Review of Design an Implementation of Energy Aware Routing Protocol in WSN

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***Abstract*— we propose an energy efficient data forwarding protocol called Energy Aware Geographic Routing Protocol (EAGRP) for wireless sensor networks to extend the life time period of the network. In EAGRP, both position information and energy are present at nodes used to route packets from sources to destination. The routing design of EAGRP is based on two parameters: location and energy levels of nodes. Each node knows the location and energy level of its neighbour's node. The performance measures have been analyzed with multiple numbers of nodes. The simulations were carried out for variable number of nodes. The proposed protocol was compared with Greedy Perimeter Stateless Routing (GPSR). Simulation results show that EAGRP performs competitively against the (GPSR) in terms of packet delivery ratio, throughput, energy consumption, and delay. Consequently, it can be concluded that EGARP does efficiently and effectively extend the network lifetime period by increasing the successful data delivery rate.**

***IndexTerms*— Routing protocol, Wireless Sensor Networks, Energy aware, Position information, Life time.**

I. INTRODUCTION

Wireless sensor networks (WSNs) are being used in a different variety of critical applications such as military and health-care applications. WSNs are deployed densely in a variety of physical environments for accurate monitoring. Therefore, order of receiving sensed events is important for correct interpretation and knowledge of what actually is happening in the area being monitored. Similarly, in detection applications (alarm application), response time is the critical performance metric. On detection of intrusion, alarm must be signaled within no time. There should be a mechanism at node for robust communication of high priority messages. This can be achieved by keeping nodes all the time powered up which makes nodes out of energy and reduces network life time period. Also, there can be a node failure that leads to reconfiguration of the network and re-measures of the routing paths, route selection in each communication pattern results in either message delay by choosing long routes network lifetime by choosing short routes resulting in depleted power source. Therefore the solutions for such environments should have a mechanism to provide low latency, flexible and fault tolerant communication, quick reconfiguration and minimum consumption of energy. Many routing protocols have been designed to address all of the above problems but each of them is more suitable in some conditions (having better performance), while not suitable in other situations; having significant limitations. Therefore, it is critical to assess routing protocols for critical monitoring applications. Hence, to achieve effective communication, it is required to identify the delivery demand for the communication and to choose a suitable routing protocol. To calculate the suitability and performance of any given protocol, some metrics are required. On the basis of these metrics any protocol can be assessed against its performance. These types of networks, which are composed of sensor nodes with limited memory capacity, limited processing capabilities, and most importantly limited energy resources, require routing protocols that take into consideration these constraints. Routing protocols have a important role in most of these activities. Position- based protocols are most commonly used in sensor networks as most of the routing protocols for sensor networks require location information for sensor nodes.

II. LITERATURE REVIEW

Haixia Zhao [1] this paper researchers Geographical and Energy Aware Routing (GEAR) is an efficient routing protocol in wireless sensor networks (WSN). It behaves well in the face of routing attacks, but it is incapable of defending unnecessary routing information, cyber attack and selective forwarding. Aimed at this problem, this paper present a position pair wise keys bootstrap scheme based secure geographical and energy aware routing protocol (SGEAR).

G. Simon [2] this paper contains Wireless Sensor Network consists of small miniaturized motes which gather information about their vicinity and collaborate with each other through wireless link. These motes are mostly deployed in a harsh environment and left unattended for the duration of their lifetime. Hostility of the environment and physical intervention possess various threats to these energy-thirsty sensor motes which results in severe catastrophic affects. In this paper provided a brief overview of denial of service attacks at various layers and proposed countermeasures available in literature and our proposed solutions in Wireless Sensor Network.

J. Yick [3] this paper survey Target tracking in wireless sensor networks requires efficient coordination among wireless sensor nodes. Previous methods have focused on tree-based collaboration, selective activation, and group clustering. In This paper presents a prediction-based adaptive algorithm for tracking mobile targets. We use adaptive Kalman filtering to predict the future position and speed of the target. This position prediction is used to determine the active tracking region which corresponds to the set of sensors that needs to be "lighted".

