Research Paper Engineering

A Survey on Routing Protocols for Wireless Sensor Networks

*S. SARANYA

* Asst.Professor CSE, Annapoorana Engineering College, Salem

ABSTRACT

We study the ubiquitous data collection for mobile users iu wireless seusor uetworks. People with haudheld devices cau easily interact with the network and collect data. In WSN, the sensor nodes have a limited transmission rauge, and their processing aud storage capabilities as well as their energy resources are also limited. The study of routiug protocols in wireless networks is an active area of research. Routing protocols for wireless sensor networks are responsible for maintaining the routes in the network and have to ensure reliable multi-hop communication under some conditions. This paper proposed to discuss some of the major routing protocols for wireless sensor networks. The routing structure of data collection is additively updated with the movement of the mobile user. With this approach, It only perform a local modification to update the routing strncture while the routing performance is bounded and controlled compared to the optimal performance. These proposed protocols are easy to implement. Our analysis shows that the proposed approaches is scalable in maintenance overheads, performs efficiently in the routing performance, and provides continuous data delivery during the user movement.

Keywords : internet protocol, wireless sensor network, sink, mobile ad-hoc network

I. INTRODUCTION

Efficient design and implementation of wireless sensor networks has become a hot area of research in recent years, due to the vast potential of sensor networks to enable applications that connect the physical world to the virtual world. By networking large numbers of tiny sensor nodes, it is possible to obtain data about physical phenomena that was difficult or impossible to obtain in more conventional ways Such sensors are generally equipped with data processing and communication capabilities. The sensing circuitry measures ambient conditions related to the environment surrounding the sensor and transform them into an electric signal. Processing such a signal reveals some properties about objects located and/or events happening in the vicinity of the sensor. The sensor sends such collected data, usually via radio transmitter, to a command center (sink) either directly or through a data concentration center (a gateway). The decrease in the size and cost of sensors, resulting from such technological advances has fueled interest in the possible use of large set of disposable unattended sensors. Such interest has motivated intensive research in the past few years addressing the potential of collaboration among sensors in data gathering and processing and the coordination and management of the sensing activity and data flow to the sink.

II.LOCATTON-BASED PROTOCOLS

In location-based protocols, sensor nodes are addressed by means of their locations. Location information for sensor nodes is required for sensor networks by most of the routing protocols to calculate the distance between two particular nodes so that energy consumption can be estimated.

A GEOGRAPHIC ADAPTIVE FIDELITY (GAF): OAF is an energy-aware routing protocol primarily Proposed for MANETs, but can also be used for WSNs because it favors energy conservation. The design of OAF is motivated based on an energy model that considers energy consumption due to the reception and transmission of packets as well as idle (or listening) time when the radio of a sensor is on to detect the presence of incoming packets. OAF is based on mechanism of turning off unnecessary sensors while keeping a constant level of routing fidelity. In OAF, sensor field is divided into grid squares and every sensor uses its location information, which can be provided by OPS or other location systems, to associate itself with a particular grid in which it resides. This kind of association is exploited by OAF to identify the sensors that are equivalent from the perspective of packet forwarding.

GAF has three states, namely, discovery, active, and sleeping. When a sensor enters the sleeping state, it tums off its radio for energy savings. In the discovery state, a sensor exchanges discovery messages to learn about other sensors in the same grid. Even in the active state, a sensor periodically broadcasts its discovery message to inform equivalent sensors about its state.OAF aims to maximize the network lifetime by reaching a state where each grid has only one active sensor based on sensor ranking rules.

B GEOGRAPHIC AND ENERGY-A WARE
IV. DATA-CENTRIC PROTOCOLS
ROUTING (GEAR):

GEAR is an energy-efficient routing protocol proposed for routing queries to target regions in a sensor field, In GEAR, the sensors are supposed to have localization hardware equipped, for example, a GPS unit or a localization system. so that they know their current positions. GEAR uses energy aware heuristics that are based on geographical information to select sensors to route a packet toward its destination region.

A Sensor Protocols For Information Via Negotiation (SPIN):

SPIN is a family of adaptive protocols for WSNs. Their design goal is to avoid the drawbacks of flooding protocols mentioned above by utilizing data negotiation and resource adaptive algorithms for example implosion and overlap. The sensors running the SPIN protocols are able to compute the energy consumption required to compute, send, and receive data over the network. SPIN is designed based on two basic ideas; (I) to operate efficiently and to conserve energy by sending meta-data (i.e., sending data about sensor data instead of sending the whole data that sensor nodes already

have or need to obtain), and (2) nodes in a network must be aware of changes in their own energy resources and adapt to these changes to extend the operating lifetime of the system.

B Directed Diffusion:
Directed diffusion is a data-centric routing protocol for sensor query dissemination and processing. Directed diffusion has several key elements namely data naming, interests and gradients, data propagation, and reinforcement. A sensing task can be described by a list of attribute-value pairs. At the beginning of the directed diffusion process, the sink specifies a low data rate for incoming events. Afier that, the sink can reinforce one particular sensor to send events with a higher data rate by resending the original interest message with a smaller interval. Likewise, if a neighboring sensor receives this interest message and finds that the sender's interest has a higher data rate than before, and this data rate is higher than that of any existing gradient, it will reinforce one or more of its neighbors.

