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Technique for Energy Consumption in Wireless sensor Network

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Abstract

Wireless sensor network has been widely used in many sectors. The popularity gained due to some reasons such as installation flexibility, mobility, reducing cost and scalability. In wireless sensor network energy consumption is one of the major issues, thus making energy – efficient protocol is design to overcome the energy consumption problem. In many existing protocols for energy – efficient routing them forward packets through minimum energy path to the sink towards the minimum energy consumption, which cause an unbalanced distribution of residual toward all sensor node in network partitioned. This paper focused on the design energy consumption routing protocol using essential hypothetical fields like depth, energy density & residual energy. The basic goal is that an approach towards force packet to the sink through dense energy area. Also addressing routing problem and enhanced the mechanism of eliminating and detecting of loops. It is also support for data security by using data security algorithm like ECC (Elliptic Curve Cryptography). This paper is important towards in energy balancing, network lifetime and coverage ratio.

Keywords – data security, energy consumption, efficient routing, essential hypothetical fields, wireless sensor network,

1. Introduction

A wireless sensor network is a bundle of micro sensors installed within an inflexible area. The sensor space is specific environment and route for sensed data to relatively control processing node i.e. called Sink. Energy is one of the most crucial resources for battery powered in wireless sensor network to increase the network lifetime and energy efficiency become one of the basic wireless sensor network is design. In structure to use the limited energy most existing routing scheme to fine minimum energy path to the sink and optimized energy at nodes. For the process of energy consumption and in cause the network lifetime some important point should be addressed i.e.

- Energy depletion
- Imbalance energy distribution
- Mobility of nodes
- Relay of nodes
- Node distribution according traffic pattern
- Data aggregation
- Energy balance routing

Although energy routing protocol has been proposed for focused energy efficiency finding optimal path to minimize energy consumption. In this paper an energy balance routing protocol is not for energy consumption but is also used for energy balance, the routing protocol work with two ways i.e. data based query routing and data gathering based routing.

In this paper we need energy –balance routing algorithm with data security using essential hypothetical fields. In that data forward towards the sink through dense energy area from protecting low energy nodes. The depth field used for applying basic routing path to forward packets toward the sink. The energy density field ensures that forward packet always through high density area and residual energy field to protect the low energy nodes.

2. Techniques for Energy Consumption

2.1 Avoiding Energy Holes

In [1] the author investigates the theoretical aspect of the uneven depletion in the sink based wireless sensor networks. They consider as uniformly distributed sensors toward sending roughly the same

information number of time to the closest sink. They prove that the to minimize the resultant amount of energy is spent on routing along with originating path of a sensor in a corona and completion at the sink, all coronas having same width.

In [2] the author investigates the theoretical aspect of the nonuniform strategy to avoid energy holes problem in wireless sensor networks. In that they conclude a circular multihop sensor network with nonuniform node distribution with constant data reporting and the unbalanced energy depletion towards all the nodes in the network are unavoidable. A nonuniform node distribution strategy is to achieve nearly balanced energy depletion in the wireless sensor network. They regulate the number of nodes in each corona and derive ratio between adjacent nodes and used distributed shortest path routing algorithm for nonuniform node distributed strategy.

In [8] the author investigates the problem of uneven energy depletion and consumption in large many –to- one sensor networks. All sensor nodes are generate consist bit rate on data and send to a single sink through multihop transmissions. This type is also used for environment and data gathering. Analytical modeling is proposed for this problem, which is help to understand the relevance of different factors on energy consumption. Using this model the effectiveness of several existing approaches towards reduced the energy hole problem consisting deployment assistance, aggregation and traffic compression.

2.2 Topology Control

In [4] the authors consider two- tiered a wireless sensor network consisting of sensor cluster installed around strategic area and base stations whose locations are relatively movable. In a sensor cluster there are many nodes for capturing encoded and transmit related information from the designated area there is at least one application node to received row data from the sensor nodes and create a comprehensive local view and send in form of composite bit – stream toward a base station. by using sensor node and application node are battery powered, energy constraints and node lifetime directly affect to the network lifetime of wireless sensor networks, on the topology control process for application nodes and base stations constitute the upper tier of a two- tiered wireless sensor network to approach maximize the topological network lifetime by wireless sensor network and used Computational Geometry algorithm for arranging base station location and application node relaying optimally.

2.3 Mobile Relay /Mobile Sink

In [5] the author investigates the benefits of heterogeneous wireless sensor network architecture composed of mobile nodes and a large number of simple static nodes. These mobile nodes act as a mobile relays or mobile sink. They compute the network lifetime by using different routing algorithm, there are three different algorithm works on three different conditions as like static network, mobile sink and mobile relay.

