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MAC chastised Dynamism Efficient in Wireless Device Lattice Spending Mistralapproach

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Abstract

In Wireless sensor Network, several researchers have provided different routing protocol for sensor networks, particularly routing protocols depending on clusters protocols. Reliability of nodes is necessary parameter in effective sensor networks. We use MAC protocol for controlling the network packets. This is because the usage of cluster based routing has several merits like minimized control messages, re-usability of bandwidth and enhanced power control. Different cluster based routing protocol is proposed by many researchers for the purpose of reducing the consumption energy in wireless sensor networks. Those techniques reduces the energy consumption but with several disadvantages like lack of QoS, inefficient transmission, etc., To overcome those problems, modified QoS enhanced base station controlled in Mistrial Approach (flooding Technique) for wireless sensor networks is proposed in this work. Here we reduce the number of retransmission and detect the overlay packets in networks using proposed approach. Simulation results show the better energy consumption, Maximum Life time & Efficient Bandwidth is achieved by flooding management when compared to the conventional techniques

Keywords: QOS, flooding, Mistrial Approach, Wireless Sensor Network.

Introduction:

A key issue in Wireless Sensor Network (WSN) system design is to minimize the overall system cost (deploy-ment, operation, maintenance, and abolishment) and power consumption. Most of the existing WSN systems rely on standard full-fledged transceivers equipped on each sensor node for communication with sinks and each other. How-ever, in most cases, the receiver module of a transceiver is more costly and consumes more energy than the transmitter [1], [2]. Moreover, many WSN applications normally contain hundreds of sensor nodes whose ultimate goal is simply to report sensed data to the sink periodically and/or when a threshold is reached, without need for any external control. The receiver module is, thus, not necessary for these nodes. Take the (futuristic) intra vehicular sensor network application [3] for example, where a few hundreds of in-car sensor nodes are used to sample the data from different parts of the vehicle. Since these sensors are only responsible for reporting the data to the Electronic Control Unit (ECU), which is within one hop, they do not need to have any receiving capability. Similar applications include tracking in Wireless Body Area Networks (WBANs) [4] and Wireless Personal Area Networks (WPANs) [5], household activities inference [6], [7], and telemetry in larger scale WSN systems such as precision agriculture [8], industrial automation [9], where there are a large number of sensors, each of which needs to send a small sample (i.e., sensed data) to a sink (or a special relay/mesh node) within its transmission range once in a while. Since the overall system cost is an important factor that affects the adoption of the technology, WSN systems that adopt function-reduced and energy-efficient nodes, such as those with only transmitters have received increasing attention.

Besides the overall system cost, Quality of Service (QoS) differentiation is also an important feature demanded by today's WSN applications.

More specifically, sensor nodes may require different level of QoS support since they perform tasks of different level of importance in the system. In the above intra vehicular sensor network example, brake status is obviously much more important than the outside temperature and thus should have a higher priority in the system.

Moreover, whether the WSN systems could continuously provide reliable data-gathering service is another critical issue. In fact, system reliability is a top requirement in the industry applications. Generally, the factors that affect the wireless communications can be categorized into three types: 1) radio frequency interference that could occur almost anytime and anywhere; 2) network change that is either predictable as a result of planned adjustment or un predict-able due to the node failures; and 3) environmental effects (e.g., bad weather and blocking objects) that affect the wireless channel condition. It is desirable to have robust WSN systems that are able to cope with these negative effects.

Related work

S. D. Muruganathan, D. C. F. Ma, R. I. Bhasin, and A.O.Fapojuwo, "**A centralized energy-efficient routing Protocol for wireless sensor networks**,"

Wireless sensor networks consist of small battery powered devices with limited energy resources. Several network layer protocols have been proposed to improve the effective lifetime of a network with a limited energy supply. In this article we propose a centralized routing protocol called base-station controlled dynamic clustering protocol (BCDCP), which distributes the energy dissipation evenly among all sensor nodes to improve network lifetime and average energy savings.

