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Augmentation in the Network Life Period by Teen Protocol in Wireless Sensor Network

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ABSTRACT

WSNs are used in environmental monitoring, security, medical applications, etc. The sensor nodes are usually randomly deployed in a specific region. These sensor nodes collect their data and send it to the Base Station (BS) via some routing protocol. These nodes cannot be recharged from time to time to keep them alive. They must follow a protocol which must ensure the efficient use of their power, so that those nodes may serve as long as possible without any external assistance. A routing technique plays a key role in their energy consumption. Many of the routing protocols use clustering as their routing technique. So clustering plays a very important role in prolonging the stability period and network life time. In this work, we propose an energy efficient multipath routing algorithm in WSN. This protocol is designed to improve the latency, resiliency and efficiency through discovering multiple paths from the source to the destination

1. INTRODUCTION

A wireless sensor network is a collection of sensor nodes with limited power supply and constrained computational and transmission capability. Due to the limited transmission and computational ability, and high density of sensor nodes, forwarding of data. Therefore routing in wireless sensor networks has been an important area of research in the past few years. The sensor nodes run on non-rechargeable batteries, so along with efficient routing the network should be energy efficient with efficient utilization of their sources and hence this is an important research concern. Advances in wireless Technologies and evolution of low cost sensor nodes have led to introduction of low power wireless sensor networks. Due to multiple functions and ease of deployment of the sensor nodes it can be used in various applications such as target tracking, environment monitoring , health care, forest fire detection, inventory control, energy management, surveillance and reconnaissance, and so on [1]. The main responsibility of the sensor nodes in a network is to forward the collected information from the source to the sink for further operations, but the resource limitations [2], unreliable links between the sensor nodes in combination with the various application demands of different applications make it a difficult task to design an efficient routing algorithm in wireless sensor networks

2. ROUTING IN WSN:

A wireless sensor network (WSN) can be defined as a network of (possibly low-size and low complex) devices denoted as nodes that can sense the environment and communicate the information gathered from the monitored field (e.g., an area or volume) through wireless links; the data is forwarded, possibly via multiple hops relaying, to a sink (sometimes denoted as controller or monitor) that can use it locally, or is connected to other networks (e.g., the Internet) through a gateway.

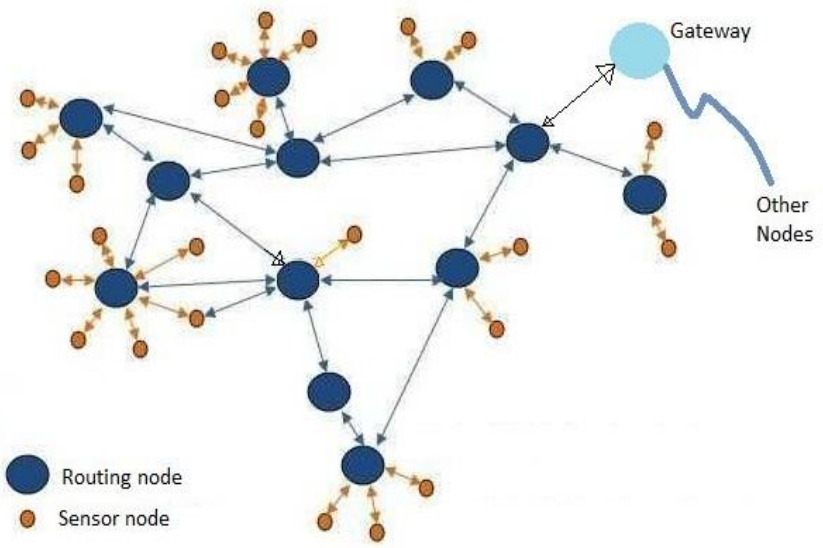

Fig.1: Typical WSN

3. REACTIVE NETWORKS

In this scheme the nodes react immediately to sudden and drastic changes in the value of a sensed attribute. These types of networks are well suited for time critical applications. Recent advances in wireless sensor networks have lead to many new protocols specifically designed for sensor networks where energy awareness is an essential consideration. But approaches like Direct Communication and Minimum Transmission Energy [27] do not guarantee balanced energy distribution among the sensor nodes. In Direct Communication Protocol each sensor node transmits information directly to the base station, regardless of distance. As a result, the nodes furthest from the BS are the ones to die first [28]. On the other hand, in case of Minimum Transmission Energy routing protocol data is transmitted through intermediate nodes. Thus each node acts as a router for other nodes' data in addition to sensing the environment. Nodes closest to the BS are the first to die in MTE routing. So far, cluster-based technique is one of the approaches which successfully increases the lifetime and stability of whole sensor networks. We classified most important energy efficient routing techniques based on various clustering attributes like cluster formation and data gathering process. Figure 2 is a hierarchical diagram of different routing protocols which are widely used in WSN.