In [6] the author proposed energy conservation protocol for energy conservation routing, topology control, clustering and data aggregation. These all protocol focused on sensor nodes, the sensor node forward data for other nodes whose number can be very large but load of sensor nodes are unbalanced. The load of sensor nodes can be balanced by changing base station position from time to time and find better routing strategy.

2.4 Energy Balancing Strategy

In [7] the author proposed and analyzes five strategies that balance energy consumption of the nodes to increase the network life time by using data compression, routing and distance variation with and without rate adaptation and reliability of balancing, these scheme is useful for the affecting transmission delay significantly, remarking on delay performance. The analyses are based on a non-fading model with adaptive white Gaussian noise and a Rayleigh fading model. The non- zero probability of a packet loss even if nodes are close is often ignored. An important thing is that the energy benefits of multihop routing become less significant.

2.5 Energy Efficient Protocol

In [9] this paper author looking communication protocols, which having significant impact on global energy dissipation of the networks. Based on the conventional protocol of direct transmission, minimum transmission energy, multihop routing and constant routing may not optimal for sensor network for that clustering based protocol utilize the local cluster base stations to distribute the energy load among the sensors in the network. This is uses localized coordinate to enable scalability and robustness for dynamic network and incorporate data fusion into the routing protocol to reduce the amount of information that must transmitted towards base station.

In [11] the author present a routing structure is called PB – routing that uses steepest gradient search

methods to route data packets. This structure assigns scalar potential to network and forward packets in the direction of more positive force. The family of PB routing algorithm scheme are loop free and used the standard shortest path routing algorithm in a special case of routing. In this analysis to indicate that the traffic aware routing algorithm shows significant improvement of end to end delay and jitter when compared to standard shorted path routing algorithm, and it also indicate that the algorithm does not incur too much control overhead and is fairly stable even traffic condition are dynamic.

In [12] the author identify the requirement and properties that still need to addressed and possible approach that adopted in the design of efficient routing protocol for the networks by using motes energy and storage restrictions. There is certainly not a protocol support mobility, scalability, data aggregation and server energy efficiency and fault tolerance at the same time. In this paper an adaptive lightweight location service supporting routing over a hierarchy that enforce balanced energy conservation across the overall network.

2.6 Energy Balancing

In [14] this paper author investigates the use of proactive multipath routing to achieve energy efficient operation of ad hoc wireless networks. The main focused is on accessing trade-off between the energy balance loads. The first propose a simple scheme for multipath routing based on proximity nodes, then combining between stochastic geometric and queuing models to developed continuum models for networks, allowing attention of different type of design i.e. with and without energy replace and storage capabilities. Author proposes a parameterized family of energy balancing strategies for grid and approximates the spatial distribution of energy burdens and analyzes the fundamental importance of trade –off explore. In that the result shows the proactive multipath routing decrease the probability of energy depletion by orders of magnitude versus that of shortest path routing scheme when the initial energy reserve is high.

In [13] the author focuses on analytical solving the linear program for some simple regular network topologies. There are two topologies considered are a regular linear array and a regular two- dimensional network. In linear case, upper bound on functional life time is derived to be achievable and the exact form of the optimal communication strategy is derived. Finally it shows that the simple collection scheme of transmitting only to nearest neighbors yields a nearly optimal in a scaling sense.

3. Proposed Technique

In wireless sensor network energy consumption is one of the major issues, thus making energy – efficient protocol is design to overcome the energy consumption problem. The proposed technique is used energy hypothetical field to forward packet toward sink using dense energy area and avoiding low energy area with data security, it is also useful for removing imbalance energy distribution and helpful for to address routing problem. It reduce energy depletion problem by using node distribution according traffic pattern.

To address the energy consumption my proposed techniques is that to divide the idea into 3 parts.

1. Energy Depth
2. Energy Density
3. Residual Energy

3.1. Energy Depth

The energy depth field is used to establish a basic routing paradigm which keep packet move towards the sink.

3.2. Energy Density

The energy density field ensures that packets are always forwarded along the high energy area.

3.3. Residual Energy

The residual energy fields aim to protect the low energy nodes.

4. Conclusion

Energy is one of the most crucial resources for wireless sensor networks. Almost works in the literatures about Wireless sensor network routing has energy consumption as an important optimization goal. Energy saving in wireless sensor networks having a lot of unique challenges as compared to wired networks. In this paper for using energy consumption protocol not only for energy consumption but it is also used energy balance to increase the network lifetime for avoiding imbalance energy consumption.

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