The performance of BCDCP is then compared to clustering-based schemes such as low-energy adaptive clustering hierarchy (LEACH), LEACH-centralized (LEACH-C), and power-efficient gathering in sensor information systems. Simulation results show that BCDCP reduces overall energy consumption and improves network lifetime over its comparatives.

YanyanZhuang, Jianping Pan and Lin Cai, "Minimizing Energy Consumption with Probabilistic Distance Models in Wireless Sensor Networks",

Minimizing energy consumption in wireless sensor networks has been a challenging issue, and grid-based clustering and routing schemes have attracted a lot of attention due to their simplicity and feasibility. Thus how to determine the optimal grid size in order to minimize energy consumption. So far most existing work uses the average distances within a grid and between neighbor grids to calculate the average energy consumption, which we found largely underestimates the real value.

In this paper, we propose, analyze and evaluate the energy consumption models in wireless sensor networks with probabilistic distance distributions. We also use these models to study variable-size grids, which can further improve the energy efficiency by balancing the relayed traffic in wireless sensor networks

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Abraham O. Fapojuwo, Senior Member, IEEE, and Alejandra Cano-Tinoco "Energy Consumption and Message Delay Analysis of QoS Enhanced Base Station Controlled Dynamic Clustering Protocol for WSN",

This paper proposes and analyzes a QoS enhanced Base station Controlled Dynamic Clustering Protocol, suitable for the support of video and imaging traffic over resource constrained wireless sensor nodes. The protocol achieves energy efficiency through a rotating head clustering approach while providing quality of service (QoS) support by including delay and bandwidth parameters in the route selection process.

A Time Division Multiple Access scheme is used for intra- and intercluster communication, providing bandwidth reservation. Performance of QBCDCP is evaluated in terms of energy consumption and end-to-end image delay via analytical and discrete-event simulation techniques. Numerical results provide insights on the selection of network parameters such as number of clusters that improve the sensing node lifetime while maintaining high quality of service.

C. B. Margi, V. Petkov, V. Obraczka, and R.Manduchi, "Characterizing energy consumption in a visual sensor network tested."

In this paper characterize the energy consumption of a visual sensor network tested. Each node in the tested consists of a "single-board computer", namely Crossbow's Stargate, equipped with a wireless network card and a webcam. Such as processing, flash memory access, image acquisition, and communication over the network. In our characterization, we consider the various hardware states the system switches through as it executes these benchmarks, e.g., different radio modes (sleep, idle, transmission, reception), and webcam modes (off, on, and acquiring image). We report both steady-state and transient energy consumption behavior obtained by direct measurements of current with a digital multimeter. We validate our measurements against results obtained using the Stargate's on-board energy consumption measuring capabilities

H. Kang et al.: LBM: "A Low-power Buffer Management Policy for Heterogeneous Storage in Mobile Consumer Devices"

Flash memory has many attractive features such as small size, low-power consumption, shock resistance, and high performance. Using flash memory and mobile disk together as secondary storage is an alternative solution to provide large storage capacity with reasonable cost specifically, power consumption rate of each storage device should be considered in the design of an efficient buffer management policy since battery limitation of mobile systems is important.

This paper presents a new buffer management policy for mobile systems consisting of heterogeneous storage devices such as flash memory and mobile disk. By considering different power-consumption rates of each storage media as well as I/O operation type and reference potential of buffered blocks, the proposed policy reduces storage power consumption significantly and also improves I/O performances.

Proposed work

Probabilistic scheme:

The probabilistic scheme is similar to flooding, except that nodes only rebroadcast with a predetermined probability. In dense networks multiple nodes share similar transmission coverages. Thus, randomly having some nodes not rebroadcast save node and network resources without harming delivery effectiveness. In sparse network, there is much less shared coverage, thus nodes won't receive all the broadcast packets with the probabilistic scheme unless the probability parameter is high. When the probability is 100% this scheme is identical to flooding.

