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Research Article

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Wireless transmitter for biomedical applications

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ABSTRACT

An Energy-Efficient Transmitter for easy analysis and treatment in Medical Applications, can be developed based on wireless communication techniques have been developed to improve human health, such systems use wireless body sensor networks (WBSNs)[1],[2]. The human body worn sensor nodes are used to monitor vital signs, such as temperature and heart rate (ECG) in WBSN. Added to this, the advantage in using sensor nodes is that they can be expanded to treatments for medical ailments. Treatments may include drug delivery and nerve stimulation. When the acquisition of the biomedical information are done, the sensed signal will be preprocessed and to proceed, the stored information will be transmitted using RF transceiver to a portable base station. The sensor nodes also are given control commands that are received from the base station through wireless communication. The important aim of this project is to regularly monitor the health of a patient in a wireless manner.

Keywords: WBSN, RF transceiver.

INTRODUCTION

Today tremendous advances have been achieved in many areas with the development of wireless communication techniques in the past few years (Fig 1). Recently, many medical systems based on wireless communication techniques have been developed to improve human health, such as wireless body sensor networks (WBSNs) [4],[5].

1.1 LIMITATIONS ON EXISTING SYSTEMS

- In the existing systems, the health ailments that are related to pulse rate is not considered.
- The main health factors such as body temperature, blood pressure are not considered.
- The presently used health monitoring equipment is neither mobile nor compact.

In this project, sensors like temperature sensor and heartbeat sensors are fixed in the skin of the patient for inertial sensing. The temperature of the human body is sensed by the temperature sensor. The Heart Beat sensor will clearly sense the number of heart beats of the patient. The Corresponding Sensed analog signals in the form of graph are converted into digital values by using analog to digital converter which are in turn given as inputs to the microcontroller. In the controller, we are using threshold values which are the normal range in a human. If the determined values exceeds the stored values, buzzer will blow and indicate that the corresponding person might get attention. Similarly, the values that are got in the sensor will be displayed in LCD. These values will be communicated using Zigbee, by which the doctor can analyze the conditions of the patient in a wireless manner [3].

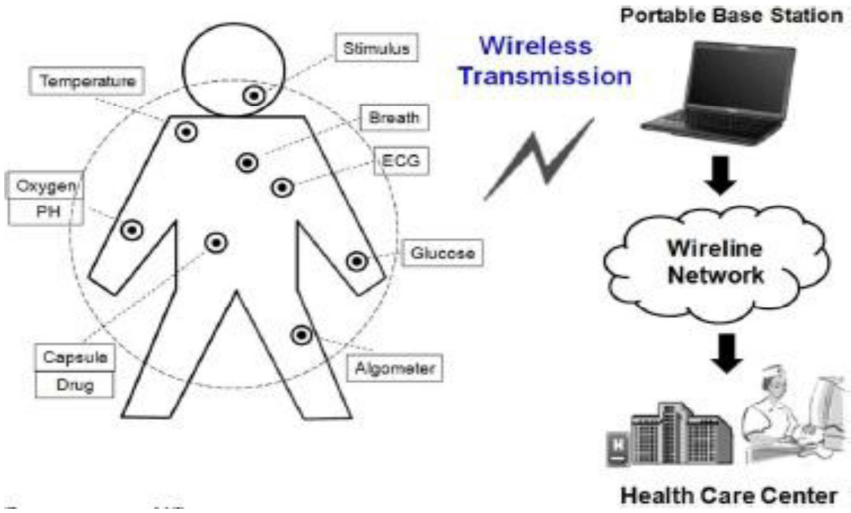

Fig 1 Wireless Communication

In this paper we are presenting an energy efficient transmitter for wireless communication of medical applications. This optimum energy efficiency is attained by combining the transmitter with the VCO direct modulation mode and the PLL-based mode [6]. By using frequency presetting technique, the data rate of the PLL based mode can be increased with low power consumption. The mechanism used here in this design is frequency auto calibration. The transmitter can avoid the repetitive calibration process and thereby save the energy in practical applications by storing the calibration parameters and control signals in the database.These are the main criteria to design a smart, compact, and low-power wireless base station which would make the medical monitoring available anytime and anywhere.The technique can reduce the lock-in time and increase the frequency switching speed greatly so that the data rate of the TX can be increased with low power consumption.

EXPERIMENTAL SECTION

Transmitter Section:

