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A Review Paper on Continuous Neighbors Discovery in Asynchronous Sensor Networks

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Abstract— It can be possible that a large number of sensor network comprising a number of nodes to be deployed in the simple wireless sensor nodes. In a large area, such networks usually have a network structure. My sensor network nodes are static, but the node even acceptable, as the loss between the wireless communication, the transmission power changes, or synchronous interruption of neighbouring nodes changes. Therefore, even if the sensor aware of its neighbours, it must continuously maintain its view, which we call continuous neighbour discovery process. Here, we discuss the next neighbour discovery in wireless sensor network solutions to more power. Each sensor coordinate efforts by reducing the time required to detect hidden sensors to reduce power consumption.

***Keywords— Include* at least 5 keywords or phrases**

I. INTRODUCTION

Sensor networks can contain a large number sensor nodes, deployed In a large area, such networks usually have a mesh network structure. In this case, some of the sensor node acts as a router, forward the message to their neighbours from one another. The node is configured to turn off their communication hardware and to reduce power consumption. Therefore, in order to make the communication between two adjacent sensors, both must be in the active mode. In the continuing large flow networks, sensors do not need to call any special neighbour discovery protocol during normal operation. This is because any new node or nodes have lost the connection to its neighbours, it can be easily heard by neighbors hearing a very short time. However, for sensor networks of low and irregular flow, a special neighbour discovery mechanism should be used. Connectivity is still subject to the network has been established, even if the change. The sensor must be constantly looking for new neighbours to accommodate the following situations:

Loss of local synchronization due to accumulated clock drifts
• As a wireless connection is interrupted by a car or animal, dust storms, rain or fog between. When these events have in the past, the hidden node must be rediscovered.
• Currently, constantly adding new nodes to compensate in some networks have stopped functioning because of their energy depleted nodes.
• To increase the transmit power of some of the nodes in response to a specific event, such as the emergency situation is detected.

II. LITERATURE REVIEW

While many papers have been written on how to minimize energy consumption in sensor networks, has very few treated Explicit Between the delay and energy balance. To the best of our knowledge, our work is the first to propose the allocation of different wake-up Frequencies nodes to according to your role in the packet forwarding process. Having regard to: the energy-latency tradeoff has been extensively studied, as in sensor networks, as well as in other wireless networks. In this section, we present related works, and compare their models and results with ours.
In S-MAC protocol packet latency caused by periodic sleeping of intermediate nodes is minimized by synchronizing wake-up schedules neighbor nodes. The duty cycles of all nodes are equal and predefined. The protocol is not intended to guarantee an upper bound on end-to-end delay, but to minimize energy consumption in the nodes. Another paper suggests that minimize delay using special planning of the nodes wake up periods. This paper extends another work by the same authors, where the nodes are organized in a unidirectional tree.
In [10] the authors address the trade-off between delay and energy in sensor networks from a different perspective. They are looking for an optimal routing path from a source node to the gateway, drought latency is minimized and energy costs are not "too big." In their network model, sensors randomly switching between sleep and active modes. Two alternatives are considered when: a centralized global optimization approach and a distributed approach. Energy efficiency can be achieved in various ways. For example, energy aware routing When a routing path taking into account the energy costs and the sensor's available energy. In [11] The number of hops along the forwarding path considered while remembering that transmission between close nodes are more energy efficient, even if the resulting route is longer. The authors use a random network model to show the energy-latency throughput addiction and to find the optimal transmission power for nodes in an ad hoc network. As already mentioned, we do not solve the routing issues in our work. The scheme proposed in [11], as well as many others may be used for this purpose.
In [12], the tradeoff between energy and latency is investigated using probabilistic computation. The authors consider a network of nodes that switch from passive to active mode independently, but with a predefined frequency. The packets are not forwarded on predefined routes, as they are in our model, but are sent instead to all neighbors in active mode.

Therefore, the network density and the duty cycle should be high enough to ensure that each packet will finally reach its destination. A probabilistic analysis finds the portion of time each node is required to be in an active state in order to ensure that the packet is delivered to the gateway on time. This model differs from ours in that our model does not use flooding and assumes that nodes are aware of their neighbor's duty cycles.