D. Vergado [4] in this paper the distributed nature and dynamic topology of WSNs introduces very special requirements in routing protocols that should be met. The most important feature of a routing protocol, in order to be efficient for WSNs, is the

power consumption and the extension of the network's lifetime. During the present years, many energy efficient routing protocols have been proposed for WSNs. In this paper, energy efficient routing protocols are classified into four main schemes: Network Structure, Communication Model, Topology Based and Reliable Routing. The routing protocols belonging to the first category can be further classified as hierarchical.

A.K.M. Muzahidul Islam [5] this paper focuses on time-efficient data congregation protocols on a variable Cluster-based Wireless Sensor Networks. The CBWSN is self-designed and re-configurable, thus capable of performing two dynamic operations: node-move-in and node-move-out. In this paper two efficient congregation techniques for Dynamic CBWSN. In order to facilitate the efficient congregation protocols author propose an improved cluster-based structure. In this structure, author first construct a communication highway, and then improve the cluster-based structure to facilitate efficient congregation protocols such that the nodes of the network can gives inter and intra cluster communications efficiently. We also study the time complexity of the routing protocols.

Y. Xu, J. Heideman [6] this paper introduce a geographical adaptive fidelity (GAF) algorithm that reduces power consumption in ad hoc wireless networks. GAF save energy by identifying nodes that are equivalent from a routing perspective and then turning off bogus nodes, keeping a constant level of routing fidelity. GAF moderates this policy using application- and system-level information; nodes that source data remain on and intermediate nodes monitor and balance energy use. GAF is independent of the underlying ad hoc routing protocol; we simulate GAF over unmodified AODV and DSR. Analysis and simulation studies of GAF show that it can consume 40% to 60% less power than another ad hoc routing protocol.

K. Kar [7] this paper present a new algorithm for routing of alerts in ad-hoc networks where the nodes are energy-constrained. The routing objective is to increase the total number of packet that can be successfully sent over the network without knowing any information regarding future packet arrivals or packet generation rates. From a theoretical perspective, it show that if admission control of packet is permitted, then the worst-case performance of this algorithm is within a factor of O(log(network size)) of the best achievable solution. In other words, our algorithm achieves a logarithmic competitive ratio. Approach provides sound theoretical backing for several observations that have been made by early researchers.

Bashir yahya [8] This paper presents increasing demand for real-time applications in Wireless Sensor Networks (WSNs) has made the Quality of Service based communication protocols an interesting and hot research topic. Satisfying Quality of Service requirements e.g. bandwidth and delay constraints for the different Quality of Service dependent applications of WSNs raises significant challenges. More precisely, the networking protocols need to cope up with energy constraints, while providing precise Quality of Service guarantee. Therefore, enabling Quality of Service applications in sensor networks requires energy and Quality of Service awareness in different layers of the protocol stack.

III. Conclusion

In this paper, a geographic routing through the greedy forwarding has been proposed and evaluated. In greedy forwarding uneven load distribution results in heavily loaded nodes to reduced faster as compared to other nodes. This causes few over-utilized nodes which may fail and result in formation of holes in the network, resulting in more packet loss. So there is a need for an of such energy efficient routing strategy that should stabilise the load of the network and prevent the holes formation. Many excellent protocols have been developed for ad hoc networks. However, sensor networks have additional requirements that were not specifically addressed in those researches. This paper we proposed new routing algorithm called EAGRP for efficiently and reliably routing data packets from source nodes to sink through a multi-hop WSN. EAGRP was compared with GPSR. Simulation experiments were carried out for different number of nodes using different evaluation metrics as shown in Table I. Simulation results show that, EAGRP performs competitively against the GPSR in terms of packet delivery ratio, throughput, energy consumption, and delay. Thus, it can be concluded that EGARP does efficiently and effectively increase network lifetime by increasing successful data delivery rate. Successful packet delivery ratio of EAGRP is about 93% in average compared to 87% for GPSR. The improvement in the throughput for EAGRP compared to GPSR is 10%.The improvement in energy consumption for EAGRP versus GPSR is 14%. Finally, the percentage improvement in the end to end delay for EAGRP compared to GPSR is 12%.

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