Counter-Based Scheme:

An inverse relationship between the number of times a packet is received at a node and the probability of that node being able to reach additional area on a rebroadcast. This result is the basis of their Counter-Based scheme. Upon reception of a previously unseen packet, the node initiates a counter with a value of one and sets a RAD (which is randomly chosen between 0 and Tmax seconds). During the RAD, the counter is incremented by one for each redundant packet received. If the counter is less than a threshold value when the RAD expires, the packet is rebroadcast. Otherwise, it is simply dropped. From, threshold values above six relate to little additional coverage area being reached. The overriding compelling features of the Counter-Based scheme are its simplicity and its inherent adaptability to local topologies. That is, in a dense area of the network, some nodes won't rebroadcast; in sparse areas of the network, all nodes rebroadcast.

Area Based Methods:

Suppose a node receives a packet from a sender that is located only one meter away. If the receiving node rebroadcasts, the additional area covered by the retransmission is quite low. On the other extreme, if a node is located at the boundary of the sender node's transmission distance, then a rebroadcast would reach significant additional area, 61% to be precise. A node using an Area Based Method can evaluate additional coverage area based on all received redundant transmissions. We note that area based methods only consider the coverage area of a transmission; they don't consider whether nodes exist within that area.

Distance-Based Scheme:

A node using the Distance-Based Scheme compares the distance between itself and each neighbor node that has previously rebroadcast a given packet1. Upon reception of a previously unseen packet, a RAD is initiated and redundant packets are cached. When the RAD expires, all source node locations are examined to see if any node is closer than a threshold distance value. If true, the node doesn't rebroadcast.

Location-Based Scheme:

The Location-Based scheme uses a more precise estimation of expected additional coverage area in the decision to rebroadcast. In this method, each node must have the means to determine its own location, e.g., a Global Positioning System Whenever a node originates or rebroadcasts a packet it adds its own location to the header of the packet. When a node initially receives a packet, it notes the location of the sender and calculates the additional coverage area obtainable were it to rebroadcast. If the additional area is less than a threshold value, the node will not rebroadcast, and all future receptions of the same packet will be ignored.Otherwise, the node assigns a RAD before delivery. If the node receives a redundant packet during the RAD, it recalculates the additional coverage area and compares that value to the threshold. The area calculation and threshold comparison occur with all redundant broadcasts received until the packet reaches either it's scheduled send time or is dropped.

Flooding with Self Pruning:

The simplest of the Neighbor Knowledge methods in Flooding with Self Pruning. This protocol requires that each node have knowledge of its 1-hop neighbors, which is obtained via periodic "Hello" packets. A node includes its list of known neighbors in the header of each broadcast packet. A node receiving a broadcast packet compares its neighbor list to the sender's neighbor list. If the receiving node would not reach any additional nodes, it refrains from rebroadcasting; otherwise the node rebroadcasts the packet.

Flooding in WSNs:

In any flooding mechanism, one must balance reliability against message overhead. On the one hand, increasing reliability generally involves sending a greater number of redundant messages and thus incurs a higher message overhead. In this worst case, the system risks provoking broadcast storms. Yet redundant messages are needed to reach all nodes and to recover from packet loss, hence reducing the overhead will generally decrease reliability.

The broadcast storm problem is so common in flooding algorithms that it has engendered a whole area of research. Storm-sensitive flooding approaches can be broadly classified into two classes: local-knowledge-based and overlay based. Local-knowledge-based approaches decide on whether to rebroadcast or drop a flooded message solely on the basis of local information. Most commonly, they use information from received broadcasts to adaptively determine the forwarding policy. Such algorithms are a natural fit for WSNs, as they do not need to maintain any kind of complex node-to-node state that might need to be adapted in the event of mobility or other topology changes. In contrast, overlay-based approaches structure the node field according to some (local) topology, and then use topological information to efficiently implement flooding and reliability. The problem here is that if nodes have low quality connections to neighbors and/or are in motion, the overlay structure must be adapted. As a consequence, a high rate of management messages may be required, and if a flooded message is propagated while the overlay is out of date, that message may experience a high loss rate. In the worst case, the system might end up in a state of churn, constantly adapting the overlay but never managing to achieve the high quality of flooding that the overlay is intended to support. We now briefly overview existing work and assign it to the corresponding class. For reasons of brevity, our review is deliberately partial; we focus on results that inspired our work here, or that have been widely cited in the literature.

