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ENERGY-EFFICIENT DUTY CYCLE WIRELESS SENSOR NETWORKS USED IN DUPLICATE DETECTABLE OPPORTUNISTIC FORWARDING

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Abstract: - Routing offers relatively efficient and adaptive forwarding low-duty-cycled networks, which allows a multiple nodes in forwarding the same packet. We observed that the sink node is greater than the traffic observed very far from the sink. When utilizing the receiver-based protocols enabling the nodes in communication will have more synchronization or information, and they do not require any nodes in network to have the same duty cycle. In our proposed work the receiver-based protocols along with the duty cycle and with the node for consumption to gain energy efficiency. This analysis, we derive a formula for the duty cycle that minimizes the energy consumption in a distance. The adaptation method with the derived distance-based cycle will be local observed traffic. Many a times the real-time, buoy networks was implemented around the world in order to successfully capture such information. The performance evaluations are the assignment methods to show the improvement of energy efficiency of the proposed duty cycle without sacrificing the delivery ratio.

Keywords: Duplicate-detectable, energy constraint, opportunistic forwarding, Receiver-based protocols, adaptive duty cycle, converge cast traffic

I. INTRODUCTION

The most effective method used to reduce the energy in Wireless Sensor Networks (WSNs). The less cycle of duty nodes that are longer to sleep and allowing more energy will be saved, as the fewer nodes are also found to be available in order to participate in data routing in given time that will also increases the latency in transmission and decreases the output. Also, there is a trade-off between different energy efficiency and the transmission latency is determined by the different nodes [1]. The duty cycle is fixed within the network with all the nodes utilizing the similar duty cycle. This may not be able to provide the best overall performance offered by the network. Many a times the sensor applications requires converge cast communication in which the data from sensors are allowed to be transmitted into a sink in the network. In receiver-based the “best” receiver in a given criteria to begin the next transmission. This is the closest to the sink and the transmitter that initiates the communication also it sends a packet which is indicating the location of the transmitter’s and the sink.

The nodes moves very close to the sink that needs to be transmitted with more data that are far from the sink, and the duty cycles of the nodes will be adjusted in order to ensure the energy efficiency at the time of meeting traffic demands and allows keeping the latency very low [2]. In very recent days a new class of protocols, that are called as receiver-based on means of different communication with the nodes that are completely unaware of different duty cycle. The nodes determine the forward progress to the sink in order to calculate their distance to the sink. After a proportional distance to the sink, the nodes send a packet back to the transmitter. The first node selected as the transmitter, and it forwards the data packet to that node [3].

We have analyzed that the performance of the receiver based routing through models receiver-based routing performs well in terms of the distances along with the energy and the latency. The traffic is assumed for further studies. In order to utilize the duty cycling with receiver-based routing and convergecast data patterns they are very clear that a network fixed duty cycle will not be provided in optimal between different energy, efficiency and latency. Later the adapting duty cycle along with the local traffic was proposed where the schedule is represented with a string of bits that needs to be updated in terms of each period using the different local traffic information available at different nodes. The various extensions that are used in the traditional receiver have been included in providing various information about the link quality in order to make routing decisions and supporting multiple paths by selecting nodes and employing the various adaptive rate control [4]. These schedules are found to be exchanged at the end of the periods, whereas the nodes are found to be aware of the other schedules. The other adaptive approach adjusts the node's duty cycle in accordance to the neighbor nodes duty cycles that flow the data and receives.

In this work the proposed differential assignment approaches the network lifetime without sacrificing any further delay and performance along with the converge cast. None of these approaches are found to be optimized with the various duty cycles for data patterns under receiver routing. In this paper, the mathematical model to use to determine the energy of the nodes of its duty cycle and to the sink for convergecast data patterns. In the protocol, the number of retransmitted packets is found to be provided different directions in order to indicate the traffic [5]. Using this model, we noticed that the duty of node distance is to sink to minimize the energy dissipation. In addition, the order to balance more than the energy efficiency they started developing a traffic duty cycle approaches that begins within the distance duty cycle adapting the duty local traffic patterns observed by the node. Whereas the heavy traffic nodes are found to be generated [6]. The number of retransmitted packets of original nodes found to be increased in their duty cycle in order to follow the traffic congestion. Alternatively, they also decrease their duty cycle to save energy.

