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A Novel method to determine Delays using AODV Protocol

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***Abstract*— AODV is capable of both unicast and multicast routing. The Top down Approach algorithm is also used in transmitting the packets from source to destination. Performances of the proposed network structure are evaluated using computer simulations. Simulation results show that, when comparing with other common network structures in wireless sensor networks, the proposed network structure is able to determine the delay time of each sensor node in the data collection process significantly.**

Index Terms—AODV, Delay time, Multicast routing

I. INTRODUCTION

A Wireless Sensor Network (WSN) consists of spatially distributed autonomous sensors to monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants and to cooperatively pass their data through the network to a main location. The more modern networks are bi-directional, enabling also to control the activity of the sensors. The development of wireless sensor networks was motivated by military applications such as battlefield surveillance; today such networks are used in many industrial and consumer applications, such as industrial process monitoring and control, machine health monitoring, and so on.

The WSN is built of "nodes" from a few to several hundreds or even thousands, where each node is connected to one (or sometimes several) sensors. Each such sensor network node has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a microcontroller, an electronic circuit for interfacing with the sensors and an energy source, usually a battery or an embedded form of energy harvesting. A sensor node might vary in size from that of a shoebox down to the size of a grain of dust, although functioning "motes"(demo video) of genuine microscopic dimensions have yet to be created. The cost of sensor nodes is similarly variable, ranging from hundreds of dollars to a few pennies, depending on the complexity of the individual sensor nodes. Size and cost constraints on sensor nodes result in corresponding constraints on resources such as energy, memory, computational speed and communications bandwidth. The topology of the WSNs can vary from a simple star network to an advanced multi-hop wireless mesh network. The propagation technique between the hops of the network can be routing or flooding.

From an energy perspective, the most relevant kinds of memory are the on-chip memory of a microcontroller and Flash memory, off-chip RAM is rarely, if ever, used. Flash memories are used due to their cost and storage capacity. Memory requirements are very much application dependent. Two categories of memory based on the purpose of storage are: user memory used for storing application related or personal data, and program memory used for programming the device. Program memory also contains identification data of the device if present.

The sensor node consumes power for sensing, communicating and data processing. More energy is required for data communication than any other process. The energy cost of transmitting 1 Kb a distance of 100 metres (330 ft) is approximately the same as that used for the execution of 3 million instructions by a 100 million instructions per second/W processor. Power is stored either in batteries or capacitors. Batteries, both rechargeable and non-rechargeable, are the main source of power supply for sensor nodes. They are also classified according to electrochemical material used for the electrodes such as NiCd (nickel-cadmium), NiZn (nickel-zinc), NiMH (nickel-metal hydride), and lithium-ion. Two power saving policies used are Dynamic Power Management (DPM) and Dynamic Voltage Scaling (DVS). DPM conserves power by shutting down parts of the sensor node which are not currently used or active. A DVS scheme varies the power levels within the sensor node depending on the non-deterministic workload. By varying the voltage along with the frequency, it is possible to obtain quadratic reduction in power consumption.

Routing is the process of selecting paths in a network along which to send network traffic. Routing is performed for many kinds of networks, including the telephone network (Circuit switching), electronic data networks (such as the Internet), and transportation networks. This article is concerned primarily with routing in electronic data networks using packet switching technology.

In packet switching networks, routing directs packet forwarding, the transit of logically addressed packets from their source toward their ultimate destination through intermediate nodes, typically hardware devices called routers, bridges, gateways, firewalls, or switches. General-purpose computers can also forward packets and perform routing, though they are not specialized hardware and may suffer from limited performance. The routing process usually directs forwarding on the basis of routing tables which maintain a record of the routes to various network destinations. Thus,

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constructing routing tables, which are held in the router's memory, is very important for efficient routing. Most routing algorithms use only one network path at a time, but multipath routing techniques enable the use of multiple alternative paths.