The tradeoff between energy and latency in general wireless networks was also studied in a different context. For example, [13] and [14] investigate this tradeoff when a technique called "modulation scaling" is used. The authors base their work on the observation that, in many coding schemes, the transmission of a packet requires a smaller amount of energy if it lasts longer. They solve the problem of finding an optimal transmission schedule for a node, given that it has to forward a random number of packets whose arrival times follow the Poisson distribution. The optimization criterion is to minimize the overall energy consumption and bound the maximum delay. Two algorithms are proposed: an off-line algorithm that finds an optimal solution, and an on-line algorithm that approximates the optimal solution. This approach is taken further in [20]. The authors deal with more general setting, assuming that each packet may have a different deadline and number of bits.

In [15], this problem is generalized by considering an aggregation tree with packets routed along the tree to the root. As in [13], the energy cost of a packet transmission is a decreasing convex function of its transmission time. The cost is different for each node because of the different amounts of data to be forwarded. The packet should be delivered to the sink within a limited time period. The authors propose an off-line algorithm for an optimal solution whose running time complexity is unknown, and an approximation algorithm with pseudo-polynomial running time that needs to know the network topology. Although our model is different, the considered problem is similar to ours. In our work, by making some assumption on the energy-latency dependency, we propose an optimal algorithm with linear complexity.

LEACH protocol[16] presumes that the sensors are able to change their transmitting power in order to build a better communication graph. The proposed solution combines the sensors into local clusters and allows only the cluster heads to contact the gateway. Since a cluster head expends much more energy than any other node, this role is periodically rotated between the cluster nodes. The tradeoff between energy and latency appears also when data-aggregation techniques are applied. On the one hand, it is better to merge several packets reporting the same event into a single one. Doing so, on the other hand, increases the delay. In the present work a sensor network with multiple gateways is also studied. Two operation models can be considered for multiple gateway networks. In the first model, each sensor is associated with one gateway, whereas in the second model every node can send data to any gateway.

The first model is studied in [17], where a sensor chooses one of the gateways while taking into account the energy efficiency of the routing, energy resources of the intermediate sensors, and load balancing. The same model is also considered in [18], where the authors propose several algorithms for intelligent gateway placement in order to reduce latency and save energy.

The neighbor discovery problem is also a well known problem discussed in the context of both ad-hoc and sensor networks. In a WiFi network operating in centralized mode, a special node, called an access point, coordinates access to the shared medium. Messages are transmitted only to or from the access point. Therefore, neighbor discovery is the process of having a new node detected by the base station. Since energy consumption is not an issue for the base station, discovering new nodes is rather easy. The base station periodically broadcasts a special control message, referred to in the following to as HELLO. A regular node that hears this message can initiate a registration process. The regular node can switch frequencies/channels in order to find the best HELLO message for its needs.

In mobile ad-hoc networks (MANETs), nodes usually do not switch to a special sleep state. Therefore, two neighboring nodes can send messages to each other whenever their physical distance allows communication. AODV [19] is a typical routing protocol for MANETs. In AODV, when a node wishes to send a message to another node, it broadcasts a special RREQ (route request) message. This message is then broadcast by every node that hears it for the first time. The same message is used for connectivity management, as part of an established route maintenance. There is no special neighbor discovery protocol besides that.

III. PROPOSED SYSTEM

For these reasons, detecting new links and nodes in sensor networks must be considered as an ongoing process. In the following discussion we distinguish between the detection of new links and nodes during initialization, i.e., when the node is in Init state, and their detection during normal operation, when the node is in Normal state. The former will be referred to as initial neighbour discovery whereas the latter will be referred to as continuous neighbour discovery. While previous works [1], [2], [3] address initial neighbour discovery and continuous neighbour discovery as similar tasks, to be performed by the same scheme, we claim that different schemes are required, for the following reasons: Initial neighbour discovery is usually performed when the sensor has no clue about the structure of its immediate surroundings. In such a case, the sensor cannot communicate with the gateway and is therefore very limited in performing its tasks. The immediate surroundings should be detected as soon as possible in order to establish a path to the gateway and contribute to the operation of the network. Hence, in this state, more extensive energy use is justified. In contrast, continuous neighbour discovery is performed when the sensor is already operational. This is a long-term process, whose optimization is crucial for increasing network lifetime.

