International Journal of Global Engineering (IJGE) E- ISSN: 2456-3099

VOL 1 ISSUE 4 (2017) PAGES 6 - 10

Received: 28/03/2017. Published: 26/04/2017

GEOGRAPHIC AND OPPORTUNISTIC ROUTINGFOR UNDERWATER SENSOR NETWORKS

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ABSTRACT:

QoS routing is an important research issue in wireless sensor network. Existing work exploits multipath routing and geographic opportunistic routing for QoS provisioning with both end to end reliability and delay constraints in WSNs but they are not efficient for QOS provisioning in WSNs. The proposed Improved Efficient QoS-Aware Geographic Opportunistic Routing (IEQGOR) is used to improve the energy efficient in WSNs. The quality of geographic opportunistic routing is improved by combining geographic routing with awake-asleep scheduling. The IEQGOR presents probability-based target prediction and sleep scheduling protocol (PPSS) to improve the efficiency of proactive wake-up and enhance the energy efficiency with limited loss. IEQGOR significantly increase the QoS in WSNs. The proposed IEQGOR is compared with the EQGOR routing approach through NS-2.34 software. Simulation results demonstrate that IEQGOR improves the energy efficiency, packet delivery ratio and reduce the delay.

Keywords: wireless sensor network, geographic opportunistic routing protocol (GOR), enhanced QoS-aware GOR (EQGOR).

1. INTRODUCTION

Wireless Sensor Network have been designed for monitoring physical or environmental conditions with distributed autonomous sensors and cooperatively passes the information or data to the main location [1]. The information sensing of wireless sensor network in decisive conditions at an emergency state deploys its main importance. Benefits of developing sensor network keeps on increasing based on its practical information in physical environment for different applications either manually or randomly [2].

The transceiver in the sensor is responsible for communication with neighboring nodes and also for the transmission of monitored parameters to the sink node. Irrespective of the application the main task of the sensor nodes as shown in Fig 1 is to sense and collect data from a target domain, process the obtained data and transmit the sensed data back to the point of analysis. This process of communication consumes a significant percentage of the overall energy dissipated. Hence, the routing protocols used greatly impact the power consumption, due to which a constant effort is made to improve the efficiency of these protocols.

The sensors operate under the extreme energy constraints which makes extremely challenging task in designing a new wireless sensor node and it involves assessing a number of different parameters required by the target application, which includes range, size, life time, storage, algorithm, computational cost etc.

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[3], in which providing reliable and timely communication in wireless sensor networks plays a vital role and is a challenging problem. This is because of varying network topology and connectivity change over time [4]. Many routing protocols [5-8] are proposed to maintain the security, reducing the time and improve the unreliable links. This IEQGOR makes the following contributions: 1) To design a target prediction

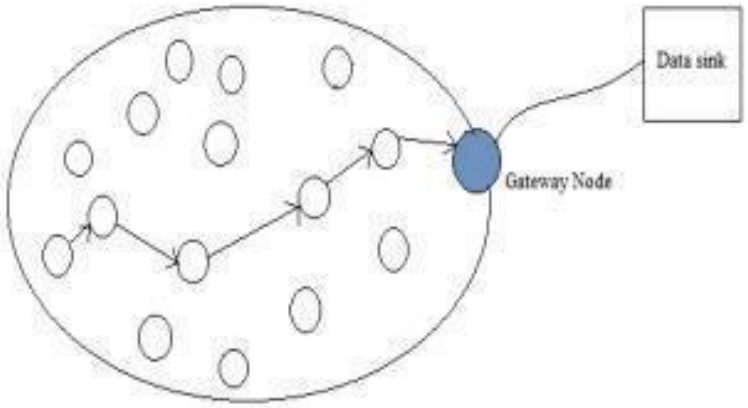

Fig.1. Wireless Sensor Networks

scheme based on both kinematics rules and theory of probability, which enhance the energy efficiency of proactive wake-up with both awakened node reduction and active time control efforts. 2) The proposed PPSS distributed algorithms runs on individual nodes, which makes PPSS scalable for large- scale WSNs.