Distance-based Duty Cycle Assignment proposed that the duty cycle is assigned to different nodes based on the node that sinks the distance. Where the duty cycle is initialized by the DDCA method and adapted to the traffic as explained above.

The results show that the DDCA reduces energy consumption with the wireless sensor networks compared with the commonly used network duty cycle method. In addition, it also reduces the latency expense and the small increase in energy consumption indicates that is able to trade-off the lower latency network in a constant duty cycle method.

II. LITERATURE SURVEY

According to Daibo Liu and Zhichao Cao the opportunistic routing that offers a relatively adaptive low-duty-cycled in networks allows a multiple nodes to be forwarded. Especially the networks along with the intensive traffic transmissions incur duplicate packets that are forwarded within a limited network and the packet performance [7]. Existing solutions to this issue is the coordination based on different approaches that can either scale up with the size of the system or to suffer very high control. Duplicate-Detectable Opportunistic Forwarding (DOF) which is a duplicate-free opportunistic forwarding protocol that helps us to lowers the duty. DOF always enables to obtain the information to the senders they are of potentials that are slotted scheme and the data packets are found to be sent to the different deterministic forwarder [8]. However, based on the light weight coordination the DOF explores different opportunities that are possible and in addition it removes the duplicate packets from all of the forwarding process. The experimental results show that DOF is found to reduce the maximum duplicate ratio when compared to the different protocols which achieves the enhancement in network yield also by saving the energy consumption.

As per Mengshu Hou and Zhe Wei it is well-known that the reputation has recently been introduced into different wireless sensor networks (WSNs) which ensured to count on the malicious nodes and to provide various solutions to the existing problems in terms of security via WSNs. In addition to the reputation modeling of WSNs the beta reputation model is found to be received the various wide attentions and there are many a literatures that have been proposed various reputation models depending on the beta reputation which are also found to be modified [9]. This research was focused on the study of the various beta reputation modeling and then they further presents a different reputation model depending on the negative distribution of various binomial. The applications of this new method are proposed and the future possibilities in the study direction are represented.

Zheng, S. Radhakrishnan, and V. Sarangan say that the different energy efficiency are found to be widely accepted as one of the most important challenges for the wireless sensor networks. In their literature, they have mentioned the issues that normally found to be addressed from the various viewpoints in specific protocol functionality, whereas the medium access controls (MAC) [10]. In this paper the conservation of the energy that has the wireless sensor networks is treated with a different approach and is also examined across the various protocol layers that have different functions including MAC and the management in topology which also routes the sensor protocols. Both the disadvantages and the advantages of various different protocols with the different layers are found to be reviewed and then discussed in detail. There are some recommendations where the employment of protocols was small, large scale and medium whereas the wireless sensor networks are also found to be presented [11].

I. Demirkol, C. Ersoy, F. Alagoz insists that machine communication is a developing and an emerging technology that provides connectivity among different devices without the intervention of the human. Also, the networks of the cellular are considered to be a ready-to-use infrastructure that implements communications [12]. The most important significant challenge is that the networks in order to differentiate the data transactions and the applications to diverse with a large number. In order to support a huge number of devices the architecture should be more powerful and the spectrum should be more efficient. They have provided a short survey on different communications in the generation project and the long term evolution. Most importantly the architectural enhancements provide communication services in networks and reviewing the features along with the requirements of the applications. Additionally, the signal overheads and the different quality also deserves the attention in identifying the issues on the diverse random that are accessed and overloaded in order to avoid the channel access. They present possible enabling technologies and point out the directions for the various communications research.

C. J. Merlin and W. B. Heinzelman, says that the low power listening WSN has been widely adopted in order to save the energy in various wireless networks with sensors [13]. The WSN is very effective in adapting to networks which are dynamic and with asymmetric traffic patterns and it sets various networks to check the interval. The nodes that have data traffic waste the significant resources of energy in doing the listening. This is particularly in many a network where the majority of the data comes and the duty cycles of others are found to be reduced. The protocol combines with an automatic selection of intervals in order to reduce energy consumption. They represent the justification for and discuss the implementation against the existing protocols in experiments.

