



HOME BASED TELEMEDICINE SYSTEM FOR RESPIRATORY DISORDER PATIENTS

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ABSTRACT

In this paper we have focused on home monitoring system for patients with respiratory illness. It involves the measurement of the heart rate, temperature and the respiration rate of the patient. We use a zigbee based wireless link to the doctor's PC for long-term data acquisition. This project also includes an automatic syringe infusion pump used to deliver medicine to the patient. The range of the parameters is initially set by the doctor's, in case of any deviation from the set values, an alarm is indicated on the doctor's side and simultaneous delivery of medication to the patient is carried out by the syringe pump. This system is highly used in conditions where there is no constant need for a medical staff to attend the patient.

KEYWORDS: Zigbee, Respiration, Drug Delivery, Infusion pump & Heart rate, Syringe infusion pump.



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I. INTRODUCTION

The drug delivery system is a syringe infusion pump which automatically delivers medication to the patient whenever an abnormal condition arises (when the measured value deviates from the preset standard range). The input section consists of three sensor parts as Temperature sensor for monitoring the respiratory disorder patient's temperature measurement [1 & 2]. As a coritical care diagnosis the system was build with heart beat sensor and respiration sensor in addition to the temperature sensor. The sensory circuit was interfaced to microcontroller with ADC, signal conditioning and signal processing circuits. To provide the data to patient the LCD display was interfaced [3 & 4]. The monitoring parameters like temperature, heart beat and respiration rate was displayed using LCD for Patient in a home environment and also the same was send to doctor's through Zigbee transmission and receiving section [7 & 8].

II. MATERIALS AND METHODS

Home health monitoring system consists of syringe infusion pump as the output which is driven by stepper motor. The stepper motor was programmed and the angle or position control was achieved by the stepper motor driving circuit [5 & 6]. The position of the syringe infusion pump was depending on the step angle of the stepper motor which was programmed using microcontroller. Three

parameters have been taken as input temperature, Heart beat and respiration rate. Monitored parameter was compared with the normal set values through microcontroller program and as a safety measure alarm indication was implemented. Alarm works when the monitored value exceeds the set value. The received data from zigbee receiver was decoded and given to the PC through PC interfacing circuit. The PC used to store the patient data in computer database.

III. RESULTS AND DISCUSSION

Our project intended for the home-based monitoring of patients with respiratory illness was successfully completed. The respiration rate was obtained by placing the respiration sensor under the nose. The sensor compares the temperature of the exhaled air with the atmospheric temperature and the difference obtained is processed and given to the microcontroller. The corresponding output was displayed on the LCD. The measured data were transmitted to the doctor's PC via zigbee. Based on the patient's health condition, the range was set by the doctor [3 & 4]. The received data and the range set by the doctor was compared and during abnormalities, an alarm was signalled in the doctor's PC and simultaneously the drug infusion pump automatically delivered the pre-loaded medication to the patient. This module is therefore very useful for the remote monitoring of patients. The obtained results are as shown in figure 1 to figure 4.

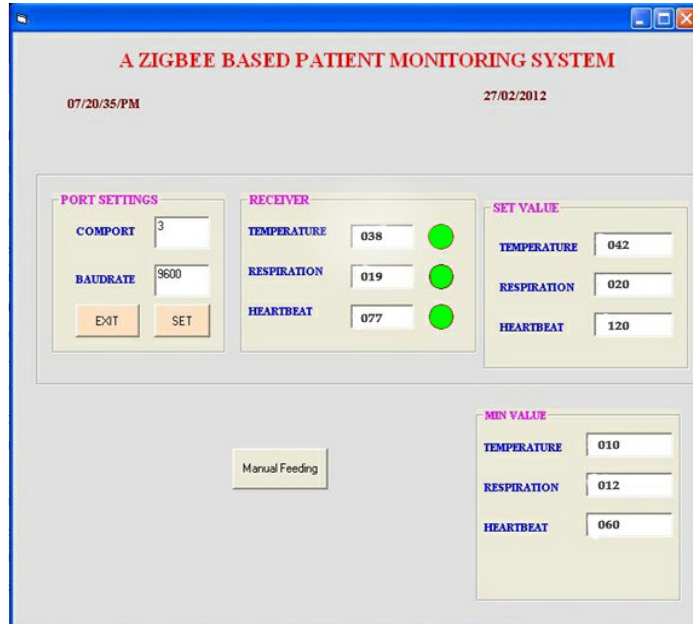


Figure 1
Patient with Normal condition

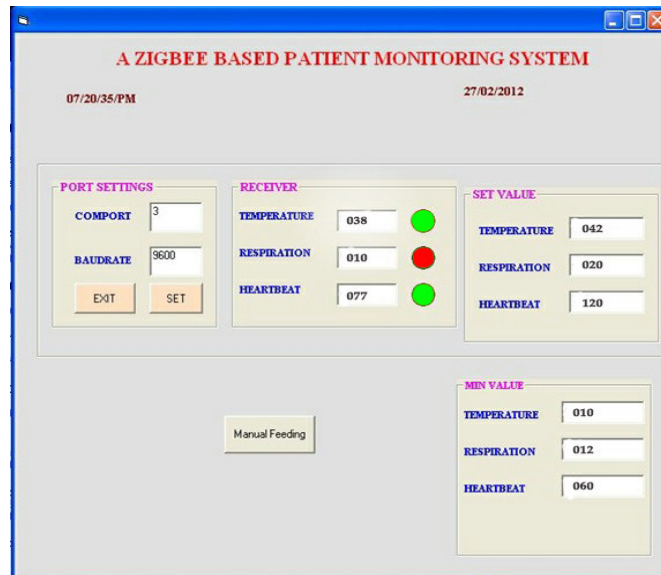


Figure 2
Patient with abnormal respiration rate



Figure 3
Patient with abnormal heart rate

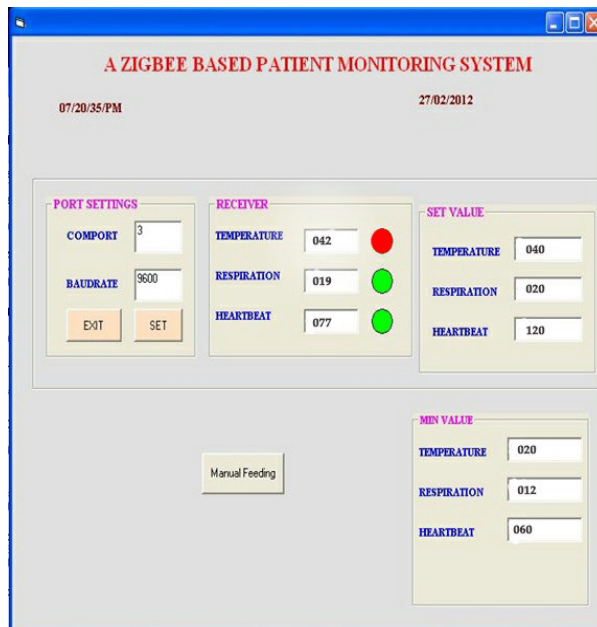


Figure 4
Patient with abnormal body temperature

IV. CONCLUSION

This project has been designed for treating patients with respiratory disorders. The techniques and methods used here can also be implemented with certain alterations for treating patients with other disorders. The drug infusion pump in our project delivers a fixed level of dosage to the patients. This can

be further improvised by allowing the doctor to set the level of dosage to be delivered to the patient. The Zigbee telemetry system used here can be replaced with web based system which provides faster transmission and large storage space.

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