MECHANISM FOR ENERGY CONSUMPTION ROUTING PROTOCOLS FOR WSN USING RSES

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ABSTRACT

The Major problem in wireless sensor network to achieve an energy efficient routing protocol. Energy consumption is a critical problem in wireless sensor network for nodes and net-work life. For increasing lifetime of networks energy saving is must and also energy saving routing protocols are very important in wireless sensor networks. More the radius more is energy requirement. Hence if radius is less then energy consumption will be less. In this paper a RSES routing protocol is presented which adjusts the radius according to threshold value, by using this protocol energy consumption is minimized. The on-demand route discovery process is used for routing table information. After remaining energy level reaches, a certain threshold, node reduces its transmission radius and again modification is done in order to achieve less energy consumption under the premise of some certain coverage ratio. By using this algorithm Energy consumption can be minimized. Using RSES, network lifetime and has a balanced network load, energy saving and routing traffic.


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1. INTRODUCTION

Today in wireless communications have enabled the development of low cost, low-power signal, multifunctional sensor nodes that have small in size and communicate untethered in short distances for sensor node. WSN consist of various sensing, data processing, and communicating components [1], leverage the idea of sensor networks. Wireless Networks consist of large number of sensor node to beneficial over traditional sensor. Various Feature of sensor networks random deployment in inaccessible terrains or disaster relief operations,
sensor network protocols, algorithms must possess self-organizing capabilities and effective. Sensor networks the cooperative effort of sensor nodes and multi-hop communication. Sensor nodes are fitted with an onboard processor. WSN application areas are sensor are use health, military, security, environment, home etc.

![Figure 1 Typical architecture of WSN](image)

Less energy consumption can be achieved by reducing the node transmission radius [3, 4]. Power control to reduce interference and improve throughput is addressed [5, 6, 7]. we present a transmission radius self-adjust energy-saving routing protocol (RSES). In this Protocol node it reduces up to maximum transmission radius level only to reach the farthest neighbor before it sends the first packet [8, 9]. When remaining energy level reaches, a certain threshold, node reduces its transmission radius again in order to achieve less energy consumption [10] under the premise of a certain coverage ratio [2]. Results are network lifetime and have a balanced network load and routing traffic.

2. RELATED WORK

2.1. Maximizing the Lifetime of Wireless Sensor Networks through Optimal
To get optimal network lifetime by power control on a much larger timescale with the so-called single session flow routing solutions, under which the packet level power control and strict requirement on synchronization are not necessary. The synchronization requirement is very low and its overhead is less when difference to packet level multisession ow routing solution. Lifetime centric flow routing for energy constrained wireless sensor networks.

2.2. Increasing the Throughput of Multi-Hop Packet Radio Networks with Power Adjustment
The power control problem has been not considering by most works, but may have impact on performance. By power control, transmission ranges of stations are tunable Packet Radio Network. How to control a multi-code assignment problem to a single code assignment problem and then use the proposed power adjustment schemes to improve the network performance.

2.3. Topology Control for Multi-Hop Packet Radio Networks
Distributed topology-control algorithm has been developed for each node in a packet radio network (PRN) to control its transmitting power and logical neighbors in order to construct a reliable high-throughput topology. The local computation can be programmed in a very efficient way. Topology-control algorithm has higher throughput more than regular-structure
networks with the same. An under the disk-threshold interference model and ALOHA random-access protocol. Distributed topology control algorithm is very well suited for real-time applications.

2.4. Topology Control of Multi-hop Wireless Networks using Transmit Power
For saving power they used Centralized algorithms in static networks and solve their optimality. The distributed heuristics that adjusts node transmission power while changing topology and maintain connection to save power in mobile network. It will have connected of multi-hop wireless networks in practice can be substantially increased with topology control.

2.5. Distributed Topology Control for Power Efficient Operation in Multi-hop Wireless Ad Hoc Networks
Network topology increases network lifetime by reducing transmission power and reduces traffic interference if node degrees is very low. Moreover, that the routes in the multi-hop network are efficient in power save. Network lifetime can be increased by efficiently managing the power-consumption in each individual node belonging to the network.

2.6. An Energy Efficient Routing Mechanism for Wire- less Sensor Networks
Maximum Energy Cluster Head routing protocol is presented which has its self-configuration and routing properties with hierarchical trees. Maximum Energy Cluster Head (MECH) protocol uses the radio properties with hierarchical tress to construct clusters. Hence the network is distributed more equally through our cluster construction.

An efficient routing algorithm for large scale cluster-based wireless sensor networks. The technique uses two levels, in first cluster members send data directly to their cluster head. Second, the cluster heads use ant colony optimization algorithm, to increase WSN sensor is any device that maps a physical quantity from the environment to a quantitative measurement.

2.8. Power-Saving Protocols for Multi-Hop Ad Hoc
To study Power saving management protocols, maintaining do main awake-interval, periodically-fully-awake-interval, and quorum-based protocols, based MANETs. Network is fully connected with Ad Hoc or there is a clock synchronization mechanism. Power-saving protocols can save lots of power with reasonable neighbor discovery time.