2. LITERATURE SURVEY

Zorzi M. et al. [10], the author study about the novel forwarding technique based on geographical location of the nodes involved in the network among receivers and provides the description of MAC scheme in its energy and latency performance on collision avoidance. Two steps are involved, first a simplified analysis is made based on relevant trade off and the semi-Markov model is developed which increases the performance evaluation. The stimulated results are provided for the analytical approach. Guidelines are designed on the network layer protocol with physical layer model. It is done by the base three layers about the probability of distance between the nodes in the network. Then optimal path finding with neighbor knowledge is described [11].

Zeng K. et al. [12], describes about geographic collaborative forwarding (GCF) scheme that exploits the broadcast nature and spatial diversity of the wireless medium to improve the packet delivery efficiency. First upper bound of the expected packet advancement is identifying which is achieved and proved by GCF. A new metric EPA per unit energy consumption is proposed with energy efficiency as a major concern, which balances the packet advancement, reliability and energy consumption. Finally an efficient algorithm is proposed which selects a feasible candidate set that maximizes the local metric.

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When the neighboring nodes wake up; it mainly relies on overhearing and checks for energy on the channel. If the channel is busy the node goes back to sleep; if it is free and the node subsequently receives a packet, then forwards it when providing routing progress and it updates its link quality estimate. Unique forwarder selection uses a lightweight coordination protocol to determine a unique forwarder in case the packet was received by multiple nodes.

3. RELATED WORK

Energy efficient opportunistic protocol (EEOR) described in [9] uses a different computational method for calculating the forwarding node list and the expected cost in an attempt to optimize the energy consumption. It considers the following design constraints taking into account a case where there are multiple source/destination pair nodes in a randomly deployed WSN. Nodes in the forwarder list of a node must agree on next operation, since agreement involves communication and thus increasing the overhead, one must guarantee that it will not overwhelm the performance gain brought by EEOR. The EEOR protocol should be able to handle the network congestion, to avoid bottleneck in order to decrease packet loss ratio and save the energy cost at the same time. All source nodes should be able to dynamically adjust their network flows.

A single packet could arrive at the destination through multiple paths, it is necessary to introduce certain penalty scheme in order to punish the selfish nodes, e.g., those nodes that choose too many nodes as potential forwarders. A node can utilize overheard messages to reduce the needs of ACK messages. Actually, to utilize this snooped information to avoid duplication is one important strategy in the design. The design inherits the advantages of OR, thus achieving shorter end-to-end delivery delay, higher energy efficiency, and reliability.

The parameters used for selecting this node, determines the efficiency of the algorithm. Energy being one of the most important and challenging constraints on Wireless Sensor Network routing algorithm is the main criteria for most algorithms. While algorithms like EFFORT and EEOR take into consideration the residual energy some other algorithms focus on reducing the overall energy consumption of the network. With real-time relay of data, data delivered late can be consequently redundant due to the time constraints associated with them. In such cases the Quality of Service is an important parameter to be taken into consideration and QOS enhancing protocols based on opportunistic routing, like EQGOR fare better than traditional QOS based protocols.

4. RESULT ANALYSIS

Energy efficient opportunistic protocol (EEOR) described in [9] uses a different computational method for calculating the forwarding node list and the expected cost in an attempt to optimize the energy consumption. It considers the following design constraints taking into account a case where there are multiple source/destination pair nodes in a randomly deployed WSN.