In [1], an energy efficient protocol is designed for low-data-rate WSNs, where sensors consume different energy in different radio states (transmitting, receiving, listening, sleeping, and being idle) and also consume energy for state transition. We use TDMA as the MAC layer protocol and schedule the sensor nodes with consecutive time slots at different radio states while reducing the number of state transitions. Efficient TDMA scheduling has been used. We use a TDMA for scheduling node activities to reduce the energy consumption. We also propose efficient centralized and distributed scheduling algorithms for homogeneous sensor networks. In our protocol, every node needs only to wake up at most twice in one scheduling period: one for receiving data from its children and one for sending data to its parent. The heterogeneous Network scheduling is similar to the centralized algorithm except that the sensors will find a schedule by collecting the information within k-hop first. Formation of data gathering tree is done for data collection and aggregation. This tree will be based on a connected dominating set (CDS).

Extensive simulation studies show that our algorithms do considerably reduce energy consumption. The advantage of this paper is it removes the unnecessary listening cost, and also reduces the energy cost for state switching and clock synchronization. The disadvantage is the delay incurred will be larger.

In [2], we study simple discrete mathematical models, the time performance of the data collection and data distribution tasks in sensory networks. Specifically, we derive the minimum delay in collecting sensor data for networks of various topologies such as line, multiline, and tree and give corresponding optimal scheduling strategies. In this model, the amount of data accumulated at each sensor node number of unit data after some given observation period is assumed finite and determined. Models used are: Line Networks, Toward More General Scenarios, Two-Line Networks, Multiline Networks, Tree Networks, and Tree Sensor Networks. In Line networks a BS is placed at one end of the network. We assume sensor nodes are regularly placed along the network. Our goal is to determine the minimal duration of the collection phase and an associated optimal communication strategy. In two-line network the optimal performance is achieved. In Multiline networks the algorithm runs at the BS determines at each TS toward which line to transmit, if transmission is possible at all.

The advantages of this paper are the delay incurred is minimized. The disadvantages are these systems are suited for networks only with directional antennas.

In [3], we study the data reporting in a WSN with no priori information on future sensor readings and analyse the rationale behind the widely used equi-interval data reporting strategy in terms of the accuracy in data collection. In wireless sensor networks a sensor node may not always be able to report all its readings to the sink node because of limited network resources. Thus, it is desirable to have an efficient data reporting strategy with high accuracy for data reporting in such network. Our objective is to find the rationale behind the equiinterval strategy, and we only consider one-hop transmission for data reporting so that the sink node is a direct neighbour of every sensor node. In a WSN, the data reporting rate has a big impact on the bandwidth performance of the network. If the rate is too high, it would cause network congestion. In the process of rate control, there are a variety of rate control algorithms, which can be classified into two categories: centralised algorithms and distributed algorithms. Both algorithms use an additive-increase-multiplicative-decrease (AIMD) policy for rate control.

Simulation results show that the equi-interval data reporting strategy can achieve higher accuracy than other strategies and with the proposed rate control algorithms. The disadvantage is that the performance of equi-interval strategy in a real testbed is not done

Many routing, power management, and data dissemination protocols have been specifically designed for WSNs. In [4], we present a survey of the state-of-the-art routing techniques in WSNs. The routing challenges involved are Node deployment, Energy consumption without losing accuracy, Data Reporting Model, Fault Tolerance, Scalability, Data Aggregation, Transmission media, Connectivity, Coverage and Quality of Service. The Flat-based routing includes Sensor Protocols for Information via Negotiation, Directed Diffusion, Rumor routing, Minimum Cost Forwarding Algorithm, Gradient-Based Routing, Energy Aware Routing. The Hierarchical Routing includes Power-Efficient Gathering in Sensor Information Systems, Threshold-sensitive Energy

The advantages are these routing protocols are designed to improve the network lifetime and to increase the energy of the sensor nodes The disadvantage are although many of these routing techniques look promising, there are still many challenges that need to be solved in the sensor networks.

Of the various possible security threats encountered in a wireless sensor network (WSN), in [5], we discuss about two types of attacks: 1) Compromised node and 2) denial of service. So even if the routing algorithm becomes known to the adversary, the adversary still cannot pin point the routes traversed by each packet. Besides randomness, the generated routes are also highly dispersive and energy efficient, making them quite capable of circumventing black holes. In Randomized Multipath we consider a three-phase approach for secure information delivery in a WSN: secret sharing of information, randomized propagation of each information share, and normal routing (e.g., min-hop routing) toward the sink. The propagation models discussed are Purely Random Propagation, Non repetitive Random Propagation, Directed Random Propagation, and Multicast Tree-Assisted Random Propagation.