3. DYNAMIC PROGRAMMING AND SERIALIZATION

3.1. Selection of Transmission Radius
When a sensor node comes into the network, that time it will use maximum transmission power and transmission radius to send packets. As a result of node distribution, max transmission radius is usually longer than the distance between node and its farthest neighbor, which causes the waste of energy. The shadow area of Figure 4 represents the energy waste when a node sends packets with the max transmission radius. Node reduces its maximum level of transmission radius only to reach the farthest neighbor before it sends the first packet.
3.2. Algorithm ITRS// Initiate Transmission Radius Selection

1. The collection of $N(u)$’s will broadcast HELLO packet containing its IP and geographical position information with the max transmission radius. All neighbors are chosen into $N(u)$. Node $u$ collects every neighbor’s information after a round of communication and computes the distance to all other neighbors.

2. The computation of $R_0$ Initial transmission radius $R_0$ equals to the distance to the farthest neighbor.

$$R_0=\max(\text{dist}(u,v) | \forall v \in N(u))$$

After the completion selection of first initial transmission radius, node can still communicate with the farthest neighbor. By network topology and routing information don’t change, and no maintenance is needed.

3.3. Route Discovery

Route discovery process of RSES is on demand. The source node by broadcasting a route request (RREQ) packet to its neighbors. The RREQ contains information the following fields: <source addr, RREQ ID, dest addr, hop cnt, route record>. The pair source addr, RREQ ID uniquely identifies a RREQ.

3.4. Algorithm TRR// Readjustment of Transmission Radius

Node energy is low; energy will be exhausted rapidly if the node still uses the initial transmission radius. So, decrease the speed of energy consumption and prolong the lifetime of node and network, node must reduce its transmission radius and the amount of neighbors and communication. In RSES,
node readjusts its transmission radius based on coverage ratio CR when node’s remaining energy reaches the threshold Er. Definition Coverage Ratio: The ratio of the amount of neighbors after readjust transmission radius to the amount of neighbors before readjustment.

1. The collection of N(u)’s information: Node(u) broadcasts Radius Readjustment Notification packet RRNT when remnant energy reaches Er, and every neighbor replies a Radius Readjustment ACK packet RRACK piggybacking its geographical position information. Node u collects every neighbor’s information after a round of communication and computes N0.

2. Deciding which node in N(u) belongs to NCR(u): Node(u) computes the distance to every node in N(u) and sorts the nodes by the distance. The CR • N0 nodes with the minimum distance will be put into NCR(u).

3. The computation of RCR: The transmission radius RCR, based on the CR, equals to the distance to the farthest neighbor in NCR(u).

4. RCR = max(dist(u,v)|∀v∈NCR(u)) The confirmation of RCR: Node u broadcasts Radius Readjustment Confirmation packet RRCN, informing the neighbors in NCR(u) that radius readjustment has finished and it will send packets with RCR.

3.5. Route Maintenance
The packet is responsible for confirming that the packet has been received by the next hop and make record; the packet is retransmitted until this confirmation of receipt (ACK) is received. If error occurs RERR identifying link and removes this broken link from table.

3.6. Data independence and Data Flow architecture

![Diagram](image)

Figure 4 Architecture for Radius Self Adjust Energy Saving Routing Protocol

The RSES is a plane on-demand energy-saving routing protocol. RSES is composed of initial transmission radius selection, route discovery; transmission radius readjustment and route maintenance figure 4 show the flow of Algorithm.

3.7. Turing Machine
The Radius Self-adjust Energy-Saving Routing Protocol is a plane on-demand energy-saving routing protocol. RSES is composed of initial transmission radius selection where transmission radius only to reach farthest neighbor before it sends the packet. Then route
discovery process of RSES is on-demand so sensor node needs to communicate with another node to get information from route table. Transmission radius readjustment when low energy that node readjust its transmission radius. Route maintenance is used ACK for confirmation its show Data Flow Architecture figure 5.

![Data Flow Architecture](image)

**Figure 5** Data Flow Architecture

### 4. RESULTS AND DISCUSSION

**4.1. Simulation Environment**

We have simulated RSES by NS2 and compared with on-demand routing protocol DSR. The following is the parameters used in the simulations. The network size is 500m*500m with 100 fixed sensor nodes. Average node traffic is 5packets/s. Packet size is 256 bits. Transmission speed is 100kbps. Max transmission radius, is 250m. Each node initial energy is 10J and Eτ is 5J. Transmitting power is 0.02 mW and receiving power is 0.01mW. Each simulation is run for 200s.

**4.2. Results**

Our First objective is to show that RSES can provide a normalized energy. This indicator is used to measure the average flow of information in sensor networks Figure 8 shows the comparison of transmission time Vs energy usage between RSES and DSR. This indicates the normalized energy required for RSES is very less than that of DSR.

Figure 7 shows the comparison of coverage area Vs energy usage between RSES and DSR. This indicates the normalized energy required for RSES is very under minimum coverage area is less than that of DSR.
Figure 6 shows the comparison of transmission time Vs throughput between RSES and DSR.

Figure 7 Comparison of Coverage area normalized energy between RSES and DSR

5. CONCLUSION

In this work, a transmission radius self-adjust energy-saving routing protocol RSES. By using RSES, source node Minimis its initial transmission radius to the most away neighbor before it sends the first packet. The on-demand route discovery process is initiated whenever a source sensor node needs to communicate with another node for which it has no routing information in its route table. Energy Saving by using, this algorithm if remnant energy reaches a certain threshold, node reduces its transmission radius again in order to achieve less
Mechanism for Energy Consumption Routing Protocols for WSN Using ResE

energy consumption under the premise of a coverage ratio which will save energy. Increasing Net- work lifetime using RESE, Algorithm which saves energy hence we can increase network lifetime.

REFERENCES