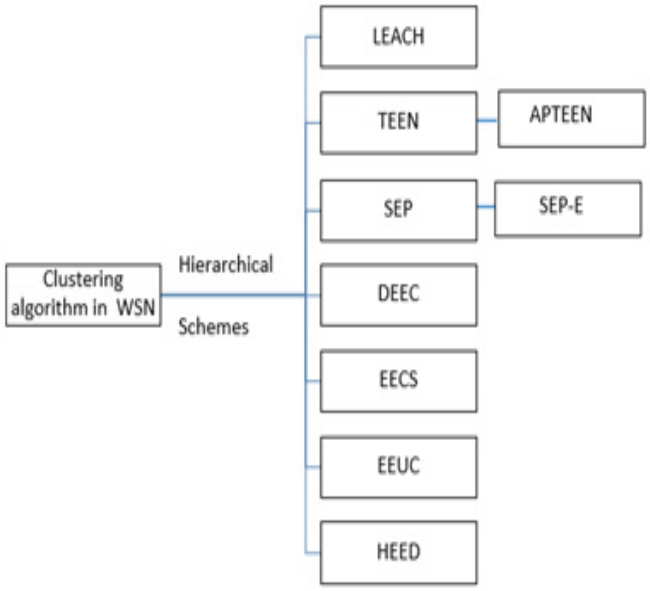

Fig.2: Classification of widely used clustering schemes in WSN

4. TEEN

In 2001, A. Manjeshwar and D. P. Agarwal [36] proposed Threshold sensitive Energy Efficient sensor Network Protocol (TEEN) protocol. Closer nodes form clusters, with cluster heads to transmit the collected data to one upper layer. Forming the clusters, cluster heads broadcast two threshold values. First one is hard threshold; it is minimum possible value of an attribute to trigger a sensor node. Hard threshold allow the nodes to transmit the event, if the event occurs in the range of interest. Therefore a significant reduction of the transmission delay occurs. Unless a change of minimum soft threshold occurs, the nodes don't send a new packet of data. Employing soft threshold prevents from the redundant data transmission. Since the protocol is to be responsive to the sudden changes in the sensed attribute, it is suitable for time-critical applications.

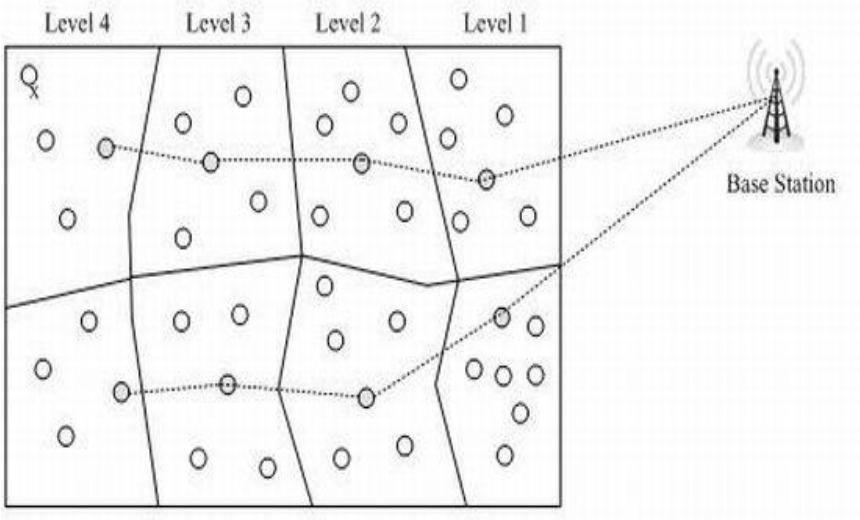

Fig.3: each cluster node is connected to BS

5. ENERGY CONSIDERATIONS

During the creation of an infrastructure, the process of setting up the routes is greatly influenced by energy considerations. As the transmission power of a wireless radio is directly proportional to the distance squared or even higher order in the presence of obstacles, multi-hop routing will consume less energy than direct transmission. However, multi-hop routing incurs significant overhead for management in topology and medium access control. Direct routing would perform well enough if all the nodes.

CONCLUSION

To evaluate the performance of our protocol, we have implemented it on the MATLAB simulator with the integrated model of Advance teen protocol. Our goals in conducting the simulation are as follows: Compare the performance of the TEEN and LEACH protocols on the basis of energy dissipation and the longevity of the network. Study the effect of the soft threshold ST on TEEN. The simulation has been performed on a network of 20 nodes and a fixed base station. The nodes are placed randomly in the network. All the nodes start with a some initial energy. Cluster formation is done as in the leach protocol. However, their radio model is modified to include idle time power dissipation (set equal to the radio electronics energy) and sensing power dissipation (set the radio electronics energy). The idle time power is the same for all the networks and hence, does not affect the performance Comparison of the protocols I have explored the Architecture of TEEN protocol and designed a algorithm for improving their network life time and energy consumption.

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