



A Review on Energy Efficient Wireless Sensor Networks using Data Encoding Technique

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Abstract- Basically wireless sensor networks requires low cost devices and low power operations. This proposed system gives a new idea which can save energy at the time of transmission of data. This is the energy efficient communication scheme for wireless sensor networks that is based on the gray number system encoding of data. In this proposed scheme the binary number is converted into gray number first and then transmitted and at the receiver end the gray number is converted to binary. This paper is survey of different methodologies which was designed for saving of energy.

Keywords- Wireless Sensor Networks, Energy efficient Scheme. Gray code, transmitter, receiver.

I. INTRODUCTION

Wireless sensor network is self configuring network and it is made up of small sensor nodes. These nodes are able to communicate among themselves using radio signals. These nodes are also called as motes. The components of any wireless sensor network involves radio trans-receiver, antenna, and micro-controller. By including all these components it forms a network and transmits the data at transmitter and receiver. [1]

This proposed system involves WSN communication, and this is energy efficient communication system which is able to save energy at transmitter and receiver. This system basically uses data encoding technique which converts binary number into gray and transmitted through transmitter. At the receiver gray number is converted into binary, and data is received in binary form. This proposed system is able to save 18% energy at transmitter and up to 36% energy at receiver. As this system is very efficient because it does not involve multiplication and division, instead it only involves addition.

II. RELATED WORK

Wireless sensor networks (WSNs) typically uses highly energy constrained, low cost sensor devices that are deployed in areas that are difficult to access and with little or no network infrastructure (in excess temperature environment, or in humidity areas and more). In most scenarios, such battery powered and operated sensor devices are expected to operate over long periods of time. Communication being a major source of power drain in such networks, energy efficient communication protocols that can be implemented with low hardware and software cost/complexity are thus of paramount importance in WSNs to reduce the device recharging cycle periods and hence provide connectivity for longer durations at a stretch [1].

In now a days there are various schemes are provided for wireless communication, this utilizes non-zero voltage levels for the transmission of data. By using this kind of data transmission technique they also keep both the transmitter and the receiver switched on for the entire duration of the transmission of a data frame, because of this the data loss is occurred during transmission as well as receiver.

A. A new approach to secure data aggregation protocol for WSN [2] :-

This paper introduces a technology which can save the energy in wireless sensor networks at the time of data transmission. This is a secure data aggregation protocol for wireless sensor network (WSN).

This system guarantee the essential security needs, this system can saves energy as well as provides security also. This system aggregates the same sort of data and then transmitted through the communication system. To provide security encryption technique is used which ensures data confidentiality with message authentication code (MAC) with data integrity [3].

Basically data aggregation is the process of combining the data which comes from various sources and after this it reroute them after removing the redundancy. In this type of data communication there are various nodes are connected in that some of are child nodes and main nodes. data is aggregated through child node at one point as per the required aggregation function, and then aggregated data is transferred to high level aggregated node [4]. It removes redundancies from transmitted data and hence decreases the amount of data transmission. Because of this is uses outlier detection algorithm to detect and filtered out the outlier sensor nodes, it provides data confidentiality by using symmetric encryption.

B. Directed diffusion for wireless sensor networking [4]:-

In directed diffusion for wireless sensor networking technique they explore the directed diffusion method for small chip nodes .This method is coordinate to perform distributed sensing of same kind of environmental phenomena. This is data centric data diffusion method in which all communication is for named data in this different nodes are connected in network & they are application aware. This can saves energy by enabling diffusion by selecting empirically good paths & by caching & processing data in network. This scheme is explore & evaluated for simple remote-surveillance sensor network analytically & experimentally .In this paper author desired the new way of directed diffusion to save energy in wireless network. [5]

C. TSS: An energy efficient communication scheme for low power WSN [6]:-

As WSN requires low cost devices and low power operations, and it employs radios with only simple modulation technique like ASK, FSK [7]. This author utilizes a new energy efficient scheme for wireless sensor networks. This proposed system uses ternary number system encoding technique, and this scheme is able to save energy at transmitter and receiver. It converts the binary data into ternary code and then transmitted through the communication channel, and vice versa at receiver.

This scheme can also called as ternary with silent symbol. This system shows that most of the existing communication system utilizes non-zero voltage levels for both 0 and 1 to distinguish between a busy channel and silent channel, and because of this it keeps both transmitter and receiver switched on during the entire duration of transmission of data. And can consume more energy while transmitting both 0 and 1 and called as energy based transmission (EbT) [8] [9] [10]. This scheme effectively work onto this type of communication, so this presented scheme can saves energy simultaneously at the transmitter and receiver [11] [12] [13]. This data encoding technique is simple as no complicated mathematical operations are involved into this.

D. Proposed system:-

These above all techniques are implemented for saving of energy in multiple ways. These techniques are very efficient but they do have same circumstance & limitations. By taking these references & technologies this paper introduces a new technique to save energy at transmitter & receiver. This is the data encoding technique. A simple algorithm is used at transmitter & receiver; it uses data encoding technique at both the sides. An efficient algorithm for conversion of binary number into gray code at the transmitter and gray to binary conversion at the receiver.