Overlay Based Approaches:

As just indicated, we use the term overlay very broadly. For us, an overlay-based approach is an algorithm that superimposes a routing structure onto the ad hoc network in support of flooding and rebroadcast. Depending on the position of a node in this overlay, it decides to either rebroadcast a flooded packet, or to only process and then drop it. While overlays provide a convenient mechanism to reduce the message overhead of flooding and to increase reliability, they suffer from the need to reconfigure the overlay when connectivity changes or if the nodes are mobile. Restructuring adds overhead but also increases the likelihood that messages will be lost, and thus may decrease coverage of the flooding protocol. Propose to structure the nodes into clusters. Their solution rebroadcasts a packet in a manner that depends on the node's position in the cluster: only cluster head and gateway nodes rebroadcast. In, the goal is to provide low-latency flooding. This is in part achieved by minimizing the collisions and interference. It shows that an optimal solution to this problem is NP complete; instead, they propose an approximation algorithm. They construct a multicast tree and compute a rebroadcasting schedule such that the expected rate of collisions will be low. Other approaches are based on the approximation of minimal connected dominating sets (MCDS). Informally, a dominating set (DS) contains a subset of all nodes such that every node not in the DS is adjacent to one in the DS. Thus, a DS creates a virtual backbone that can be used to efficiently flood messages. It has been shown that the creation of an MCDS is NP-complete. Thus, most approaches

attempt to find a sufficiently good approximation to a MCDS. A number of approaches rely on two-hop neighbor information to select nodes that rebroadcast the message. These approaches require that hello messages containing neighbor information are exchanged between the nodes. For instance, in the Double-Covered Broadcast (DCB), node n collects information about the two-hop neighbor set. Among its one-hop neighbors it then picks nodes that rebroadcast the message (called forward node) such that (1) the rebroadcast by the forward node covers the two-hop neighbors, and (2) the one-hop neighbors that are no forward nodes are within range of at least two rebroadcasts by forward nodes. The reception of the message by the forward node is implicitly acknowledged when n overhears the rebroadcast.
The scalable broadcast algorithm (SBA) also uses two-hop neighbour knowledge, but employs a different approach to select the forward nodes. With node mobility, the two-hop neighbour sets need to be updated frequently. Otherwise, the neighbour sets become outdated and reliability drops.

Mistral approach applied in WSN

In this module, the base station sensor monitored the network transmission in each sensor node Then compare the transmitted packets in each node and eliminate the retransmitted packets in all nodes in cluster wise. In this, Mistral approach is used for removing the redundant packets. In this approach, the node capacity is determined. If the node capacity is greater than or equal to no of packets then the packets are transmitted and reach the destination. If the node capacity is less then no of packets, that is if the node capacity is 6 but the no of packets to transmit is 10 means, only 6 packets are transmitted and the remaining 4 packets are stored in compensation packet buffer in first round. After the completion of transmission of 6 packets that is after reaching the destination the remaining 4 packets are transmitted and reach the destination. Measure the throughput in WSN & conclude the Qos. Whenever we remove the retransmitted packets in any network, the original packets only transmitted from source to destination.Automatically QOS is increased when remove the retransmission packets in each.Finally we conclude the throughput, from that we get more Qos in that WSN.

