcontroller and ZIGBEE module. Receiver consists of ZIGBEE module, microcontroller and Display monitor.

Microcontroller is the heart of the device. It stores the required data and make use of if whenever the person uses the device. This device helps deaf and dumb person to announce their requirement. By this the person who is near can understand their need and help them.

All output signals generated from flex sensors and accelerometer are in analogue form and these signals need to be digitized before they can be processed. Therefore microcontroller is used in this project. It has inbuilt ADC module, which digitizes all analogue signals from the sensors.

Based upon the signals received from the sensors the controller recognizes letter. This letter then needs to be transmitted to the Smartphone. Hence it is given to the Bluetooth module.

Even sometimes the controllers make the word from letters. These letters are also transmitted to the smart phone.

IV. RESULTS

Figure 2. LCD output

At the transmitter section the LCD provided at panel displays the various indicator generated with different sensors like body temperature, pulse rate, blood pressure etc.

This LCD is interfaced with microcontroller. The parameters shown are further transmitted to the receiver section using zigbee module.

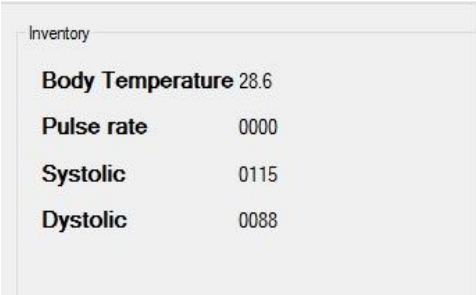

Figure 3. receiver output

The parameters like body temperature, pulse rate, blood pressure etc. are transmitted using zigbee module are received by zigbee receiver and showed by using a software on a PC.

If the receiver is not present then the parameters send on a PC will be send to a mobile phone via GSM module.

V. CONCLUSION

1. Thus this project introduces an embedded system with a combination of Zigbee and GSM. Patients monitoring system is an important criterion of modern technology.
2. The proposed system is high speed patients monitoring system. This system works on wireless protocol.
3. This system features efficient data transfer among different sections in practical application.

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