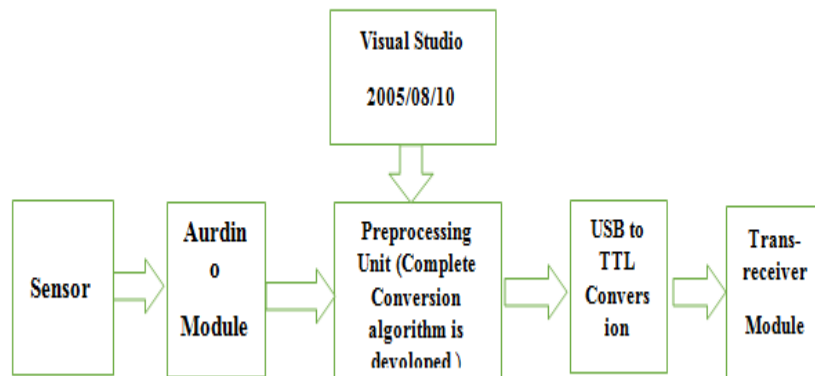


Figure 1: Transmitter

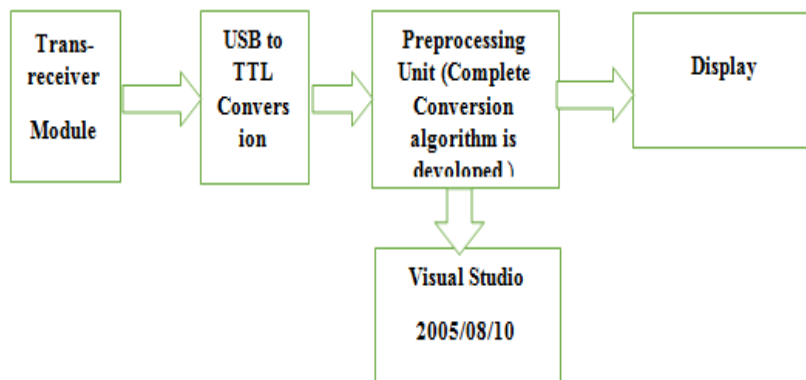


Figure 2: Receiver

In this scheme reading is from sensor module and after that decimal number is processed and after that will be in binary for processing but instead of processing binary number it is converted into gray code and then data transmission is done, Vice a versa process will be done at receiver end. There are various advantages of gray code over binary number if we compare binary number with gray code. In conversion of binary to gray does not involve any division and multiplication instead it involves addition. This can save energy at transmitter and receiver; and this algorithm can be implemented efficiently. Above figure shows the block diagram of proposed system which involves transmitter and receiver.

CONCLUSION

This paper is a survey of different methodologies to save energy at the time of data transmission; also we compare these methodologies with proposed system. The proposed system is able to save energy at transmitter and receiver by using efficient algorithm which is conversion of binary to gray code at the transmitter and vice versa at the receiver. This paper also provide a block diagram of proposed system.

REFERENCES

- I. K. Sinha, "An energy efficient communication scheme for applications based on low power wireless networks," to appear in Proc. 6th IEEE Consumer Communications and Networking Conference (CCNC), Las Vegas, USA, Jan. 10–13, 2009.

- II. Mukesh Kumar Jha, T.P. Sharma, "A new approach to Secure Data Aggregation protocol for Wireless Sensor Networks", *International Journal on Computer Science and Engineering (IJCSE)* Vol. 02, No. 05, 2010.
- III. Saut Ozdemir, Yang Xiao, "Secure Data aggregation in wireless sensor network: A comprehensive overview", *Computer Network*, vol. 53, Elsevier, pp. 2022-2037, 2009.
- IV. C. Intanagonwiwat, R. Govindan, D. Estrin, J Heidemann, F. Silva, "Directed Diffusion for Wireless Sensor networking", in: proceeding of *IEEE/ACM Transaction on Networking*, Vol. 11, 2003, pp 2-16.
- V. F. Bennett, D. Clark, J. Evans, A. Hopper, A. Jones, and D. Leask, "Piconet: Embedded mobile networking", *IEEE Pers. Commun.*, vol. 4, pp8-15, Oct 1997.
- VI. Rabindranath Ghosh, Koushik Sinha, Debashish Datta, Bhabani P. Sinha, "TSS: An Energy Efficient Communication Scheme for Low Power Wireless Networks", *IEEE 978-1-4244-3367*, 2008.
- VII. J. Burrell, T. Brooke and R. Beckwith, "Vineyard computing: sensor networks in agricultural production," *IEEE Per. Comp.*, vol. 3(1), pp. 38–45, 2004.
- VIII. I. Demirkol, C. Ersoy and F. Alagoz, "Mac protocols for wireless sensor networks, a survey," *IEEE Comm. Mag.*, 2005.
- IX. W. B. Heinzelman, A. Chandrakasan and H. Balakrishnan, "Energy efficient communication protocol for wireless microsensor networks," *Proc. Intl. Conf. on Sys. Sc.*, 2000
- X. K. Sinha, S. Ghose and P. K. Srimani, "Fast deterministic broadcast and gossiping algorithms for mobile ad hoc networks," *J. of Par. & Dist. Comp. (JPDC)*, vol. 68(7), pp. 922–938, 2008.
- XI. K. Sinha, "An energy efficient communication scheme for applications based on low power wireless networks," to appear in *Proc. 6th IEEE Consumer Communications and Networking Conference (CCNC)*, Las Vegas, USA, Jan. 10–13, 2009.
- XII. K. Sinha, "A new energy efficient MAC protocol based on redundant radix for wireless networks," *Proc. Recent Trends in Information Systems (RETIS)*, Calcutta, pp. 167–172, 2008.
- XIII. K. Sinha and B. P. Sinha, "A new energy-efficient wireless communication technique using redundant radix representation," *Tech. Rep., Indian Stat. Inst., ISI/ACMU-07/01*, 2007.