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The advantages of this paper is it provides security The disadvantages is that our current work is based on the assumption that there is only a small number of black holes in the WSN, but if the number of hole increases then attack may occur.

Wireless sensor networks utilize large numbers of wireless sensor nodes to collect information from their sensing terrain. Since, wireless sensor nodes are battery-powered devices energy saving is always important in determining the lifetime of a wireless sensor network The wireless sensors are distributed on the environment in order to efficiently collect data from the environment. Most of the time, wireless sensor nodes are located in extreme environments, where are too hostile for maintenance. Sensor nodes must conserve their scarce energy by all means and stay active in order to maintain the required sensing coverage of the environment. The Sensor Nodes (SN) collects data and transmits it to the Base Station (BS).The problem defined here is to efficiently collect data from the sensor nodes by maximizing the network life time and minimizing delay.

Recently, many algorithms are proposed to tackle the energy saving problem in wireless sensor networks. In these algorithms, however, data collection efficiency is usually compromised in return for gaining longer network lifetime. There are strong needs to develop wireless sensor networks algorithms with optimization priorities biased to aspects besides energy saving.

The working of existing system is shown in the below figure. The existing uses Two-Hop network. A network with Within each cluster, one of the sensor nodes is elected as a Cluster Head (CH) and with the rest being Cluster Members (CM). The cluster head will collect data from its cluster members directly or in a multihop manner. By organizing wireless sensor nodes into clusters, energy dissipation is reduced by decreasing the number of nodes involved in long distance transmission. The number of data transmissions and energy consumption can be further reduced by performing data/decision fusion on nodes along the data aggregation path. In sensor networks with cluster, it is common for a cluster head to collect data from its cluster members one by one. Let ‘T’ be the average transmission delay among nodes. Data packets generated by sensor nodes are considered as highly correlated, and thus a node is always capable of fusing all received packets into a single packet by means of data/decision fusion techniques.

II. PROPOSED SYSTEM

By transforming the two-hop network into a multihop network, an improved multihop cellular network model is designed. In such model, all communication between the source and destination nodes is routed through the BS. All the sensor nodes communicate with the Base Station in multihop fashion. The objective of the proposed network structure is to determine the delays in the data collection processes of wireless sensor networks by keeping the communication distance and network lifetime at acceptable values. Ad hoc On-Demand Distance Vector (AODV) Routing is a reactive routing protocol, meaning that it establishes a route to a destination only on demand. In contrast, the most common routing protocols of the Internet are proactive, meaning they find routing paths independently of the usage of the paths. AODV is capable of both unicast and multicast routing. The main advantage of this protocol is having routes established on demand and that destination sequence numbers are applied for find the latest route to the destination. The connection setup delay is lower. Another advantage of AODV is that it creates no extra traffic for communication along existing links. Also, distance vector routing is simple, and doesn't require much memory or calculation.

The AODV Routing protocol uses an on-demand approach for finding routes, that is, a route is established only when it is required by a source node for transmitting data packets. It employs destination sequence numbers to identify the most recent path. In AODV, the source node and the intermediate nodes store the next-hop information corresponding to each flow for data packet transmission. In an on-demand routing protocol, the source node floods the RouteRequest packet in the network when a route is not available for the desired destination. It may obtain multiple routes to different destinations from a single RouteRequest. The major difference between AODV and other on-demand routing protocols is that it uses a destination sequence number (DestSeqNum) to determine an up-to-date path to the destination. A node updates its path information only if the DestSeqNum of the current packet received is greater or equal than the last DestSeqNum stored at the node with smaller hopcount.