ROUTING:
Span is a routing protocol also primarily proposed for MANETs, but can be applied to WSNs as its goal is to reduce energy consumption of the nodes. Span is motivated by the fact that the wireless network interface of a device is often the single largest consumer of power. Hence, it would be better to turn the radio off during idle time. Although Span does not require that sensors know their location information, it runs well with a geographic forwarding protocol. When used with a geographic forwarding protocol, Span's election rule requires each sensor to advertise its status (i.e., coordinator or non-coordinator), its neighbors, and its coordinators Furthermore, when it receives a packet, a coordinator forwards the packet to a neighboring coordinator if any, which is the closest to the destination or to a non-coordinator that is closer to the destination.

D.BOUNDED VORONOI GREEDY FORWARDING [BVGF]:
BVGF uses the concept of Voronoi diagram in which the sensors should be aware of their geographical positions. In this type of greedy geographic routing, a sensor will always forward a packet to the neighbor that has the shortest distance to the destination. The sensors eligible for acting as the next hops are the ones whose Voronoi regions are traversed by the segment line joining the source and the destination. The BVGF protocol chooses as the next hop the neighbor that has the shortest Euclidean distance to the destination among all eligible neighbors. Each sensor actually has only one next hop to forward its data to the sink. Therefore, any data dissemination path between a source sensor and the sink will always have the same chain of the next hops, which will severely suffer from battery power depletion. BVGF does not consider energy as a metric.

Data-centric protocols differ from traditional address-centric protocols in the manner that the data is sent from source sensors to the sink. In address centric protocols, each source sensor that has the appropriate data responds by sending its data to the sink independently of all other sensors. However, in data-centric protocols, when the source sensors send their data to the sink, intermediate sensors can perform some form of aggregation on the data originating from multiple source sensors and send the aggregated data toward the sink.

III CONCLUSION
Routing in sensor networks has attracted a lot of attention in the recent years and introduced unique challenges compared to traditional data routing in wired networks. In this paper we classify the routing protocols in WSNs in to data-centric, hierarchical and location based depending on the network structure. Data centric protocols use the metadata structure to transmit the sensed information to the BS Naming the data helps to construct a query which requests for only certain attributes of the data, thus known as data-centric routing techniques. Regardless, the sensor nodes can also be grouped for efficient data dissemination to the sink. Hierarchical routing protocols adopt the clustering approach by grouping sensor nodes. This approach is highly scalable and thus used in a number of applications. Location based protocols use the information of position of sensor nodes in to elegantly to route data. We epitomize the logic behind these protocols followed by the advantages and constraints. We also mention the possible application domain of these protocols and scope for improvement in the future.

Few other protocols followed the traditional network flow and QoS modeling methodology However, we have also observed that there are some hybrid protocols that fit under more than one category the classification of the protocols covered in this survey. Since it is an important consideration for routing protocols in terms of energy saving and traffic optimization. Protocols, which name the data and query the nodes based on some attributes of the data are categorized as data-centric. Many of the researchers follow this paradigm in order to avoid the overhead of forming clusters, the use of specialized nodes etc. However, the naming schemes such as attribute-value pairs might not be sufficient for complex queries and they are usually dependent on the application. Efficient standard naming schemes are one of the most interesting future research direction related to this category. Other possible future research for routing protocols includes the integration of sensor networks with wired networks (i.e. Internet). Most of the applications in security and environmental monitoring require the data collected from the sensor nodes to be transmitted to a server so that further analysis can be done. On the other hand the requests from the user should be made to the sink through Internet. Since the routing requirements of each environment are different, further research is necessary for handling these kinds of situations.

REFERENCES

[1]. "21 ideas for the 21st century", Business Week Aug. 30 1999, Pp. 78-167. | [2]. S.K. Singh, M.P. Singh, and D.K. Singh, A survey of Energy-Efficient Hierarchical Cluster based Routing in Wireless Sensor Networks International Journal of Advanced Networking and Application (IJANA), Sept.—Oct. 2010, vol. 02, issue 02, pp. 570—580. | [3] S.K. Singh, MP. Singh, and D.K. Singh, Energy-efficient Homogeneous Clustering Algorithm for Wireless Sensor Network', International Journal of Wireless & Mobile Networks (IJWMN), Aug. 2010, vol. 2, no. 3, pp. 49-61. | [4] Jun Zheng and Abbas Jamalipour, "Wireless Sensor Networks: A Networking Perspective", a book published by A John & Sons, mc, and IEEEE, 2009 | [5] S. Misra et al. (eds.), Guide to Wireless Sensor Networks, Computer Communications and Networks, DOT 10.1007/978-1-84882-218-4 4, Springer-Verlag London Limited 2009. | [6] Ivan Stojmenovic and Stephan Olariu. Data-centric protocols for wireless sensor networks. In Handbook of Sensor Networks, Chapter 13, pages 417—456. Wiley, 2005. | [7] Christopher Ho, Katia Obraezka, Gene Tsudik, and Kumar Viswanath, "Flooding for reliable multicast in multi-hop ad hoc networks", In Proceedings of the 3rd International Workshop on Discrete Algorithms and Methods for Mobile Computing and Communications (DIAL-M '99),1999, pp. 64—71. | [8] Ming Liu, Jiannong Cao, Guihai Chen, and Xiaomin Wang, "An Energy-Aware Routing Protocol in Wireless Sensor Networks", Sensors 2009, vol. 9, pp 445-462. | [9] Luis Javier Garcia Villalba, Ana Lucila Sandoval Orozco, Alicia Triviflo Cabrera, and Claudia Jacy Barenco Abbas, "Routing Protocol in Wireless Sensor Networks", Sensors 2009, vol. 9, pp. 8399-8421