Technique Pair of node to provide Power in WSNs

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Abstract

The problem of exhaustion of the battery in the sensor node is one of the problems in traditional wireless sensor networks (WSNs) and charging in a hibernate state, which occurs frequently to assume the traditional connection, which delays data collection. To solve this problem, we propose node pair technology to reduce unnecessary packets in the send of same data as the connection between the short distance sensor nodes is prevented to improve data collection efficiency, the node pair effectiveness ratings have been conducted by computer simulation.

Keywords

Pair of node, provide Power, sink node, WSNs

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I am satisfied with the submission as it is

1. Introduction

Sensor node power offer technology is an important technology leading to expanding wireless sensor network applications, which represent provide wireless communication functions to sensors and construe multi-hop wireless networks, Usually sensor-time requests take a long time, such as running the battery for several years. This reduces WSNs' applications, Therefore, it has become necessary to avoid the problem of battery depletion of the sensor nodes in the network and to solve these problems, we suggest a technique of pairs of sensor nodes [1].

The nodes itself determines the need for similar data to reduce unnecessary packets. Also, with simple sensor nodes with limited performance they cannot be synced as a whole, Only a simple synchronization takes place between the associated nodes, And the waiting time for reception is switched to allow reception at the same point, Thus, the time is increased in practice, In addition to preventing communication between short-distance sensing nodes to improve the efficiency of data collection. This makes it possible to collect data more quickly, improve the spread rate, and reduce unnecessary traffic.

In the entire network, which likely causes communication failures due to packet collision. To show the effectiveness of the method of the node pair, it was simulated using MATLAB program [2].

The new contributions to this manuscript are the use of pairs of proximity sensing nodes, and the nodes themselves define the need for similar data to reduce unnecessary beams. Also, with simple sensor nodes with a limited performance that cannot be synchronized as a whole, only a simple synchronization is performed between the paired nodes, and the waiting time of the reception is switched to allow reception of reception at the same point. In practice, time increases, and communication between short-distance sensing nodes is prevented to improve the efficiency of data collection. This makes it possible to collect data more quickly, improve acquisition rate, and reduce unnecessary traffic across the entire network, which is likely to cause transmission failure due to packet congestion.

2. Previous studies

A number of providing Power technologies have been proposed for wireless sensor networks: In the

Study submitted [3] theoretical analysis of the different ways by which can improve the energy efficiency of the wireless sensor networks is presented, and discussion photovoltaic cell which is one of different energy efficient routing techniques for efficient power management in wireless sensor networks, which enhance the operational battery lifetime of the nodes and [4] focuses on different techniques to reduce the consumption of the limited energy budget of sensor nodes. After having identified the reasons for energy waste in WSNs, we classify energy-efficient techniques into five classes, namely data reduction, control reduction, energy-efficient routing, duty cycling, and topology control. then detail each them by a recapitulative table.

In studying [5] propose the network routing is enhanced using AOMDV protocol which can accurately discover the neighbor nodes and power management with HMAC protocol which reduces energy utilization significantly. A complete analysis is being performed to estimate how the QoS metrics in various scenarios of power consumption in wireless networks the study [6] presents an energy-efficient neighbor discovery protocol targeted at synchronized low duty-cycle medium access control (MAC) schemes such as IEEE 802.15.4 and S-MAC. The protocol effectively reduces the need for costly network scans by proactively distributing node schedule information in MAC protocol so Energy consumption is further reduced by optimizing the beacon transmission rate. The protocol is validated by performance analysis and experimental measurements with physical WSN prototypes. then the protocol can reduce node energy consumption up to 80% at 1−3 m/s node mobility.

The comparisons with the papers mentioned above differ from one study to another. In Ref. [3], the photovoltaic cell was used, and in Ref. [4−6] different protocols were used to reduce contract energy consumption and extend battery life. In our research, this technique used node pair technology to reduce unnecessary beams in data transfer. Similarly, communication between short distance sensor nodes is also prevented to improve data collection efficiency and energy-saving.

3. Transfer the data in the WSN

WSN is characterized by its increasing importance in remote control, gathering information related to the environment, monitoring weather, inspecting the safety

of industrial and building installations, detecting fires, penetrating areas, border security, and military applications. It involves the transfer and processing of various physical events such as heat, sound, and pressure by wireless sensitive devices spread over a limited area which may be known as a randomized or random spread [7].Where the data is collected and transferred from a large number of sensor network nodes to the sink node by connecting the multi-port to the end-user as in Fig. (1) and by repeating the following steps [8].

1) When each node is the sensor in the transmission state, the information flows if there is a sensor node in the standby state of reception within the transmission band
2) If not, they return to shipping again.
3) If there is a Sink node in the transmission range, the transmission is performed only to the Sink node.
4) After the transfer is completed, the sensor node clears the sent data.

4. Other methods to provide power in WSNs

Given the significant importance of the use of wireless sensor networks, various studies of providing power methods have emerged in WSNs, that is:

(1) The study of Sandra and others shows and compared several Media Access Control (MAC) protocols, Which are designed to improve power consumption without compromising the delivery of data in WSNs [9].
(2) In the study of Amit Sharma and others Analyze and estimate the lifetime of the sensor node and
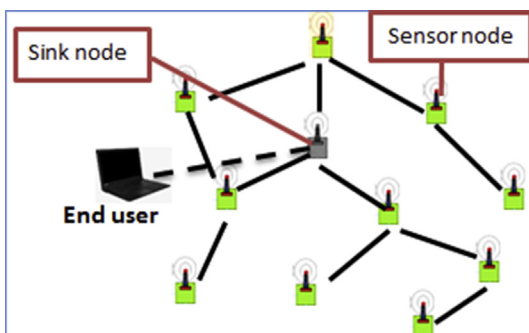

Fig. 1. Sensor network provides Power.

measure the energy characteristics of the node based on the proposed model, where it can work with battery about 6.5 months for 10 times and simulation experiments show that the sensor node works for about 7 months [10].
(3) The study of Jamal N. Al-Karaki & Ahmed E. Kama: Routing techniques based on network architecture are categorized into site-based routing protocols. These protocols are categorized in multi-directional, query-based, negotiated or service-based routing methods, depending on the protocol process [11].
(4) In the study of V. Karthikeyan, A.Vinod P. Jeyakumar, a new method was proposed to discover the traditional node and set up the path by implementing the AOMDV protocol.