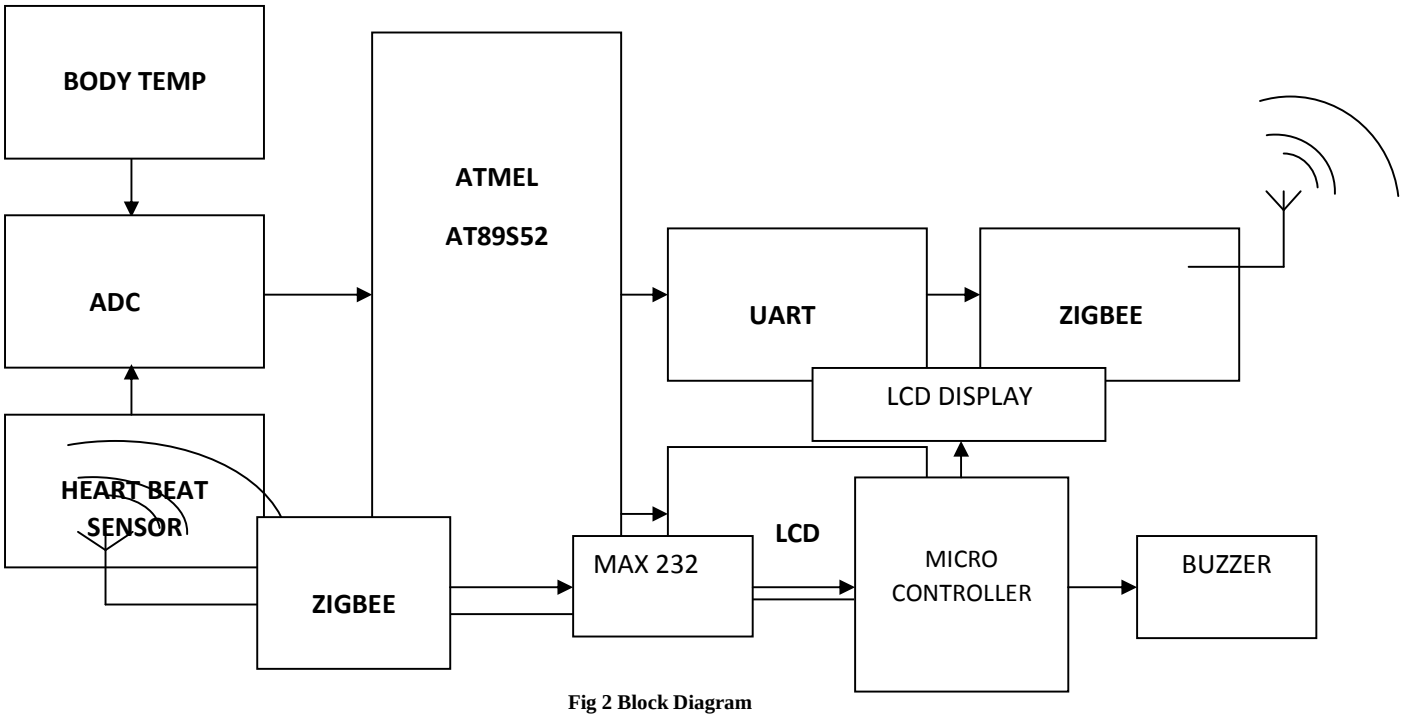

Fig 2 Block Diagram

2.1EXPLANATION OF BLOCK DIAGRAM

Body temperature sensor, heart beat sensor are used to sense the human body temperature as well as heart beat rate. The sensed data is send to a microcontroller for processing through an analog to digital converter. The function of an analog to digital converter always convert the analog values into the required digital values.

Zigbee acts as a transmitter as well as a receiver and is interfaced to the micro controller by means of MAX 232. A liquid crystal display is provided for displaying the sensed values.

The sensed values are transmitted from the patient side to the doctor side in a wireless manner by means of Zigbee, microcontroller and values are displayed using a liquid crystal display[7]. A buzzer is setup to indicate abnormal conditions (Fig 2) [8].

RESULTS AND DISCUSSION

Temperature sensors and heartbeat sensors are fixed on the human body for initial sensing.
The temperature of the patient is sensed by the temperature sensor.
Heart Beats of the patient are sensed by the heart beat sensor.
The sensed values are sent from patient side to doctor's side in a wireless manner using Zigbee and are displayed in LCD for a doctor to monitor.

CONCLUSION

Based on the results obtained, it is concluded that medical monitoring using wireless transmission works better than same using wired transmission as wireless transmission is,

- Smart and Compact.
- Makes the monitoring of physical conditions available anytime and anywhere.
- Increased data transfer rate with low power consumption.
- The sensed values can be stored in the data base to avoid repetition.

Future Scope

Early warning system or post event notification in various sectors, including transportation, environment, forestry (read forest fires), agriculture (read precision farming), national security (intrusion detection along international borders, or tracking hostile objects), public health in work places (mines, nuclear power plants, refineries), and disaster mitigation.

REFERENCES

[1] B. Latr´e, B. Braem, I. Moerman, C. Blondia, and P. Demester, *Wireless Networks*, vol. 17 January **2011**, pg. 1–18
[2] S. Ullah, H. Higgins, B. Braem, B. Latre, C. Blondia, I. Moerman, S. Saleem, Z. Rahman, and K. Kwak, *Journal of Medical Systems*, August **2010**, pg. 1–30.
[3] N. Hamza, F. Touati, and L. Khriji, *Proc. Int.Conf. Commun. Comput. Power* (ICCCP'09*)*, 18 February **2009**, pg. 183-188.
[4] E. Jovanov, D. Raskovic, J. Price, J. Chapman, A. Moore, and A. Krishnamurthy, "Patient monitoring using personal area networks of wireless intelligent sensors," *Biomed. Sci. Instrum.* , **2001**, pg. 373–378.
[5] M. Chen, S. Gonzalez, A. Vasilakos and V. Leung, *Mobile Networks and Applications*, vol. 16 no. 2, **2011**., pg. 171–193
[6] U. Varshney and S. Sneha, *IEEE Commun. Mag.*, vol. 44, no. 4,Apr. **2006**, pg. 49–55.
[7] J. S. Choi and M. Zhou, *Proc. IEEE Conf. Syst., Man Cybern.*, **2010**, pg.2427–2433.
[8] S.-K. Chen and P.-C. Wang, *IEICE Trans.*, vol. 93-B, no. 4, pg. 858–861.