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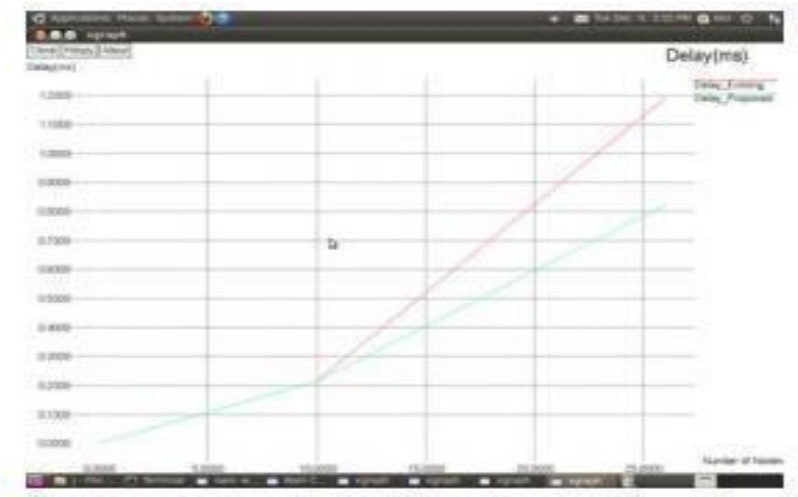

Fig.2. Output waveform

Nodes in the forwarder list of a node must agree on next operation, since agreement involves communication and thus increasing the overhead, one must guarantee that it will not overwhelm the performance gain brought by EEOR. The EEOR protocol should be able to handle the network congestion, to avoid bottleneck in order to decrease packet loss ratio and save the energy cost at the same time. All source nodes should be able to

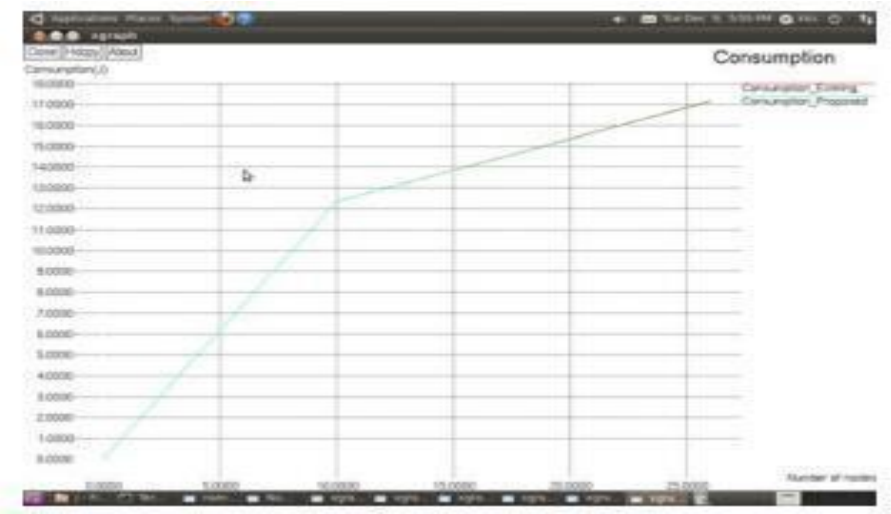

Fig.3. Energy Consumption Vs Nodes

dynamically adjust their network flows. A single packet could arrive at the destination through multiple paths, it is necessary to introduce certain penalty scheme in order to punish the selfish nodes, e.g., those nodes that choose too many nodes as potential forwarders. A node can utilize overheard messages to reduce the needs of ACK messages. Actually, to utilize this snooped information to avoid duplication is one important strategy in the design.

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CONCLUSION

Routing algorithms greatly influence the performance of Wireless Sensor Networks and hence are constantly evolving, aiming at finding the most optimal and efficient solution for routing of data. Opportunistic routing algorithm is designed for multi-hop networks and uses an approach different from traditional reactive protocols as it The parameters used for selecting this node, determines the efficiency of the algorithm. Energy being one of the most important and challenging constraints on Wireless Sensor Network routing algorithm is the main criteria for most algorithms. While algorithms like EFFORT and EEOR take into consideration the residual energy some other algorithms focus on reducing the overall energy consumption of the network. With real-time relay of data, data delivered late can be consequently redundant due to the time constraints associated with them. In such cases the Quality of Service is an important parameter to be taken into consideration and QOS enhancing protocols based on opportunistic routing, like EQGOR fare better than traditional QOS based protocols.

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