RouteReply if it has a valid route to the destination. The validity of a route at the intermediate node is determined by comparing the sequence number at the intermediate node with the destination sequence number in the RouteRequest packet. If a RouteRequest is received multiple times, which is indicated by the BcastID-SrcID pair, the duplicate copies are discarded. All intermediate nodes having valid routes to the destination, or the destination node itself, are allowed to send RouteReply packets to the source. A timer is used to delete this entry in case a RouteReply is not received before the timer expires. This helps in storing an active path at the intermediate node as AODV does not employ source routing of data packets. When a node receives a RouteReply packet, information about the previous node from which the packet was received is also stored in order to forward the data packet to this next node as the next hop toward the

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destination

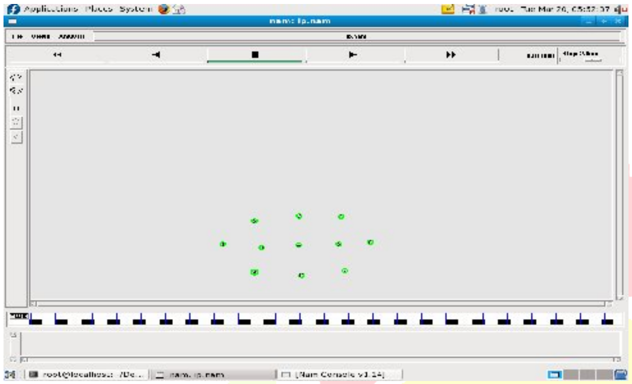

FIG.1. CREATION OF NODES

The above screenshot represents the creation of sensor nodes in wireless network. The node with identification number 0 and 1 represents the source and the destination.

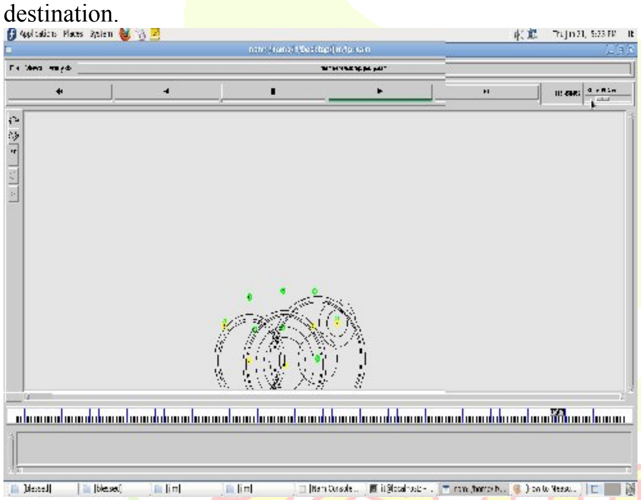

Fig.2. Determination of Path with least delay

This page describes the best possible path for transmitting data between the source and destination with minimized delay.

III. CONCLUSION

AODV is capable of both unicast and multicast routing. The Top down Approach algorithm is also used in transmitting the packets from source to destination. Performances of the proposed network structure are evaluated using computer simulations. Simulation results show that, when comparing with other common network structures in wireless sensor networks, the proposed network structure is able to determine the delay time of each sensor node in the data collection process significantly.

REFERENCES

[1]C. Florens, M. Franceschetti, and R. J. McEliece, "Lower bounds on data collection time in sensory networks," *IEEE J. Sel. Areas Commun.*, vol. 22, no. 6, pp. 1110–1120, Aug. 2004.

[2]H. Deng, B. Zhang and J. Zheng," Rate Constrained Uniform Data Collection in Wireless Sensor Networks", Published in IET Communications Received on 2nd February 2010 Revised on 9th October 2010.

[3]J. N. Al-karaki and A. E. Kamal, "Routing techniques in wireless sensor networks: A survey," *IEEE Wireless Commun. Mag.*, vol. 11, no. 6, pp. 6–28, Dec. 2004.

[4]Tao Shu, Marwan Krunz and Sisi Liu, "Secure Data Collection in Wireless Sensor Networks Using Randomized Dispersive Routes" *IEEE Transactions On Mobile Computing,* vol. 9, no. 7, july 2010.

[5]A.S. Poornima, B.B. Amberker," Secure data collection using mobile data collector in clustered wireless sensor networks", Published in IET Wireless Sensor Systems Received on 25th October 2010 Revised on 7th February 2011.