The Hybrid MAC protocol was implemented and the results showed a significant reduction in power consumption [12].

5. Proposed technology to the power saving

A pair of sensor nodes is associated with short distances in pairs of sensor nodes and without repeating the contract, and each associated node reports about status to each other irregularly.

When the sensor node of the main unit is in Standby mode for the reception and the sensor node of the dual nodes is in standby mode For the reception, the last sensor node is in the weighted state. In the state of sleep while waiting for reception. When the flowing current was already measured to the sensor node, there was a current of about 25 mA flowing in the For reception standby state, but it was about 22 °C in the case of sleep.

The sensor node does not do anything if waiting and returns to the standby mode one more time when it ends wait for mode for the main receiving unit.

As a result, when another sensor contract is sent, the waiting time for receiving the contract at the same point becomes much longer, thus increasing the probability of successful data transfer and reception.

Thus, the send and reception between the sensor double contract, as in fig. (2), which represents the waiting state to avoid duplication to reception readiness.

In addition, given For not making transport and reception between the dual sensor nodes, communication is reduced to a short distance in the way to the
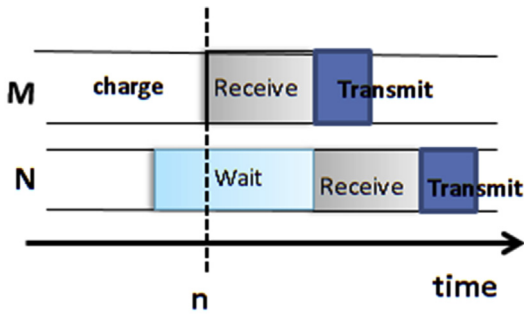
Fig. 2. Transmitter and receiver between sensor nodes double.

Fig. 3. Contract valuation.

sink node and increases data connections for relatively long distance. As a result, the hop count from the sensor node is reduced to transferring the data to the mitigation source node, and the time to get the data is reduced by the filter source node.

In addition, the dual node sensor node does not transfer the data itself but transfers the data to the sensor node of the master unit.

By sending similar data obtained at a short distance in the same package, unnecessary traffic can be reduced and the acquisition speed improved.

Because these two data are similar data created at a short distance, they are the same data without increasing the amount of data that effects power consumption.

Fig. (2) shows the state transmission of the M sensor node, or the main unit and N sensor node, in pairs on the time axis., And the two nodes are realized from the operating state sensor to each other. The sensor node repeats three steps for charging: the reception and the transmission readiness, but if it passes regularly here, the receiver standby state is expected Condition overlaps Prepare for reception For the pair at time = n. In such a case, wait for the N sensor node, and not waiting for reception. The waiting state is performed by combining the known reception time and the sending time, and waiting for node N to wait for the reception. In this way, the receiver is waiting so that the node pairs do not cover each other.

6. Computer simulation

Simulated using the MATLAB program to draw a two-dimensional form of 10,000 × 9100 pixels and the sensor contract arranged randomly in four directions, The data acquisition rate for the Sink node installed in the center is evaluate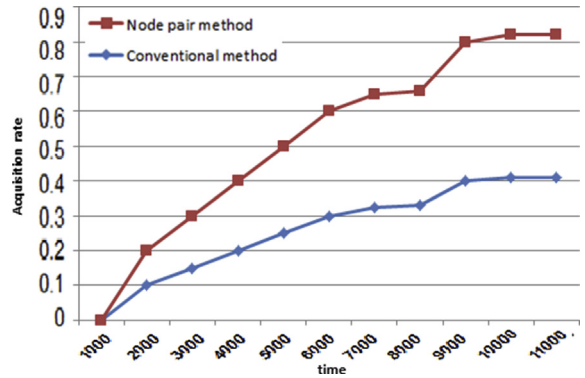d. The acquisition rate is the ratio of the total number of sensor nodes to the number of data without losing the data obtained by the filtered source node at a given time. The number of duplicate data is also measured at the same time, and the number of duplicate data is defined as the number of matching data that reaches the Sink node.

The distance between the double nodes is 30 pixels or less and the distance from the sensor node is 20 pixels. The charging rate is 10 MW on average and is given in random numbers according to the standard distribution of the 2 bands. Charging time can be calculated between about 65.14 and 95.20 ms of Transport capacity And the power of reception and system power consumption of the sensor node. The transmission time is about 2.5 ms, and the receiver reception time is set to 5.3 ms, twice that. in Fig. (3), the emphasis was placed on improving the acquisition rate and acquisition speed when using the proposed method.

7. Conclusions

The node pair method was proposed to efficiently gather information in wireless sensor networks to provide power. The proposed method shows that the acquisition rate can be improved while reducing the number of duplicate data, making it possible to collect data more quickly and reduce unnecessary traffic across the entire network.

8. Recommendations

Advanced technology can be used with a number of three or more node pairs, but checking whether changing the distance between the associated nodes is necessary.

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