III. DISTANCE-BASED DUTY CYCLE ASSIGNMENT

The node is always related to its distance that sinks the number of nodes found in the network and the packet traffic generated by the source nodes. For the analysis, we assumed that a circle area with the sink which is located in the center and the nodes including the sources are uniformly allocated. We noticed that the time required for a transmission and the energy efficiency of the network that is closely related to the various duty cycle and the different values that are used. The higher duty cycles values provide are always available for data routing and the possibility to have the nodes is decreased whereas the lower latency is achieved. The same data packet and the number of duplicates are always higher as the probability of multiple forwarders increases. The long preamble transmission data are forwarded at the time of the forwarders. The number of potential forwarders, the interval and the traffic load influenced the probability of multiple forwarders. Most existing duplicate mechanisms are based on overhearing and a forwarder packet, which is found to be identical pending

in the queue and it deletes the packet. In recent scenario the current sensor operating systems does not allow a node to interrupt on any kind of ongoing transmission tasks. Moreover, the traffic especially in large-scale networks with various dynamic links, further forwards hard to exactly relay by others.

3.1 SLOT ASSIGNMENT AND FORWARDING MANAGEMENT

The requirements of the slot assignment are that the multiple forwarders should be equally distributed into various slots and the sender should also infer the progress of the different forwarders According to a hash function, the forwarder always matches its routing that is progressing to a different location on the priority sequence. The priority sequence looks like a ruler that measures the routing progress and then they split all the slots into slightly overlapped zones that are matched to segments of the priority sequence that was randomly assigned to one slot in the zone. The forwarder will always serve multiple senders during a very less period and maintains a table, which always records the slot information in order to trace the potential senders. Each and every entry of the sender table includes the sender's address along with the expected data sequence number and the selected slot. When a probe is found to be received, the forwarder initially checks the routing of the sender. If they can provide routing progress it selects a different slot to the acknowledgment of the sender. Alternatively, the forwarder adds a new entry into the table. The DSN is the probe copies that the sender's data which are pending are in packet. The sender attaches and selects the slot number as the virtual forwarder address. Then they receive a data packet of the sender table and if there is no matched entry, the forwarder drops the packet and it will take the responsibility to forward the data packet.

The forwarder received probe and it still receives the duplicate of the same probe where the sender is yet to receive the probe due to the link dynamics. Considering that collision rate which is low by using slot assignment and its potential forwarders are sufficient that makes full use of the forwarders in state and then by decreasing the impact of link asymmetry on energy consumption. Then the forwarder receives the duplicate probe, it in turn back to sleep to save energy. In the interim, the sender will receive multiple different slots that are sending a probe. The forwarder corresponding to the earlier provides relatively high routing progress and the sender inserts the minimum slot number to receive the pending data packet and sends it. When the sender preparing to send a batch of packets, they are intended and will keep the batched sending. The probes of the first packet and the probes of the rest of the packets are not necessary. In order to save the overhead of the probe transmission, they directly sends the rest of the packets within the different found by the probes with the first packet and including the loss of data. When the pending data packet is found to be acknowledged, the sender completed his transmission and because of the link of the probe the slots and the sender will not receive the data from the forwarder. A larger retransmission limit is always not advisable. We should keep retransmitting the data packet of new forwarders as an important problem for the efficiency of the protocol. They loss tends over temporally available links and propose the data loss.

IV. IMPLEMENTATION OF PROPOSED ALGORITHMS

In this paper we focus on some of the algorithms that arise in the context of wireless sensor networks used in Duplicate Detectable Opportunistic Forwarding. Especially, we review the algorithms in sensor deployment, routing and coverage along with the fusion. There are a large number of researches that are related to the wireless sensor networks. At an extreme high level, we noticed that the developed algorithms are found to be categorized. Limited memory and the communication capability of the different sensors, are found to be distributed that has focused only the localized algorithms.

4.1 SLOT ALGORITHM

The duty cycle analysis is based on the idea of the slot algorithm that the expected energy consumes of a sensor node that is proportional to the expected total time of the node and the listening power is approximately the same as the transmission and the reception power. The total time that is required for a complete transmission and the energy efficiency of the various networks is closely related to the cycle and the different values used. The higher the duty cycle values provide more nodes and available for data routing, the possibility to have the relay nodes is found to be decreased and with a lower latency is achieved and they consume more energy.