When the sensor performs continuous neighbour discovery, it is already aware of most of its immediate neighbours and can therefore perform it together with these neighbours in order to consume less energy. In contrast, initial neighbour discovery must be executed by each sensor separately.

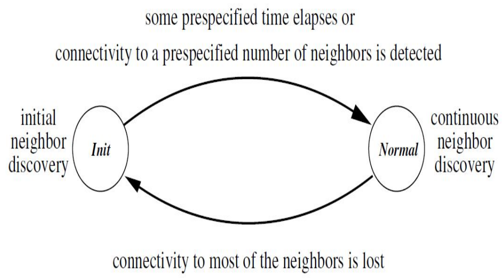

Fig. 1. Continuous neighbor discovery vs. initial neighbor discovery in sensor networks

IV. BACKGROUND

for solving the problem of neighbor discovery in wireless networks with directional antennas two classes of probabilistic neighbor discovery algorithms, viz. Direct-Discovery Algorithms in which nodes discover their neighbors only when they hear transmissions from their neighbors and Gossip-Based Algorithms in which nodes gossip about location information about their neighbors. the operation of these algorithms in a slotted, synchronous system and find the transmission probability that maximizes the probability of discovering their neighbors. Simulations of the algorithms demonstrated that the Gossip-Based Algorithms are insensitive to increase in node density i.e., the time required to discover a given fraction of neighbors remains unaffected with the increase in node density.

a paper [4] have proposed an approach for minimizing the average energy consumed during the neighbor discovery phase of a wireless ad hoc sensor network. In such networks with a high node density, the energy saved by using this optimal scheme during each instance of neighbor location can significantly increase the lifetime of the network. This approach for neighbor location, combined with the methodology in leads to an efficient way for a wireless sensor network to form low energy routes with small node degree. Many papers have been written on how to minimize energy consumption in sensor networks, very few have explicitly addressed the tradeoff between delay and energy. To the best of our knowledge, our work is the first to propose the assignment of different wake-up frequencies to nodes according to their role in the packet forwarding process. However, the energy-latency tradeoff has been thoroughly studied in sensor networks, as well as in other wireless networks. In this section we present related works, and compare their models and results with ours. In the S-MAC protocol [5], packet latency caused by periodic sleeping of intermediate nodes is minimized by synchronizing the wake-up schedules of neighboring nodes. The duty cycles of all nodes are equal and predefined. The protocol is not intended to guarantee an upper bound on the end-to-end delay, but to minimize the energy consumption of the nodes.

Another paper [6] proposes to minimize the delay using special scheduling of the nodes' wake-up periods. This paper extends another work [7] by the same authors, where the nodes are organized in a unidirectional tree. However, in [6] the authors assumption of arbitrary communication patterns renders the problem NP-Complete. The authors propose algorithms that find an optimal solution for specific topologies, such as trees and rings. They also show that their algorithms can be used as heuristics for general graphs. In [8], the authors address the trade-off between delay and energy in sensor networks from a different viewpoint. They search for an optimal routing path from a source node to the gateway, such that latency is minimized and energy cost is not "too big." In their network model, sensors randomly switch between sleep and active states. Two alternatives are studied: a centralized global optimization approach and a distributed approach. Energy efficiency can be achieved in different ways. For example, energy aware routing finds a routing path while taking into account energy cost and the sensor's available energy. In [9] the number of hops along the forwarding path is considered, while keeping in mind that transmission between close nodes is more energy efficient, even if the resulting route is longer. The authors use a random network model to show the energy-latency-throughput dependency and to find the optimal transmission power for nodes in an ad-hoc network. As already indicated, we do not address the routing issues in our work. The scheme proposed in [9], as well as many others, can be used for this purpose

V. CONCLUSION

The main idea behind the continuing neighbor discovery mechanism we propose is that the task of finding a new node u divide among all the nodes that can help towards discovering u. These nodes are characterized as follows (a) they are also neighbors of u (b) they belong to a connected segment of the nodes that have already discovered each other (c) the node v also belong to this segment .. let degs (u). be the number of these nodes. This variable indicates the in-segment degree of a hidden neighbor u. To take advantage of the proposed system discovery, the node v assess the value of degs (u).

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