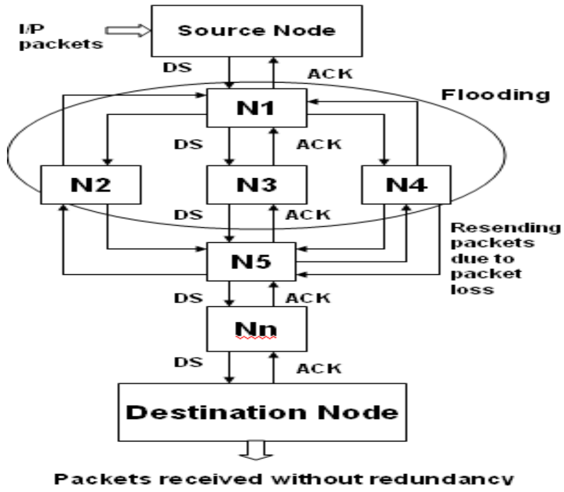

Fig: Propose Mistral Approach Flow diagram

Results and discussions:

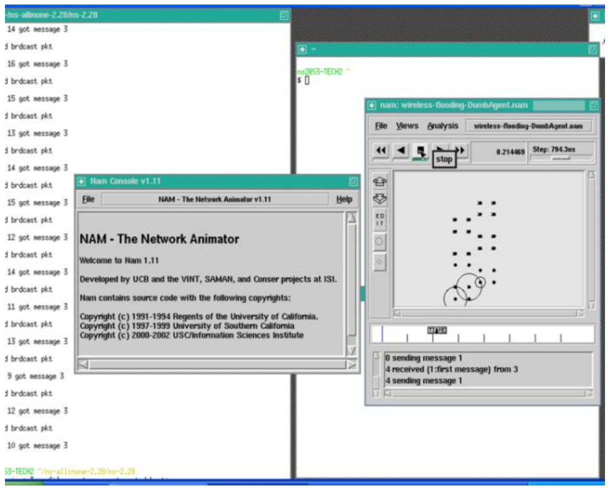

Fig: Wireless flooding based network creation and detect the retransmission packets from the node sides

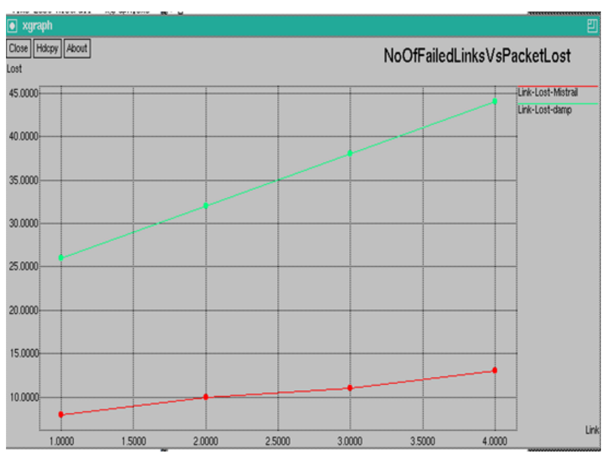

Fig 3: Number of Failed Links Vs Packet Lost

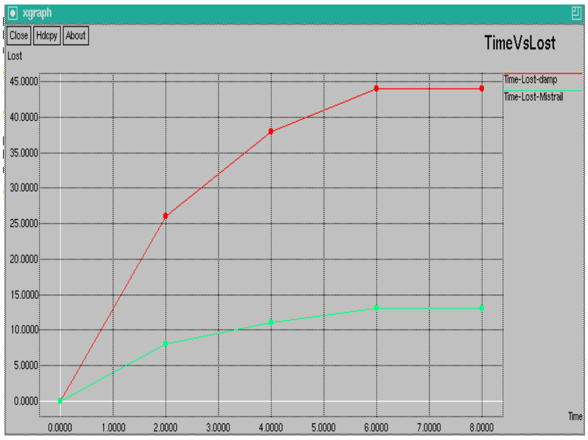

Fig 4: Time Vs Lost

Conclusions:

Using our proposed approaches, we have solved the problem of congestion by reducing it.Time delay and packet loss are decreased in this project QoS of the system is increased with the help of flooding approaches. We can conclude that the load overhead and other issues using Mistral approach in wireless networks has been avoided. Our future work, besides addressing the above two issues, will further explore the potentials of this hybrid WSN cluster architecture in building a larger system with multicluster and multihop communications (based on sinks and/or HP standard nodes).

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