4.2 SHA ALGORITHM

SHA algorithm is used to sense the data physically as well as with the environmental changes which are relayed to the main processing centre. These consist of different nodes which have limited energy. While designing it starts routing which is another challenging design for WSNs. The most important aim of routing the protocol is to provide a high accomplished by balancing different energy of sensor nodes in network. In WSN the multi routing and the traffic pattern has unbalanced energy consumption and will be uneven which in turn reduces the complete network lifetime. SHA are found to be usually more secured with threats as the transmission medium is more susceptible to the security attacks and the guided transmission medium. It is possible to modify and send their transmissions.

V. PERFORMANCE EVALUATION

The simulations were carried out and we have considered sensor network of area with different nodes randomly deployed with the wireless network simulation. Sensor network is divided into 3 different grids. The trace file gives more information of being transmitted in between received and then dropped in particular. They also give each node participating. As it can be seen this protocol gives high throughput as routing is based on combined weight of energy as well as distance.

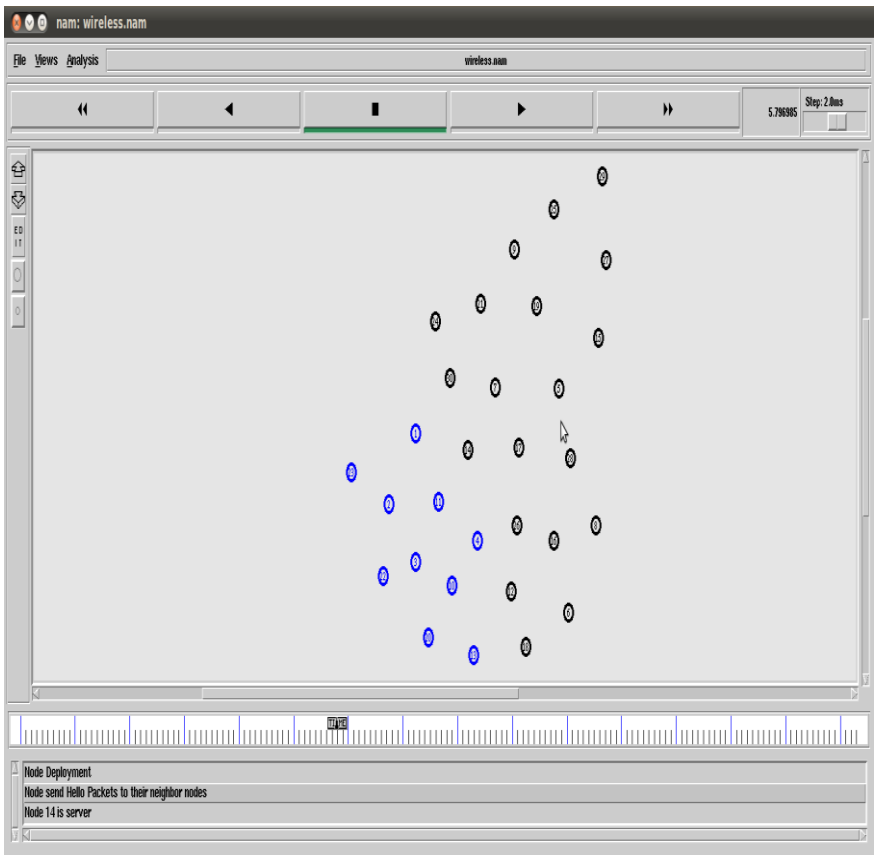

Fig. 1 Node Deployment

The sensor networks are more effectively used to monitor the environment and to detect whereas to classify targets of interest. The effectiveness of these networks are varied and determined to a very large extent by the coverage that was provided by the sensor deployment. The positioning of sensors affects the coverage, cost, and the resource management. The algorithm with a low computation found to be overhead and improves the coverage for a given number of sensors within a cluster in cluster-based sensor networks.

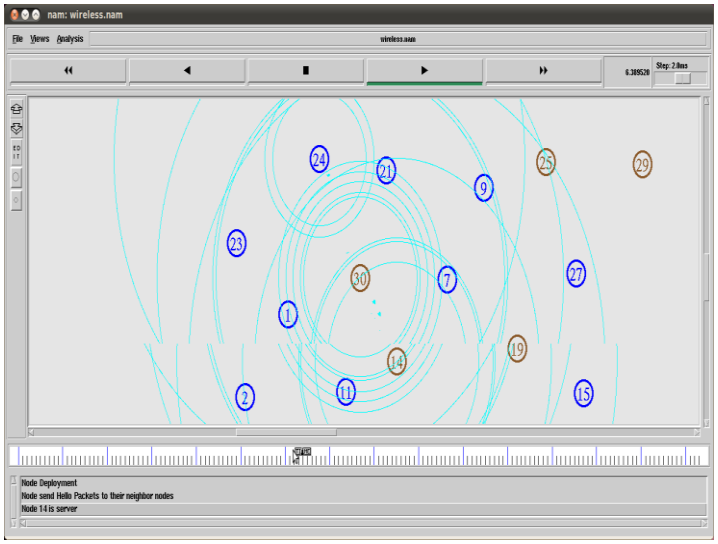

Fig. 2 Data Transmission

The diffusion model is found to be allowing the intermediate nodes that locally transform all the data. Caching and aggregation also increases the efficiency, scalability of the coordination. And locally the data can be accessed by other sinks with the lower energy consumption. The data naming local transmission features captures the data-centricity and application specificity that is possible in sensor networks.

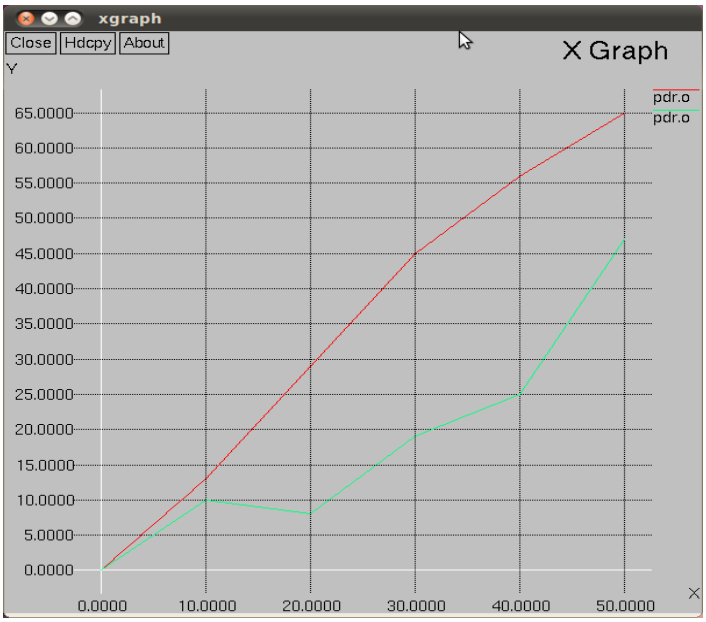

Fig. 3 Performance Comparison of Existing with Proposed

The graph generated using is shown in figure 3. As it can be seen this protocol gives high throughput as routing is based on combined weight of energy as well as the distance.

VI. CONCLUSION

Developing an efficient protocol is urgent for a wireless sensor network. In this paper, we proposed a DOF, a duplicate-detectable unsynchronized low-power opportunistic that is adaptive to various traffic loads. DOF mainly solves the channel degradation problem incurred by the large amount of duplicates in traditional opportunistic forwarding and retains the benefits of the opportunistic routing as much as possible. Energy

efficient protocol was presented with the use SHA 1 secure routing is achieved which suppresses any modified packets by malicious nodes. As seen in the results, this protocol fairs well in terms of energy usage and also helps in extending the network lifetime. By analysis we can say that by optimizing the energy consumes, and can achieve a high throughput and high message delivery ratio.

VII. FUTURE SCOPE

In this paper, we observed the duty cycled for a node as a function of its distance to the various sink to minimize the expected energy consumption for convergecast traffic patterns. Depending on our analysis, we have developed the duty cycle algorithms. Simulation results show that both methods decrease energy consumption compared with the constant duty cycle method. This analysis was found to be extended as future work in order to improve the performance of distance-based duty cycle assignment in heavy traffic scenarios, by taking the packet collisions and contention into account.

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